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# Pension Reform, Fiscal Policy and Economic Performance

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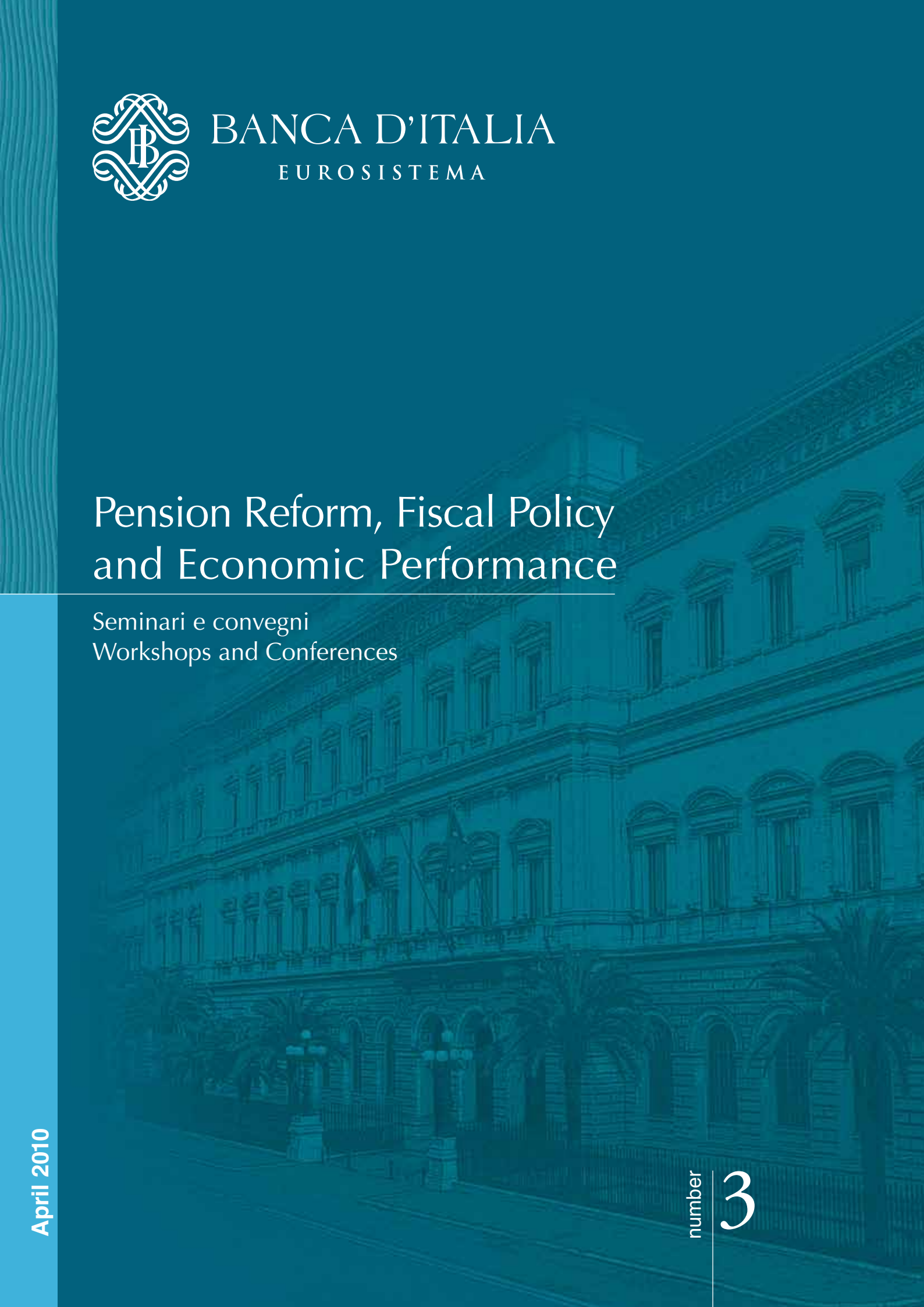

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*Earlier versions of the papers in this volume were presented at the Banca d'Italia workshop on* "Pension Reform, Fiscal Policy and Economic Performance" *held in Perugia, S.A.Di.Ba., on 26-28 March, 2009. We wish to thank the staff of S.A.Di.Ba. for their assistance in all aspects of the organization of the workshop.*

*Previous Public Finance workshops have addressed the following topics:*

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STRUCTURAL ECONOMIC ANALYSIS DEPARTMENT

PUBLIC FINANCE WORKSHOP

# Pension Reform, Fiscal Policy and Economic Performance

Papers presented at the Banca d'Italia workshop
held in Perugia, 26-28 March, 2009

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# FOREWORD

*Daniele Franco*[*]

This volume brings together the papers presented at the 11th Banca d'Italia Public Finance Workshop, held in Perugia from 26 to 28 March 2009.

The workshop examined the issue of pension reform with the aim of highlighting the recent analytical developments and the most important policy issues. It discussed the implications of pension reforms for labour supply, retirement decisions and labour mobility, as well as their impact on saving and investment decisions and financial markets. It considered how changes in the design of pension systems impact on income distribution within and across generations. It also examined the effects of reforms on macroeconomic developments. Finally, it appraised the political economy of pension reforms, their contribution to the achievement of fiscal policy goals and the role of pension rules in fiscal policy frameworks.

Banca d'Italia is grateful to the institutions which contributed to the success of the initiative, to the experts who provided research papers and to all who came to Perugia to take part in the discussions.

This volume extends the analysis of fiscal policy issues carried out in the previous workshops, which were devoted to *Indicators of Structural Budget Balances* (1998), *Fiscal Sustainability* (2000), *Fiscal Rules* (2001), *The Impact of Fiscal Policy* (2002), *Tax Policy* (2003), *Public Debt* (2004), *Public Expenditure* (2005), *Fiscal Indicators* (2006), *Fiscal Policy: Current Issues and Challenges* (2007) and *Fiscal Sustainability: Analytical Developments and Emerging Policy Issues* (2008).

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# INTRODUCTION

*Daniele Franco,[*] Maria Rosaria Marino[*] and Pietro Tommasino[*]*

Over the last decades, pension systems have been reformed in most developed countries. Further reforms are under way or are being discussed. Changes are prompted by the need to adjust pension arrangements to the new demographic, economic and social conditions, while trying to safeguard the essential achievements of social protection schemes: the possibility to transfer resources to the after-retirement part of life, the reduction of the risk of outliving one's resources, and the decline of poverty among the elderly.

Pension reforms are mostly driven by the need to control outlays. Most developed countries are ageing: the ratio of the elderly-to-working age population has already reached historically unprecedented levels and is projected to increase further. The ageing process is driven by progress in life expectancy and low fertility rates. Demographic changes increase the demand for transfers and services for the elderly. Public pension schemes bear much of this pressure. In spite of the reforms introduced over the last twenty years, the ratio of pension expenditure to GDP is still expected to rise in most OECD countries. In the euro area it is set to increase from 11 per cent of GDP in 2007 to a peak of 13.9 per cent in 2053. While the reform debate largely reflects the concern about these long-term expenditure developments, with the sustainability of PAYG systems being frequently questioned, policy changes are sometimes also invoked in order to improve budget balances over the short and medium term.

Reforms may also try to counter the adverse effects of the pension system on the labour market and to improve the distributive effects related to the composition of public spending. Over recent decades, while life expectancy increased, the participation rates of the elderly fell significantly in most industrialised countries. The average effective retirement age is about 60 in most European countries. One explanation for the low participation rates in Europe is that PAYG systems are not neutral with respect to the retirement decision. Indeed, in many countries social security provisions are such that the pension wealth of a worker decreases with the age of retirement. Even if the trend towards lower activity rates seems to have come to a halt, the present levels of participation rates are considered too low in view of the ageing process. There is also a growing awareness that, in order to achieve higher employment rates, countries need both to improve the design of pension schemes and to take action in the labour market.

The surge in pension spending has contributed to improve the economic conditions of elderly citizens, traditionally one of the groups most subject to high poverty. Poverty rates for older citizens have dropped and are now similar to the population average: in some European countries they are actually lower than for younger people. This has led to the question whether more public resources should be channelled to welfare programs targeting the needs of other social groups. The rise in the ratio of pensioners to the active population could lead to an increase in contribution rates and compress the resources available for other potentially problematic groups of citizens.

All pension reforms basically tackle one issue: how to grant adequate living standards to an increasing number of elderly citizens without imposing an excessive burden on the public finances. However, very different approaches have been implemented: from parametric changes to traditional PAYG public schemes to the introduction of new pension formulas (such as notional funding) in PAYG schemes, to the development of funded schemes. Even within the same broad line of reform, the specific changes introduced are usually significantly different from country to country, reflecting national traditions, problems and priorities.

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While the need for changes in pension rules is often widely recognised, the introduction of reforms is usually politically difficult. This reflects the importance of pension systems in all developed countries. Most citizens either contribute to finance them or draw benefits from them: individuals' plans and decisions are influenced by social security rules over a large part of their lifetime. Pension systems absorb sizeable public resources, influence the labour and capital markets, and affect income distribution both within and across generations. These features make reforms an extremely complex task.

All reforms are likely to hurt some categories of citizens or some generations, in terms of cuts to their social security wealth or a higher tax burden. Reforms can however improve the incentive structure of the pension system. The removal of distortions, such as the incentive to retire early, can have positive effects on economic growth. Reforms should both ensure the macroeconomic sustainability of pension systems and improve their microeconomic features.

Pension reforms represent an interesting test to evaluate the ability of each country to adjust its institutions to the new developments, manage complex long-term problems and reconcile multiple objectives. Interestingly, the need to reform pension systems has spurred the development of new policy solutions, such as bipartisan committees, and new technical tools, such as long-term projections. International organisations and the European Commission have played an active role in the pension policy debate and helped to elicit government preferences, widen the technical discussion on the issue and improve the availability of information to assess the sustainability of the public finances.

The papers presented at the workshop were organized in four sessions, mirrored by the sections in this volume. Section 1 examines the impact of pension reforms on the labour market and their implications for investments in human capital and productivity growth. Section 2 is devoted to the impact on capital markets, and specifically to the effects of the increasing role of funding. Section 3 considers how changes in the design of pension systems impact on income distribution within and across generations. The analysis is complemented by comments on some macroeconomic implications of the reforms. Section 4 deals with the political economy of pension reforms and their role in the broader fiscal policy context.

## 1 Pension reform and the labour market

Section 1 includes papers dealing with the interaction between pension system design and labour market functioning.

In their paper, El-Mekkaoui De Freitas and Oliveira Martins address four empirical puzzles concerning the life-cycle theory: i) an excessive (relative to what theory predicts) consumption drop at retirement; ii) an excessive amount of savings in old-age; iii) the lack of a clear negative relationship between the generosity of PAYG systems and private saving rates; and iv) the lack of a positive relationship between increases in longevity and increases in saving ratios. The authors try to shed new light on these puzzles with a blend of theory, informal reasoning and empirical analysis. First, they set up a 2-period OLG model in which the relationship between longevity and saving ratios can be either positive or negative. Second, they argue that a change in the preference structure in old age (namely, a decrease in the demand for private consumption goods and an increase in the demand for health-related and other "welfare" goods), if coupled with a generous public pension and health system, can explain both the drop in consumption at retirement age and the excess savings after retirement. Finally, they argue that the relationship between the size of PAYG systems and private savings may also depend on the size of the healthcare system. Regression analysis on a panel of 18 OECD countries seems to be consistent with the proposed explanations of the four puzzles.

In his contribution, Paul Rodway summarizes and updates recent work done at the New Zealand Treasury on the New Zealand public pension scheme. The scheme provides a flat rate, universal, non-means-tested pension benefit. Early-retirement provisions are basically absent and pensions are paid even if individuals continue to work after the eligibility age. The paper shows, using aggregate data, that participation at older ages tends to decrease in response to reductions in the minimum eligibility age, and vice versa. Furthermore, using survey data, it documents that receiving pension benefits significantly and negatively affects the chance of being in the labour force. All in all, it appears that the New Zealand superannuation scheme, despite having no explicit financial disincentives, for many senior workers is still a barrier to continued participation in the labour market.

Ahuja and Paserman discuss recent pension reforms aimed at prolonging working lives in the 27 member states of the European Union. Indeed, in the framework of the so-called Open Method of coordination, member countries have agreed on a set of common policy objectives concerning social protection systems. In particular, promoting longer working lives is a policy priority. To this end, a number of countries have legislated increases in the minimum retirement age (albeit often with a long phase-in period). Some countries have also introduced actuarial reductions for those retiring before a "normal" retirement age and/or actuarial premia for those postponing retirement after that age. Legal obstacles to receiving pensions while continuing to work have also been reduced while the link between the amount of benefits and that of contributions have been strengthened. Finally, access to early retirement schemes and unemployment benefit schemes specifically targeted at older workers has been restricted. The authors document that, partly as a result of these reforms, the employment rate for older workers (55-64) increased from 37 to 45 per cent during the 2001-2008 period. However, they argue that to benefit to the full from pension reforms, it is also necessary to sustain the demand for older workers through lifelong learning policies and incentives for employers.

Argimón, Botella, González and Vegas estimate the impact of social security wealth and the rules for the calculation of benefits on the transition to retirement in Spain. They use data on the employment and contribution histories of a sample of men aged between 60 and 70, drawn from a large administrative data set (all the individuals in the sample were in principle able to retire, according to the rules of the Spanish system). Using these data, they build measures of social security wealth and proxies for the financial incentive to retire implicit in the rules for benefit calculation (among such proxies are the replacement rate and the change in the social security wealth of workers who decide to postpone retirement by one year). Lastly, they estimate a duration model in which the dependent variable is the length of the period between the moment at which a person becomes entitled to a pension and the moment at which the pension is actually claimed. The results show that this period is shorter for larger pensions. Moreover, workers tend to postpone retirement if they are compensated with a suitably higher flow of pension payments. The paper also overviews the main implications of the current crisis for pensions. In particular, the authors argue that the rise in unemployment may severely affect the future pensions of young workers. It may also push older workers into early retirement and hamper the implementation of reforms aimed at reducing pension expenditure. Finally, it may dent the pension wealth accumulated in funded schemes.

Arpaia, Dybczak and Pierini build a comprehensive data set of the pension reforms legislated in the EU between 1990 and 2006. They classify the reforms in three broad classes: fundamental changes to the old-age scheme (*i.e.*, changes in the way the pension system is financed and/or in the eligibility conditions), non-fundamental changes to the old-age scheme and changes to early retirement schemes. They use the reform data set to conduct a "policy experiment" to assess the effects of such reforms on participation rates. It turns out that the benefits of reforms are somewhat elusive and depend on the age bracket, the gender and the nature of the reform. The effects are

often non-significant and/or negative. The authors conclude that it is crucial, in order to maximize the labour market effects of pension reforms, to provide enough information to workers and to avoid lengthy and uncertain phase-in periods.

In his contribution, Kovács describes the challenges the Hungarian pension system is currently facing, and discusses the possible policy solutions. The Hungarian system underwent a structural reform in 1997. It now has two mandatory pillars: a defined-benefit PAYG system and a fully-funded defined-contribution scheme. The first problem discussed in the paper is the very high number of disability pensioners below retirement age limit (currently around 10 per cent of the active population). This problem dates back to the political transition out of socialism, which caused a sharp rise in the unemployment rate. In fact early retirement and disability pensions were used as a way to cushion the social costs of the transition. The second problem – also related to the functioning of the labour market – is the low contribution density. The author concludes that the time is ripe for an open debate about what changes to the pension rules are best suited to foster labour market participation in Hungary.

Commenting on El-Mekkaoui De Freitas and Oliveira Martins, Clemens suggests that the existence of a bequest motive and the possibility to change labour supply in the face of unexpected changes in longevity might both have a role in explaining the empirical problems encountered by the life-cycle theory. He also suggests that a decline in the demand for private goods at older ages could attenuate the welfare effect of the slowdown of growth due to ageing. Commenting on the paper by Rodway, he argues that New Zealand employment patterns are not surprising, given that even a flat-rate non-means-tested scheme can discourage labour supply, as it is implicitly a tax on labour. Moreover, the fact that willingness to work decreases in the presence of pension benefits can be attributed to an income effect. Concerning policy options for the future, he supports increases in the eligibility age (possibly linked to changes in life expectancy), while he remains sceptical about increasing the role of funded pension schemes. He also argues that the rise of single-person households is likely to reduce spending automatically, as willingness to work seems to decrease for those having a non-working spouse.

In commenting on the papers by Argimon *et al.* and Ahuja and Paserman, Jędrzejowicz points to two potentially important issues: involuntary retirement and minimum pension guarantees. In particular, he argues that generous minimum pension guarantees may have an impact on labour supply at older ages, even if its direction and magnitude are still the subject of debate in the empirical literature. He also adds further elements to the list of pros and cons of funding featured in the paper by Ahuja and Paserman: on the one hand, he highlights the political economy advantages of pension reforms based on funding (as they are more difficult to revert); on the other, he points to the significant risks inherent in investing on financial markets. Finally, Jędrzejowicz briefly describes the current challenges to the Polish pension system, mostly related to the labour market effects of some of its rules (e.g., the low retirement age for women and the insufficient accumulation of pension rights for many low-wage workers with discontinuous careers).

As regards the paper by Kovács, Köhler-Töglhofer points out that Hungary's problems are similar to those of other countries: even if in Europe there has been, on average, a significant rise in older workers' participation rates in the last decade, many countries have lagged behind. As regards the paper by Arpaia *et al.*, she points out that reform packages often include very heterogeneous reform measures. Thus, from a policy perspective, it would be important to check for the labour supply impact of specific measures or factors. She notes that the lack of any clear-cut short-term impact of reforms might be due to the fact that people do not change their plans quickly when the system changes. Moreover, reforms may have long phasing-in periods.

## 2 Pension reform and capital markets

Section 2 is devoted to the impact of pension reforms on the capital market and in particular to the effects of the increasing role of funding.

Draper and Westerhout study the effects of the introduction of a fully-funded DB pension scheme in the context of an OLG model, in which the rate of return on equity is stochastic and labour supply is endogenous. In the model, households have a finite life of uncertain length; there exists a pension fund which receives contributions from working generations and pays pensions to retired generations; households are obliged to participate in this pension fund. Pension benefits relate to the individual's labour history, but are unrelated to both capital market rates of return and the length of life: shocks to pension wealth are absorbed by changing the contributions that the pension fund levies upon working cohorts. In such a model, a trade-off emerges between the welfare improvement due to an increased degree of market completeness (as the pension scheme protects against longevity risks and financial market risks) and the welfare decrease due to labour supply distortions (to protect pensioners against adverse fluctuations of financial markets, a tax on labour is implicitly levied on workers; moreover, this tax burden is sub-optimally distributed through time). However, the authors propose a calibrated version of the model in which the introduction of the pension scheme turns out to improve welfare significantly.

Gillingham, Leive and Tuladhar describe the various ways in which the financial market crisis might affect workers, pension funds and governments. In 2008 the impact of the stock market decline on global pension assets was substantial (roughly 40 per cent, according to the authors' estimates for the G20 countries). Some individuals, especially those near to retirement, may have been severely affected. However, the authors note that, in most countries, the richest part of the population was disproportionately affected by the losses. Moreover, they used a simulation to show that the performance of individual accounts over the past 45 years has been quite satisfactory, even if internal rates of return differ markedly across cohorts. DB pension plans were affected by the crisis as well, since their assets/liability ratio declined sharply; therefore they could be obliged to increase contributions and/or cut benefits in order to restore an adequate level of funding. Governments will also be affected by the fall in asset prices: indeed, they often provide guarantee schemes that offer insurance against the loss of assets in private DB plans due to employer insolvency; in addition, some governments also guarantee minimum benefits or minimum rates of return to defined-contribution pension plans. Finally, there is the possibility that governments will be forced by strong political pressures to compensate pension plans for at least a portion of the reductions in asset value they suffered. The authors warn that in no case should government responses compromise fiscal sustainability.

Moreno and Santos argue that demographic changes and the degree of funding of the pension system can influence savings rates, the current account and financial development in emerging market economies (EMEs) in several ways. Their first point is that theory predicts a negative link between dependency ratios on the one hand and both savings and investment on the other Moreover, available empirical evidence suggests that the current account tends to improve when the dependency ratio decreases. This is obviously important for economies which are projected to suffer from population ageing in the coming years (for example, China). Their second point is that the positive link between the degree of funding of the pension system and saving rates is likely to be weaker than predicted by theory due to several factors, such as the lack of financial literacy. Therefore, reforms aimed at privatizing pensions, which are discussed in many EMEs, might be less beneficial than expected. Their last point is that in many EMEs there is a positive correlation between the degree of funding and financial development, and that a higher degree of financial development could in turn reduce current account surpluses: this could provide the

benefits that some EMEs have sought from foreign exchange market intervention and foreign reserve accumulation, without the associated disadvantages.

The paper by Rofman, Fajnzylber and Herrera describes the recent pension reforms adopted by Argentina and Chile. The procedures and results of these reforms and the reasons for them are different, although they share some characteristics. The structural reforms of the 1980s and 1990s sought to improve the long-term fiscal sustainability of the pension systems and their institutional design, while transferring part of the economic and social risks from the government to participants. However, in recent years the authorities in both countries identified the insufficient coverage among the elderly and the inadequacy of benefits as the most critical problems. As a result of differences in political economy and institutional constraints, the responses were different. In Chile, a long and participatory process resulted in a far-reaching reform that focused on the medium term results through a carefully calibrated adjustment. In Argentina, instead, reforms were adopted through a large number of successive normative corrections, with little public debate about their implications and immediate impact on coverage and the public finances. The slower stepwise approach taken by Chile's authorities will probably ensure better outcomes and more sustainable results than in Argentina. On the other hand, Argentina's bolder and faster reforms resulted in an immediate response to a current problem. Most of the elderly excluded from the system received a pension benefit within a year, improving their welfare immediately, while in Chile the process of reaching all beneficiaries will be more gradual.

Rezk, Irace and Ricca carried out an analysis of fully-funded pension regimes based on individual accounts implemented since the 1980s in six Latin American countries (Argentina, Chile, Colombia, Mexico, Peru and Uruguay), in order to ascertain whether they were conducive to increasing aggregate savings and helped to strengthen domestic stock markets. To this end, they used a version of the life-cycle model. The authors also studied the impact on private savings of a group of economic and demographic variables which the related literature usually links to the performance of both defined-benefit and defined-contribution pension systems. The impact of individual accounts systems upon aggregate private savings was assessed under different scenarios such as: homogeneous and heterogeneous individuals, voluntary and compulsory contributions and loose and tight borrowing constraints. The theoretical analysis made it possible to prove that only under mandatory contributions and operating liquidity restrictions would private savings be unambiguously increased by pension fund assets.

The paper by Cuevas, González, Lombardo and López-Marmolejo explores how privatizing a pension system can affect sovereign credit risk. The authors analyze the importance that rating agencies give to implicit pension debt (IPD) in their assessment of sovereign creditworthiness. They show empirically that financial analysts judge IPD and financial public debt differently as a consequence of their understanding of the intrinsic differences between the two, but this could also reflect myopia on the financial analysts' side, possibly due to their not being fully aware of the obligations entailed by IPD. The authors find that rating agencies generally do not seem to give much weight to IPD, focusing instead on explicit public debt. However, by channelling pension contributions away from the government and creating a deficit of resources to cover the current pension liabilities during the reforms' transitional periods, pension privatization reforms may transform IPD into explicit public debt, adversely affecting a sovereign's perceived creditworthiness, thus increasing its risk premium. The apparent lack of attention paid to IPD in the assessment of sovereign creditworthiness could be an indication that markets, though concerned over contingent liabilities, simply do not trust the available measures of IPD, which are subject to considerable error. In this light, accompanying pension reforms with efforts to offset their transition costs through fiscal adjustment would help preserve a country's credit rating. Should a government lack any room to implement the needed fiscal adjustments, it might be preferable to

follow a gradual parametric approach to improve the sustainability of the PAYG pension system before undertaking the transition to a fully-funded system.

The paper by Leiner-Killinger, Nickel and Slavík addresses the risks for public finances associated to moving to funded pension systems in a volatile economic environment, such as that of the new EU Member States. The authors take stock of the available data on pension assets and combine them with data on inflation and other financial market developments. They argue that risks for the public finances stem only partially from potentially large variations in pension incomes due to stock market developments, as the share of pension funds invested in stocks tends to be comparatively small. The risks are higher for those new Member States where the limited diversification of assets and the relatively large fraction of total assets held in government debt securities limit the possible positive impact from systemic pension reforms. Should pension incomes turn out to be inadequate, governments might be induced to step in, thus implying a smaller reduction in the general government budget burden than anticipated. As a consequence, while maintaining multi-pillar pension systems remains of the utmost importance, a wider diversification of assets and better financial knowledge are decisive.

Commenting on the Draper and Westerhout paper, Afonso claims that the privatization message and its implications were not too clear in the article and wonders if the absence of perfect capital markets would cause significant changes. He also points out that some sensitivity analyses making use of calibration parameters would be useful to see to what extent some results still hold. Afonso asserts that the paper by Gillingham, Leive and Tuladhar provides input for some questions and further thinking on how governments should react in a crisis in terms of supporting the losses suffered by pension funds. He then argues that pragmatism should help and prevail when dealing with the problem of allowing past private profits to become current or future public losses. As regards the article by Rezk, Irace and Ricca, Afonso stresses that the thesis put forward by the study (mandatory pension fund regimes have a positive impact on private saving) is different from what is reported in other studies (*i.e.*, Freitas and Martins, 2009). He suggests that an alternative way to address the question would be to use a consumption specification as in Feldstein (1974 and 1982) to assess how pension funds' assets impinge on private consumption and influence the current account balances, on the basis of their relationship with private savings, government savings and investments.

In commenting on the paper by Moreno and Santos, Cuccaro emphasizes the role that a widespread informal sector has in explaining low contribution density in many emerging market economies, while the lack of appropriate institutions might partly explain the portfolio composition of pension funds. Commenting on the paper by Rofman *et al.*, Cuccaro suggests that it is important to discuss the fiscal conditions and the context in which pension reforms were implemented. In the same vein, she underlines that the recent pension measures in Argentina might reflect the pro cyclical behaviour of fiscal policy. Therefore, the reduction of the pro-cyclical behaviour constitutes an additional challenge. In the short term, the main challenge is that of managing the pension system in a less favourable fiscal environment and with limited access to the capital market. Finally, the enhancement of the independency of social security institutions is also crucial. Setting up the proper legal framework to guarantee the transparency, efficiency and predictability of the administration of the pension fund is another pending issue.

Eich discusses the articles by Cuevas, González, Lombardo and López-Marmolejo, and Leiner-Killinger, Nickel and Slavík. About the first paper, he claims that rating agencies are not alone in facing the challenge of translating long-term trends into an assessment of the public finances. For example, following the reforms of the Stability and Growth Pact, the European Commission puts greater emphasis on long-term budgetary developments in its assessment of EU public finances. One innovation over recent years has been to incorporate implicit pension liabilities into medium-term public finance objectives for the Member States. The Commission

uses quantitative and qualitative indicators to derive its assessment and, for instance, to weigh up the potential long term benefits of reforms against their potential short-term fiscal costs. Admittedly, many countries have not been very successful themselves in deriving clear policy objectives from the analysis of long-term trends. Commenting on the paper by Leiner-Killinger, Nickel and Slavík, Eich argues that the current economic crisis shows that occupational pensions are under immense pressure and that private pensions have also done badly in most countries. This proves the usefulness of a mixed system, with unfunded social security pensions complementing funded occupational or private pensions. On this basis, he claims that governments ought to be determined to ensure that, in the long-term, both occupational and private pensions play their respective roles successfully.

## 3 Pension reform, redistribution, macroeconomic impact

The papers presented in Section 3 deal with the impact of changes in the design of pension systems on income distribution within and across generations and with the macroeconomic implications of reforms.

Brender examines the distributive effects of Israel's restructured retirement benefits system using ten stylized representative prototypes of the most common Israeli household composition and employment profiles. He concentrates on the joint effects of tax benefits for pensions and the public Old Age Allowances program's contributions and disbursements on lifetime income distribution, net replacement rates at retirement and lifetime consumption smoothing. The author finds that the system is neutral in terms of its effects on lifetime income distribution, except for the top income decile which gains less than the others. Furthermore, forced pension savings result in a net loss for many low-income households, distort their consumption path and lead to post-retirement net replacement rates that he deems "too high". Finally, evidence points to rational and active behaviour of households with respect to these incentives, questioning the need for the compulsory pension savings enacted recently.

Dekkers, Buslei, Cozzolino, Desmet, Geyer, Hofmann, Raitano, Steiner, Tanda, Tedeschi and Verschueren stress that the demographic changes that Europe will face in the coming decades will have profound consequences not only for the sustainability but also for the adequacy of social security schemes, including pensions. The paper aims at assessing the consequences of the Ageing Working Group projections on the adequacy of social security pensions. The authors use a microsimulation model and examine three countries: Belgium, Germany and Italy. Adequacy is assessed on the basis of the replacement rate, the redistributive impact of pensions and the different risks of poverty. Pension beneficiaries are compared to wage-earners. The replacement rate will follow different patterns: in Belgium and Germany it will decline until the beginning of the 2030s and recover later, in Italy it will show a continuous decrease. In all three countries income inequality declines from the working age to the retirement age and the risk of poverty among pensioners first increases and then decreases. The pension reforms implemented in the three countries have similar effects on income redistribution and poverty levels; these effects are particularly strong in Italy.

Using data from the EU survey on Income and Living Conditions (SILC), Franco, Marino and Tommasino provide evidence that there are sizeable differences across EU countries with respect to the diffusion and intensity of poverty and that poverty rates change significantly across age groups, types of households and individuals of different occupational status. In some countries, poverty rates among young and elderly citizens are much higher than among working age individuals. The paper shows that, while pre-transfer age-poverty profiles are rather similar across countries, national social spending programs differ in their effectiveness in lifting children and

elderly people out of poverty. The authors propose new parameters for the appraisal of the age-orientation of government spending, which are useful in explaining national age-poverty profiles: countries with smoother age-poverty profiles are those with elderly-oriented and children-oriented welfare states, where the transfer system is relatively more effective in lifting children and elderly people out of poverty. These countries mainly belong to the so-called social democratic group of countries. At the other extreme, Southern European countries show a pronouncedly V-shaped age-poverty profile. In these countries the transfer system channels relatively few resources toward families with children and with elderly people and, as a consequence, is relatively ineffective in lifting these groups out of poverty.

The paper by Ramaiah focuses on the Indian government's recent initiatives to reform the pension system in the light of the pressure exercised by demographic factors. A newly defined contribution system was introduced in 2004. The author stresses that there are some policy issues which need to be addressed for its success. The first point raised is that the voluntary nature of the system, along with poor financial literacy and the attitude of households towards financial savings, prevents the system from achieving optimum coverage. A priority would therefore be to design an effective, efficient and accessible system for a heterogeneous workforce. The second point raised relates to the provision of an adequate retirement income. Ramaiah highlights the importance of extending coverage to as many people as possible so that subscribers might substantially gain in terms of lower fees and charges and high returns. Finally, the paper notes that India has the world's youngest and fastest-growing working-age population and that public policy has a critical role to play. It will be necessary to include those working in the informal economy in the pension system in the years to come.

The paper by Barrell, Hurst and Kirby deals with the effects of pension reforms on some consequences of the crisis. According to the paper, the rapid introduction (but slow implementation) of a policy to extend working lives could alleviate the sharp rise in the national debt stocks of the euro-area countries and the United Kingdom due to the crisis and the fall in equilibrium output caused by the contraction of the capital stock. The paper analyses the effects of a possible extension of working lives in the euro-area and the United Kingdom and draws a distinction between the impact of these changes on output and income in open economies with capital mobility. The authors find that lengthening working lives will, in due time, increase consumption and restore the equilibrium capital stock. If consumers and firms recognize that they will have to work longer and hence have a higher income, consumption and investment would increase, helping to offset the impact of the recession. In addition, tax revenues would grow and pension spending decrease. These gains by the government could be used to improve services, cut taxes or pay off debts.

The results presented by Zaidi indicate that OECD countries significantly differ in terms of the rate of poverty of elderly citizens. Using a country-specific relative poverty line, he finds that almost 13 per cent of the elderly people living in OECD member countries are poor. Countries with low poverty rates for the elderly generally have a good social safety net in the form of a basic pension and/or they offer strong redistribution in the earnings-related contributory pension schemes in the form of minimum guaranteed pensions. Single women and the oldest age cohort (aged 75+) have, in general, a much higher poverty rate compared with other subgroups. For women this is mainly due to the features of their working career; while for the oldest individuals the reason lies in the lack of pension coverage during the earlier part of their working career and in the indexation of pension benefits to price dynamics rather than income dynamics. The paper shows that poverty rates for all age groups above 50 declined, while those for people below that age they rose, owing to the success of past pension policies in providing adequate pension benefits. However, in view of financial sustainability concerns, recent pension reforms have scaled down the level of pension

benefits. Thus, in the absence of longer work careers, it is likely that future generations of elderly citizens will be poorer more often than the rest of the population.

The main purpose of the study conducted by Fall and Ferrari is to analyse the impact of demographic factors on pension systems and to consider the role that a reserve fund can play in the context of the adjustments needed to balance the accounts of the pension schemes. The study does not deal with the question of the financial management of the reserves. In particular, in the projections presented in the paper, a purely normative assumption has been used for the return on reserves, corresponding to the average return on bonds over the long period. Actually, reserve fund's investments could turn out to be more profitable than the repayment of government debt, thereby generating leverage. A reserve fund can go overweight in risky (and hence high-yield) assets as long as the disbursement horizon is distant, thus benefiting from attractive returns combined with limited long-term risks. By defining its schedule of income and disbursements, the Pension Reserve Fund can optimise its returns for a given level of risk. However, even with a distant and well-defined disbursement horizon, investment in the Fund would still be riskier than paying down the public debt. Leverage is obviously not contradictory with the Fund's assigned objective. But this leverage cannot be taken as the prime function of a reserve fund, and its size cannot be precisely calibrated on this basis.

Commenting on the Barrell *et al.* paper, Cottarelli highlights some critical aspects. First, he suggests to verify whether there are empirical studies supporting the idea that raising the retirement age will increase people's perception of their life expectancy. Second, the adoption in the paper of a unique equation describing the transfers of pensions and unemployment benefits to the population for all countries neglects the existence of the country-specific features of the pension system. Third, from a purely accounting perspective, stating that it is possible to finance the cost of the crisis by increasing the retirement age by two years is misleading, given that, even before the crisis, the increase was thought to be necessary to ensure debt stability in the long run in European countries. Concerning the paper by Zaidi, Cottarelli argues that the results could potentially be very sensitive to the measurement methods and the definition of poverty adopted. Therefore, some sensitivity analysis would be required to strengthen their robustness. He lists important drawbacks of using relative poverty measures, especially for pensioners.

In his discussion of Brender's paper, Follette suggests to investigate further into the adequacy of the Old-Age Allowances (OAA) program in preventing poverty for low- and moderate-income families, given that the stylised households used in the simulations may not capture all the variations in work and household formation experiences. He then elaborates on Brender's conclusion that the mandatory defined contribution program is too large for many households as it will deliver too much income in the retirement years and result in too little disposable income during working years. He suggests to scale down the mandatory pension program in order to reduce the amount of over-saving at the low end of the distribution. The relative importance of the OAA and the pension plans could be shifted towards pensions proportional to income and away from the flat benefit. As regards the paper by Ramaiah, Follette argues that even if in India a newly-defined contribution scheme was recently introduced, coverage has not been expanded, and a series of risks have been shifted on to households. He then focuses on other points not addressed by the paper. How much did the public finances improve as a result of the reforms? Who paid for the financial hole in the PAYG system determined by the shift from PAYG to funded systems for new entrants? What options are available to expand coverage in the private sector? How do the administrative costs for the Indian plan compare with those of other countries?

Before commenting on Franco *et al.* and Dekker *et al.*, Paul examines the distribution of poverty among age groups in France in 2007, pointing out that, as stated in the first paper, poverty rates are higher for younger people, in spite of the generous family allowance scheme. However,

family allowances are not means-tested and therefore are insufficiently targeted on low-revenue families. Paul raises a few criticisms about the use of poverty indicators expressed in monetary terms and notes that the informal economy, self-consumption and family support are not taken into account in measuring poverty. Turning to Dekkers *et al.*, he notes that in France poverty among the elderly is lower than among the working age population. Nevertheless, there is a risk of a reversal of this situation as a consequence of the rise in unemployment, which makes it difficult to get full pension benefits, and of the ageing of the population, which threatens the financial balance of PAYG pension systems. He stresses that results from the MIDAS model should be taken with caution for different reasons. For instance, the model does not take into account incomes different from pensions. and even very small adjustments in the parameters related to demography and economic growth may substantially change the results.

## 4 Pension reform and fiscal policy

Session 4 examines the political economy of pension reforms and their role in the context of fiscal policy.

The paper by Gonand investigates the issue of the choice of different reforms of the PAYG pillar on the basis of the degree of aversion to intergenerational inequality and the rate at which the welfare of future generations is discounted. The effects of pension reforms on economic growth, households' intertemporal utility and social welfare are simulated with a dynamic general equilibrium model with overlapping generations parameterised on four countries with different demographic patterns (France, Germany, Japan and the United States). The model shows that a no-reform scenario, in which taxes are increased to balance spending, leads to a lower rate of economic growth. It also shows that no pension reform is Pareto-improving in the four countries considered: all reforms reduce the welfare of the baby-boomers and increase that of their children and future generations. If expenditure savings are achieved via cuts in the replacement rate, baby-boomers bear most of the welfare cost of the reform, while younger generations benefit from it. A rise in the average age of retirement would smooth the intergenerational redistributive effects associated with the reform.

Carone and Eckefeldt evaluate the impact of recent pension reforms in EU countries on the basis of the 2009 round of long-term projections of pension expenditure carried out by the Ageing Working Group of the EU. In the coming decades, demographic factors are projected to be the main driver of pension expenditure growth. They are expected to be partly counterbalanced by the decline in the coverage ratio (thanks to the increase in the retirement age), less generous public pension transfers and the increase in the employment rate, especially of older workers. In several countries these developments have been enhanced by recent reforms. A comparison of the 2009 projection exercise with that of 2006 gives some additional indications about the impact of recent reforms: in many countries the fall in coverage is more accentuated in the latter projection, thus offsetting the dependency effect to a greater extent. Moreover, in several countries the offsetting impact of the reduction in benefits has increased, compared with the 2006 projection. Both these developments reflect the effects of the pension reforms. The authors note that more policy action is necessary in many countries, in particular in order to increase the retirement age and the employment rate of older workers.

Clavijo analyzes the pension and healthcare reforms implemented in Colombia in the 1990s and in the first decade of the new century. While pension reforms aimed at curbing expenditure, health reforms aimed at broadening the coverage of publicly-provided care. Parametric pension reforms focused on increasing the retirement age and curbing replacement rates. They reduced the net present value of pension liabilities in 2007 from 260 to 160 per cent of GDP. Clavijo argues

that further reforms are necessary to achieve fiscal sustainability. It is also necessary to improve the incentives implicit in pension rules, reduce payroll taxes levied on firms and increase the retirement age. Reforms have significantly increased healthcare coverage. This has boosted spending, which is now relatively high with respect to other countries. The public healthcare deficit is expected to increase further in the coming decades. Clavijo stresses that it is important to tackle the labour informality problem. Through their impact on contributions to pension and health systems, labour market reforms can have important effects on the public finances.

The paper by Cunha, Paulo, Sousa Pereira and Reis examines the reforms implemented in the Portuguese pension system in recent years. From the mid-1970s pension expenditure increased fast because of generous pension rules and the ageing of the population. The reforms introduced in 1992 and in 2002 have been reinforced by additional reforms in 2005 and in 2006. Key features of the latter were the curb on public sector employees' special provisions, the introduction of a sustainability factor linking new pensions to life expectancy and the introduction of new rules for the indexation of benefits. The paper evaluates the implications of these rules, which are very progressive and will reduce the gap between larger and smaller pensions. They show that high wage contributors will have lower incentives to postpone retirement: they will face a trade-off between the initial pension level and the future updates. The authors also point to the need for a better understanding of how the sustainability factor affects the decision to retire.

Matsuo examines the structure and prospects of the Japanese pension system in the context of the challenges posed by population ageing and the high current public debt. Social security expenditure accounts for almost half of the general expenditure in the Japanese budget and is growing rapidly. In the coming years the first baby-boomers will retire. Therefore, pension reform is deemed indispensable for the sustainability of social security and the overall Japanese fiscal position. Matsuo describes the main features and implications of the reform introduced in 2004, which aimed at making the pension system sustainable for the next 100 years and at limiting the burden for the working-age population. The reform set a ceiling on the pension system contribution rate and introduced a new mechanism for the indexation of pension benefits. Pensions will not be fully adjusted to changes in prices, either upward or downward. The reform has also set a minimum level of 50 per cent for the ratio of first and second pillar pensions to the average income of employees.

Melguizo, Muñoz, Tuesta and Vial analyze the fiscal costs stemming from pension reforms introducing mandatory individual capital accounts managed by the private sector. They examine the experience of Chile, where individual capital accounts have been in operation for almost 30 years. They also evaluate the more recent Chilean reform, which strengthened the solidarity pillar, and the pension reforms introduced in Colombia, Mexico and Peru. They argue that, while it is difficult to export the Chilean experience to other countries with different political and economic structures and institutions, the Chilean reform provides several important indications. It shows that a key factor for the success of a system based on individual retirement accounts is the proper functioning of market institutions, especially the financial markets. The protection of property rights and minority shareholders is crucial. Regulation is also important, though it can be introduced gradually and pragmatically. Fiscal policy is also paramount. The transition costs tend to be high and persistent, making fiscal consolidation prior to the reform advisable. The functioning of the labour market is also important: widespread informality limits the coverage of the pension system. If informality is pervasive, it may be necessary to establish a large solidarity pillar, although this can act as a disincentive to formalization.

Langenus comments on the papers by Carone and Eckefeldt and by Gonand. Concerning the former paper, he notes that the new AWG projections show that, in spite of the new demographic scenarios and the recent reforms, the projected increase in pension expenditure in the coming decades has not become significantly smaller since the 2006 AWG update. He suggests to be

cautious about the assumption underlying the projections: the assumed increase in the employment rate of older workers may require changes in labour market institutions, and the decline in replacement ratios can raise social sustainability problems. Moreover, it is not clear whether the policy environment required to permit high net migration is or will actually be in place throughout the projection period. Langenus also points to the problems met in comparing AWG projections when trying to disentangle the impact of reforms, revised assumptions and changes in projection models. As regards the paper by Gonand, Langenus points to the difficulty of translating analytical results into clear policy recommendations. He notes that the comparison of utility, welfare, income and consumption levels of different cohorts is quite complicated. He suggests discounting the welfare of future generations. He also suggests that EU fiscal rules can help governments to take action in favour of future generations. In particular, more ambitious medium-term objectives can increase the pre-funding of ageing costs.

Eckefeldt comments on the papers by Cunha *et al.* and Matsuo. With reference to the first paper, he writes that the pension reforms introduced in Portugal go a long way towards enhancing fiscal sustainability. The sustainability factor plays a big role in this regard, while the new indexation scheme presents interesting and innovative features. However, the substantial decrease in the benefit ratio introduces a risk element in terms of pension adequacy. Concerning this aspect, Eckefeldt notes that, in spite of the reforms, the benefit ratio for public employees will remain much higher than for the general social security pensions. The Japanese pension reform will also significantly reduce the income of pensioners compared to that of workers. Eckefeldt indicates that the guaranteed 50 per cent benefit ratio is achieved via an increase in the government contribution to the pension system, which will require a major tax reform. He praises the fact that the 2004 reform enhances transparency and a more effective allocation of pension funds: this can increase the "political sustainability" of the pension system. The improved information to workers on their accrued pensions will raise awareness of retirement income and could also lead to an increase in private savings.

Ter-Minassian, while appreciating the analysis carried out by Clavijo, argues that more details concerning the methodology and the assumptions used to project the future liabilities of the public pension system would allow readers to better assess their realism. A sensitivity analysis would also be useful. In addition, she suggests that Clavijo evaluate the political and social feasibility of his proposal to link the retirement age to life expectancy and to specify what further parametric changes would be necessary to reduce the replacement rates for the public system. As to the private pillar, she suggests to evaluate the impact of rates of return on pension portfolios lower than the historic figures, which appear relatively high in an international perspective. Ter-Minassian notes that the paper by Melguizo *et al.* presents an interesting overview of pension reforms in Chile, pointing both to achievements and shortcomings. The paper highlights the trade-offs between the social objective of preventing old-age poverty and the economic objectives of preserving incentives to contribute to the pension system and minimizing fiscal costs. She suggests that the authors expand the analysis of the 2006 reform, both in terms of the reform process and its incentive to contribute to funded schemes.

**Session 1**

# PENSION REFORM AND THE LABOUR MARKET

# CONSUMPTION STRUCTURE, WELFARE GOODS AND RETIREMENT INCOME: LINKING THE AGEING PUZZLES

*Najat El-Mekkaoui de Freitas*[*] *and Joaquim Oliveira Martins*[*, **]

*While the empirical evidence tends to support some predictions of the life-cycle theory, a number of puzzles remain: an ageing-consumption, an ageing-saving, a saving-capitalisation and a saving-longevity puzzles have been put forward in the literature. This paper analyses the links between these puzzles and develops a model relating usual life-cycle variables, social transfers (public health care expenditures and the generosity of pension systems) to the level of savings. A reduced-form model using a panel of 18 OECD countries is tested, confirming the proposed explanations for the puzzles, together with other factors such as public deficits (Ricardian equivalence) and the population structure. We found that the relative generosity of welfare systems have a significant negative impact on household saving rate. It can also explain why the increase in longevity does not have had in general a positive impact on the household saving ratio.*

## 1 Motivation

The life cycle model is the main framework used in economics to understand the relations between ageing, consumption and saving behaviour. While main predictions of the life cycle theory tend to be supported by empirical evidence, a number of puzzles remain. The literature has put forward four main types of puzzles: an ageing-consumption puzzle, an ageing-saving puzzle, a saving-capitalization puzzle and a saving-longevity puzzle.

The first puzzle concerns the tendency for consumption to decrease in old age. This stylised fact observed in all OECD countries, seems to contradict the idea that households save in order to maintain their consumption level after retirement. Second, significant levels of savings are observed at old age. Another puzzling fact is that countries with generous PAYG system and health care system (welfare goods) have the highest private saving rate. In contrast, in countries where pension funds are well developed, the private saving rate is much lower. Finally, an increase in longevity by increasing the duration of the retirement period could be expected to increase the saving ratio.[1] However, when empirically tested, the sign of longevity variables in traditional saving equations is often negative.

An extensive literature has put forward potential explanations for each of the puzzles, but, to our knowledge, there has been no attempt to bring all of them together in an integrated view. We argue in this paper that the four puzzles are interlinked. As discussed below, the interaction between consumption and provision of welfare goods and the level of retirement income can indeed explain a large part of these phenomena. In order to highlight the role of these determinants and their links, it is instrumental to compare household saving behaviour, health and retirement systems of two country groupings: those with PAYG systems and those with fully-funded systems.

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[1] This of course only holds when the age of retirement is fixed and not linked to longevity, which is still the case in most social security systems in OECD countries.

Other traditional determinants of savings have also to be brought into the picture, in particular the role of Ricardian compensation between private and public savings, as well as income.

The paper begins with a review of empirical facts on consumption, savings and pensions that generate the puzzles referred above. In order to guide our intuition concerning the relationships among the key variables, we develop in Section 3 a two-period life cycle model where we consider the optimal welfare consumption, welfare transfers, the generosity of pension systems and longevity. In Section 4, we get back to the facts and present some possible explanations of the ageing puzzles. In Section 5, we then present econometric panel estimates that combine both the relationships derived from the theoretical framework, other additional effects and controls often used in the empirical literature. A final section concludes.

## 2 The ageing puzzles: consumption, saving and longevity

The most useful framework to study the link between ageing, consumption and saving is the life cycle model (Modigliani and Brumberg, 1954; Friedman, 1957). In its simplest version, individuals live two periods. In the first period each person earns a wage from his or her labour supply and in the second period the person is retired. Individuals save from their wage income to provide for second period consumption with a constant rate of interest (*i.e.*, the rate of interest does not vary with the level of saving). The main result obtained from this framework is that the consumption is smoothed: the individuals will save in order to transfer purchasing power to the period of the retirement.

But some empirical facts on consumption, pension and saving do not fit well with the basic life-cycle model. The *first puzzle* concerns the link between ageing and consumption. A large body of literature has found that consumption falls significantly at retirement, a fact somewhat in contradiction with life-cycle consumption smoothing. This applies over a number of countries (e.g. US, UK and Italy), across different time periods and across different measures of spending. This stylized fact is displayed in Figure 1, relating levels of household consumption by age for the US and several European countries.

While household survey data suggest that total consumption displays a hump-shaped profile across age-groups,[2] this is not equivalent to say that the consumption profile is hump-shaped over the life cycle mainly due to the existence of cohort and time effects.[3] Nonetheless, they would suggest that the pure consumption-smoothing hypothesis is only partly supported by the micro data.[4]

Several explanations of this puzzle have been put forward. Allowing for uncertainty, Banks, Blundell and Tanner (1998) suggest that unanticipated shocks that occur around the time of retirement could explain the fall in spending within the context of the life-cycle model. Bernheim, Skinner and Weinberg (2001) suggested that workers do not adequately foresee the decline in income associated with the retirement. Hurd and Rohwedder (2003) argue that the drop in spending

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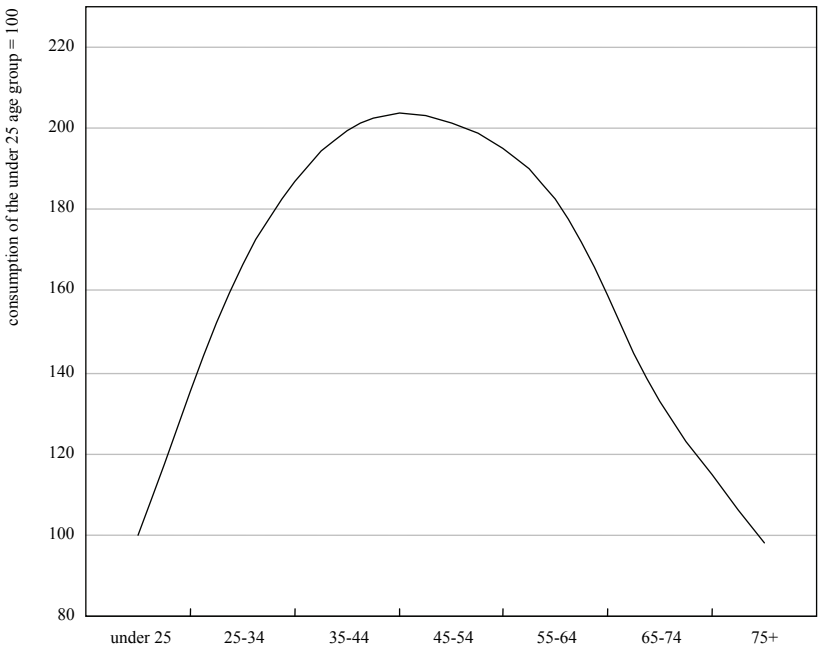
[2] To be precise, the consumption profile is hump-shaped across households headed by individuals belonging to different age groups.

[3] Due to the lack of data, it will be assumed that the snapshot picture of total consumption per household by age-groups approximates the life-time consumption profile of a cohort (*e.g. static* ageing as opposed to *dynamic* ageing). This approach takes an agnostic view on how a combination of various household characteristics in conjunction with institutional factors in each country affects the life-cycle consumption pattern. Fernandez-Villaverde and Krueger (2002) suggest that the bias induced by the use of age-groups instead of cohorts may not be very large for the estimation of the hump-shaped consumption profiles.

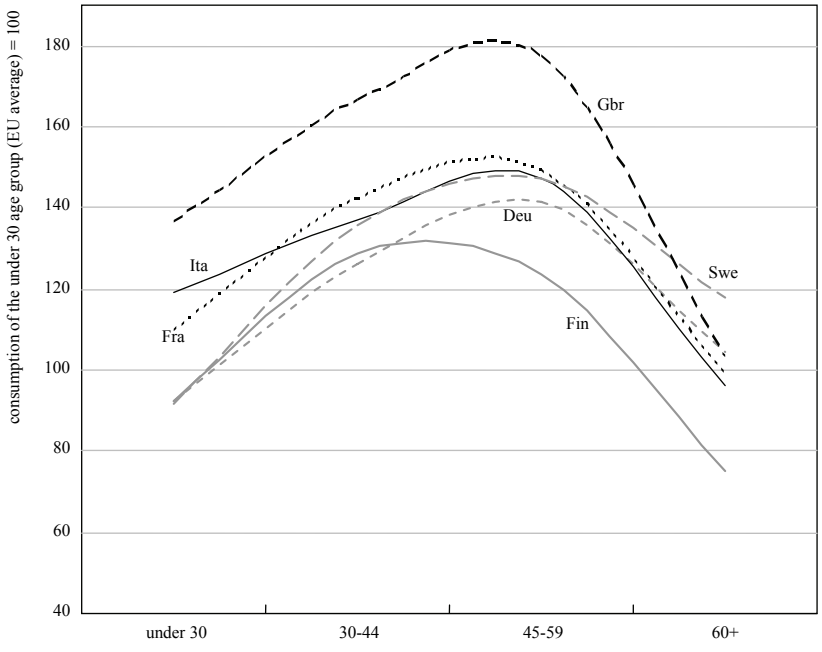
[4] Attanasio (1999) provides an overview of competing theories of consumption behaviour over the life cycle. Note that when the age-income profile is more hump-shaped than consumption, the above observed age-consumption patterns are still compatible with some consumption smoothing over the life cycle.

**Figure 1**

**The Consumption-saving Puzzle**
**United States**




**European Countries**




Source: Consumer Expenditure Survey, US, 2002; Household Budget Survey of Eurostat and Luxembourg Income Study.

can still be explained by an extended version of the life-cycle model, where certain work-related consumption expenditures stop at retirement and market-purchased goods and services are substituted by household home production. The latter could be the case of long-term care services, which often are provided informally within families. However, in a more recent paper, Hurd and Rohwedder (2006) argue, like others, that the reduction in consumption cannot be explained by the simple one-good life cycle model with forward-looking consumers. Many factors such as leisure or poor health could also explain the decline in spending. Along these lines, Smith (2007) argues that retirement is involuntary, largely reflecting ill health status and redundancy, and likely to be associated with a negative wealth shock.

The *second puzzle* is closely related to the previous one, although is not equivalent. With a certain stability of retirement incomes and a decline in consumption, positive saving at old ages can be observed (see Börsch-Supan *et al.*, 2000; Börsch-Supan and Winter, 2001). However, it is puzzling that

individuals cannot anticipate this fact and continue to save at old age, in particular in countries with generous welfare goods (high pension replacement rates and health care coverage).

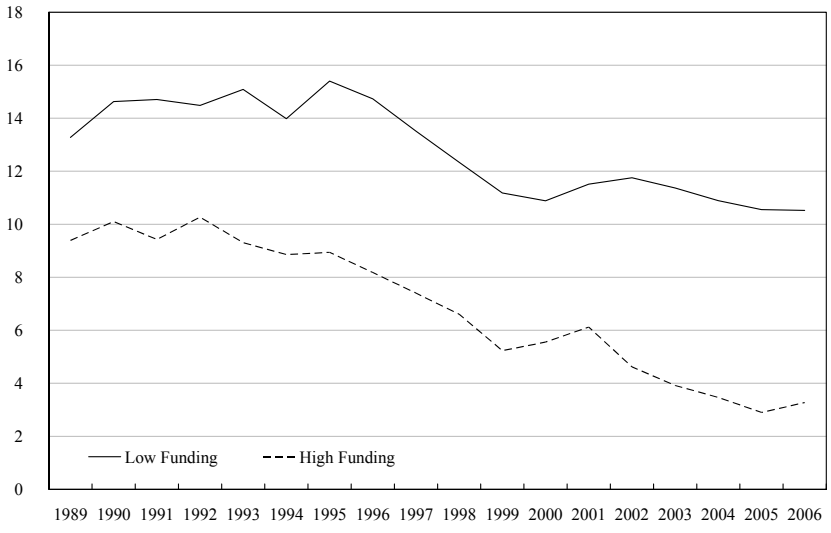
Bloom *et al.* (2003) and Sheshinski (2004) suggest that higher life expectancy may increase the need for additional precautionary savings, despite the effect of improved health care on the length of desired working life. Moore and Mitchell (1998) also conclude that Americans are not preparing adequately for retirement as a couple would need to save 20 per cent of annual earnings between 1992 and the time of retirement (at 62) to have a replacement rate of 61 per cent. A single woman would need to save around 32 per cent of her income to have a replacement ratio of 54 per cent at age of 62. They conclude, despite seemingly large accumulations of total retirement wealth, the majority of older households will not be able to maintain current levels of consumption into retirement without additional saving. Bernheim *et al.* (2001) argue their results are difficult to reconcile with the life-cycle model and that they are more likely to be the result of household behaviour not governed by rational, farsighted optimization. Khitatrakun and Scholz (2004) note that tax incentives, like IRAs and 401(k) are not needed and may lead to excess savings. Finally, a largely evoked, but not well documented, reason for saving at older ages is the existence of bequest motives.

The *third puzzle* arises from the fact that countries with fully funded systems have the lowest private saving rates. In principle, the introduction of a fully-funded pension system should induce a decline in the replacement rate of PAYG systems and, according to the life-cycle model, increase aggregate savings. Figure 2 shows that while saving rates have been decreasing steadily in all countries, the countries with PAYG systems have persistently displayed higher household saving rates and the gap has widened over time.

In a seminal paper, Feldstein (1974) highlighted a negative link between PAYG pension systems and household savings. But, subsequent empirical tests on the impact of pension systems on household saving have produced mixed results (e.g., Edwards, 1996; Callen-Thimann, 1997; Corsetti, Schmidt-Hebbel, 1995) and Murphy and Musalem, 2004). Confirming earlier Feldstein's results, Edwards (1996) found that the social security system has a negative impact on private saving using a sample of 32 countries (developed and developing countries). Baillu and Reisen (1997) also found a positive and statistically significant impact of pension funds on savings using a panel of 11 countries for the period 1982-93. In more recent study, Bosworth and Burtless (2004) did not find an econometrically significant impact on private

**Figure 2**

**The Saving-capitalisation Puzzle**
**Average Household Saving Rate**




Source: OECD ABD Database and authors' calculations.

saving for a set of 11 countries during the period 1971-2000. Murphy and Musalem (2004) considered 43 countries for the period 1960-2002 and found that mandatory contribution to funded pension systems increase national saving. It could be noted that it is quite difficult to compare these studies due to the heterogeneity of samples and estimation methods.

That the introduction of pension systems may decrease, increase or be neutral on savings has several potential explanations. Under defined benefits, if pension wealth can be seen as a substitute for private accumulation and therefore there could be a decrease of the household saving when a pension system is introduced. Moreover, pensions are usually paid in the form of annuities. Without pension annuities, the employee would be forced to accumulate more to finance their retirement period. Thus, by offering annuities, pension plans could reduce savings. Another explanation is related to earlier retirement decision, as individuals who retire earlier are forced to save more in order to finance a longer period of retirement. Imperfect capital markets can also prevent households from borrowing freely, thereby forcing them to save more than they otherwise would. In this case, insofar as mandatory private pension funds may increase financial deepening and reduce borrowing constraints they would decrease household savings.

The *fourth puzzle* is related to the impact to impact of longevity. Bloom *et al.* (2003) argued that higher life expectancy should lead to an increase of precautionary savings, but empirical work has often suggested an opposite sign. This could be seen as a sort of "saving-longevity puzzle". More recently, Bloom *et al.* (2006) have also shown that in the absence of strong saving retirement incentives, such as in PAYG systems, an increase in longevity does not induce higher savings.

## 3 Ageing consumption, saving and longevity: theory

To guide our investigation of the ageing puzzles, we now develop a simple life-cycle model. Following Bohn (1999) and Chakraborty (2004), we consider a two period overlapping generation's model with a survival probability.[5] This provides a tractable framework to think about the different determinants of savings at the individual level. Our aim is to consider the institutional settings of the welfare system during retirement and how they impact saving behaviour. Therefore, we specify a model combining Pay-as-you-go (PAYG), funded pension retirement incomes and welfare transfers (*e.g.* public health insurance). Each agent lives two periods and optimises her/his consumption and saving over the life-cycle. In the first period, each agent splits her disposable wages $w_i$ into consumption ($C_i$) and saving ($S_i$):

$$C_i + S_i = (1-\alpha).w_i \tag{1}$$

where $\alpha$ is the rate of social contributions. In the second period, we assume that only a welfare good consumption (e.g. Health) is considered $H_i$.[6] As we are mainly interested in the demand-side drivers of household savings, we assume here that income growth and the interest rate are pre-determined.

To finance consumption in the second period, the agent receives a PAYG pension with a replacement rate $\beta$, the accumulated saving accrued by the return on capital $r$ and a given amount of welfare transfers $T$. Note that the amount of savings accumulated for the second period has to be scaled down by the survival probability $p_i$, given that when it increases you have to spread your

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[5] See also Drouhin (2002). In another context, Jorgensen and Jensen (2008) also incorporate the survival probability a stochastic OLG model with endogenous labour supply.

[6] This assumption does not entail a loss of generality in the model, as we could have introduced a composite consumption good in the form $\delta.C + (1-\delta).H$, with the weight $\delta$ changing from period 1 to period 2.

consumption over a longer retirement period.[7] By definition, the income from the PAYG system and the welfare transfers are not affected by changes in the longevity (at least at the individual level):

$$H_i = \beta.w_i + \frac{(1+r)}{p_i} \cdot S_i + T_i \tag{2}$$

Note that we did not introduce a pure time-preference parameter, as usual in perfect foresight models. Under uncertainty, the survival probability captures the effect of the discounting parameter (see Chakraborty, 2004).[8] To simplify, we omitted the index corresponding to the time period. Solving for $S_i$ in (2) and replacing into (1), we obtain the inter-temporal budget constraint:

$$C_i + \frac{p_i}{1+r} \cdot H_i = (1-\alpha) \cdot w_i + \frac{p_i}{1+r} \cdot T + \frac{p_i}{1+r} \cdot (\beta \cdot w_i) \tag{3}$$

Maximising the utility of each agent under the budget constraint (3), we obtain:

$$\begin{aligned} &Max\, E\left[u(C_i, H_i)\right] = u(C_i) + p_i \cdot u(H_i) \\ &s.t. \quad C_i + \frac{p_i}{1+r} \cdot H_i \le (1-\alpha) \cdot w_i + \frac{p_i}{1+r} \cdot T + \frac{p_i}{1+r} \cdot (\beta \cdot w_i) \end{aligned} \tag{4}$$

First-order conditions imply that:

$$\begin{aligned} u'(C_i) &= \lambda_i \\ u'(H_i) &= \lambda_i /(1+r) \end{aligned} \tag{5}$$

where $\lambda_i$ is the Lagrange multiplier associated with the budget constraint. Using these conditions we obtain the usual consumption smoothing rule:

$$\frac{u'(C_i)}{u'(H_i)} = (1+r) \tag{6}$$

As in Bohn (1999) and Chakraborty (2004), we assume thereafter that the $u(C) = \text{Log}(C)$ and idem for $H$.[9] We get then a simple relation between $C_i$ and $H_i$:

$$H_i = (1+r) \cdot C_i \tag{7}$$

Now replacing (7) into the budget constraint:

$$C_i + p_i \cdot C_i = (1-\alpha) \cdot w_i + \frac{p_i}{1+r} \cdot T + \frac{p_i}{1+r} \cdot (\beta \cdot w_i) \tag{8}$$

The optimal level of consumption in each period can be derived:

$$\begin{aligned} C_i &= \frac{1}{1+p_i} \cdot \left[ (1-\alpha) \cdot w_i + \frac{p_i}{1+r} \cdot T + \frac{p_i}{1+r} \cdot (\beta \cdot w_i) \right] \\ H_i &= \frac{1}{1+p_i} \cdot \left[ (1+r) \cdot (1-\alpha) \cdot w_i + p_i \cdot T + p_i \cdot \beta \cdot w_i \right] \end{aligned} \tag{9}$$

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[7] Using a survival probability is identical to modelling the length of life in the retirement period. Note that this probability gives an indication of the life expectancy. By normalising the duration of one period to one, life expectancy is by definition $(1+p)$. For example, if period 1 is equal to 60 years and total life expectancy is 84, the survival probability in this context is (24/60)=0.4.

[8] See Bohn (2001) and Jensen and Jørgensen (2008) for an alternative specification.

[9] A log utility implies homothetic preferences. Nonetheless, the main results of the model used in this paper derive from the existence of the conditional life expectancy and from the intertemporal budget constraint.

By using the expression for the optimal consumption above and equation (1), we derive the optimal saving rate over net income in the first period:

$$s = \frac{S_i}{(1-\alpha)\cdot w_i} = \frac{p_i}{1+p_i}\cdot\left[1-\frac{\beta + T_i / w_i}{(1+r)\cdot(1-\alpha)}\right] \tag{10}$$

The derivative the optimal saving ratio *s vis-à-vis* the survival probability has interesting properties, when interacted with key parameters characterising the generosity of the welfare system.

$$\frac{\partial s}{\partial p_i} = \left[\frac{1}{1+p_i}\right]^2 \cdot \left[1-\frac{\beta + T_i / w_i}{(1+r)\cdot(1-\alpha)}\right] \geq 0 \quad if \quad \beta \leq (1+r)\cdot(1-\alpha) - T_i / w_i \tag{11}$$

For reasonably small values of $\beta$, an increase of the survival probability increases the saving ratio. This is the expected intuitive result, *i.e.* when an individual experiences a higher longevity he/she has to save more in order to ensure an adequate consumption level in the second period. Assume that the interest rate is equal to 3 per cent, the contribution rate is 20 per cent and the welfare transfers are equivalent to 10 per cent of the wage income. From (11), the threshold for the replacement rate is around 72 per cent. For larger values of this parameter, an increase in the survival probability induces a decrease in the saving ratio. The intuition is as follows. Assume that $\alpha$, $r$ and $T$ are equal to zero, and $\beta > 1$. This implies a negative saving ratio (equation 10). Then an increase of the survival probability would generate an expected income above the initial consumption level. Consumption smoothing would then require a higher consumption and lower saving.[10] To some extent, variation in the welfare transfers ratio ($T_i/w_i$) also induces a change in the sign of $\partial s / \partial p_i$ , but only for very large values of $\beta$.

Under the current prevailing replacement rates in most OECD countries, our model could therefore provide an explanation for a possible negative effect of longevity on savings. The "longevity puzzle" would be only *a priori* in contradiction with life-cycle theory.

The derivatives of the saving ratio ($s$) vis-à-vis the other key parameters in the model are defined in a non-ambiguous way, as follows:

$$\partial s / \partial \beta \leq 0 \; ; \quad \partial s / \partial T_i \leq 0 \; ; \quad \partial s / \partial \alpha_i \leq 0 \; ; \quad \partial s / \partial r \geq 0 \; ; \quad \partial s / \partial w_i \geq 0 \tag{12}$$

The saving rate is expected to be a decreasing function of the replacement ratio, welfare transfers to older people and the rate of social contributions ($\alpha$). In other words, the systems providing large transfers and generous retirement income (typically PAYG) are expected to have *ceteris paribus* lower individual saving rates. Conversely, the saving ratio depends positively from income and the interest rate.

Assuming that all individuals are identical in each period, one can derive an aggregate saving by taking the weighted average of savings of the two segments of the population. Given that savings in the second period are by definition zero, the aggregate saving ratio is simply the product of the individual saving rate by the share of the active people on total population (or one minus the share of old people):

$$\frac{S}{Y} = \left\{(1-\alpha)\cdot\frac{p_i}{1+p_i}\cdot\left[1-\frac{\beta + T_i / w}{(1+r)\cdot(1-\alpha)}\right]\right\}\cdot\left[1-\frac{Old\ \ population}{Total\ population}\right] \tag{13}$$

where $S$ and $Y$ are aggregate saving and gross household income. As suggested by life-cycle theory,

[10] In the case where there is no perfect consumption smoothing, an increase of the replacement income could actually induce excess savings in the second period.

the aggregate saving ratio is expected to be negatively related to the share of old people in the population.

## 4 Back to the empirical evidence

There are a number of additional empirical facts that combined with the insights from the theoretical model may help to understand the ageing puzzles.

The first fact relates to consumption structure and how it evolves with age. Household survey data allow an assessment of the age-group specific composition of consumption expenditure by broad categories of goods and services. Figure 3 shows the relative level of consumption for main items and age group for the US. Most expenditure items display a hump-shaped profile. The consumption level per capita increases steadily with age, peaks at middle-age then decreases. Only health consumption increases with age. The same profiles can be observed for other countries (cfr. Oliveira Martins *et al.*, 2005).

While health care is one the few consumption items increasing with age,[11] it is also heavily subsidised. The shares of publicly provided health services to household income increased steadily countries (e.g. France, Sweden, UK and USA, see Figure 4). The ratios varying from 5-7 per cent of household income in UK and US to 10-15 per cent in France and Sweden.

At the same time, average replacement rates increased in most countries (Figure 5).[12] For example, in France, Italy and Portugal they reached above 80 per cent. In US, starting from a lower basis they reached close to 55 per cent in the early 2000s. In Sweden they have declined following pension reform to around 55 per cent. By 2003, average replacement rates in PAYG systems are around 58 per cent compared with 44 per cent in fully-funded systems. As many PAYG systems are currently unsustainable, this should induce a decline in replacement rates over time.

How the interrelations among these basic facts can explain the puzzles? The changing structure of consumption with age, together with a large subsidy for welfare goods and increasing replacement rates could provide an explanation for both the ageing-consumption and ageing-saving puzzles. If old-age consumers shift their consumption structure towards goods that are heavily subsidised and receive substantial retirement income, this could both induce a decline of observed consumption expenditures and a surplus of saving at older ages. This hypothesis will be tested in the next section.

To investigate how the saving rates are related to the introduction of fully-funded systems, we ran a simple regression of household saving[13] rates ($SAV_{it}$) on the rate of capitalisation ($CAP_{it}$, defined as the ratio of pension fund assets on GDP) for a set of 25 OECD countries for the period 1993-2005. We use both an OLS pooled regression and a fixed-effect model. To avoid a potential endogeneity problem, the capitalisation variable is lagged by one period. Results are as follows:

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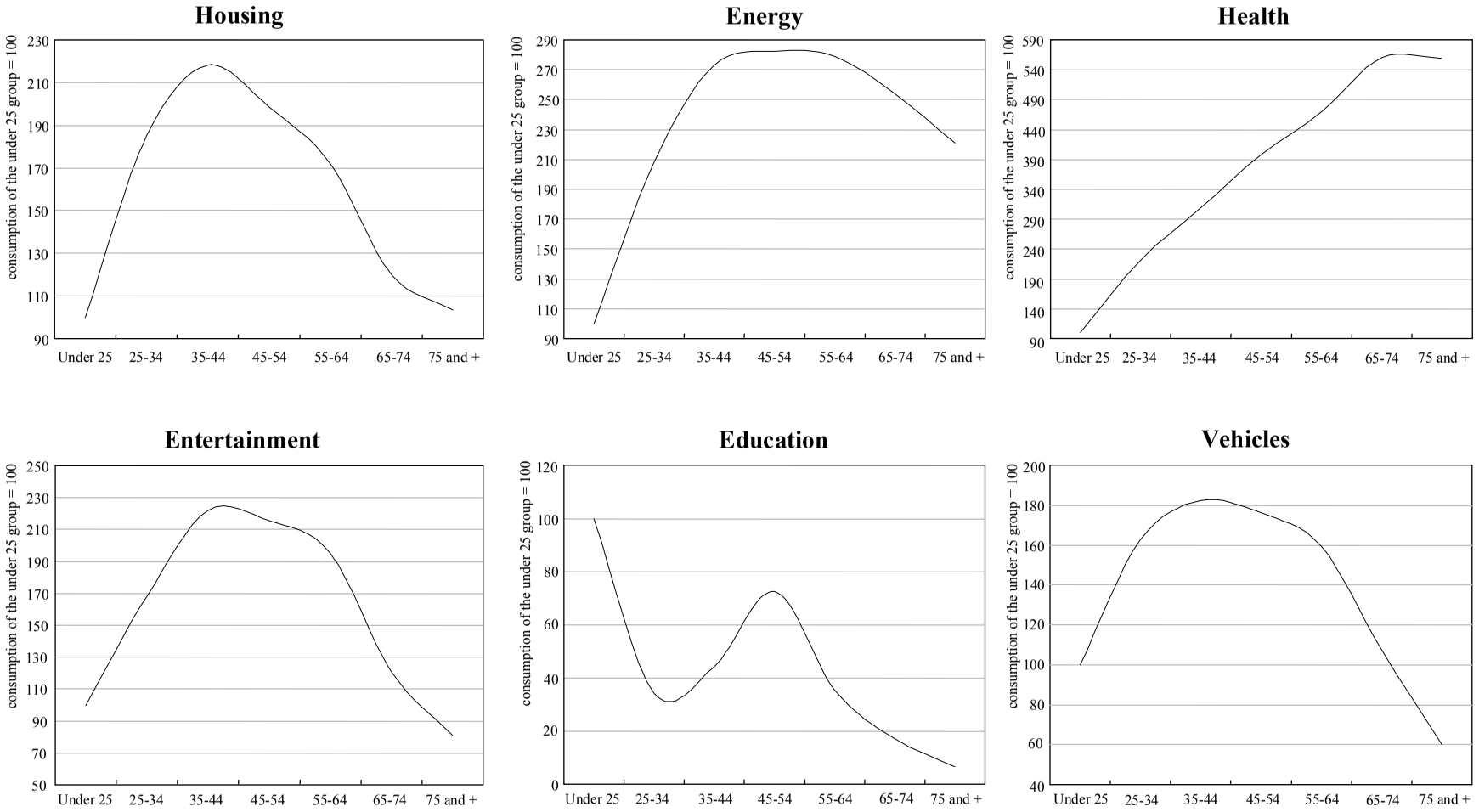
[11] Note that age by itself is not a major driver of health care expenditures, but other factors such as the proximity to death, the effects of income and technological progress. In contrast, the expenditures of long-term care are mainly determined by the age profile (see Oliveira Martins and de la Maisonneuve, 2007, for a discussion).

[12] Average replacement rates are defined here as the ratio between average pension benefits to gross average wages. They were computed using the data OECD Pension and ADB databases.

[13] Household saving is defined here as household disposable income less consumption. Household income consists primarily of the compensation of employees, self-employment income, and transfers. Property and other income – essentially dividends and interest – are evaluated in the light of business income and debt interest flows. The sum of these elements is adjusted for direct taxes and transfers paid to give household disposable income. Note that SNA93/ESA95 has changed the concept of disposable income for households (compared with SNA68/ESA79) so as to include private pension benefits and subtract private pension contributions.

**Figure 3**

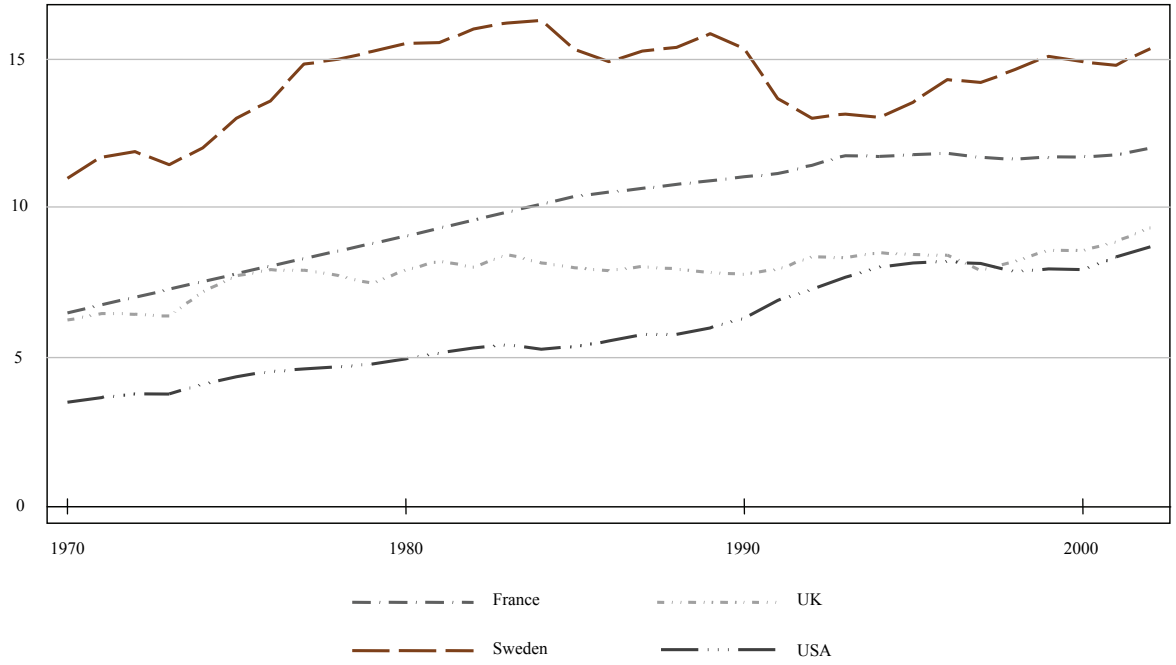
**Relationship between Age and Consumption by Expenditure Items in the US**




NB: Consumption levels per capita in each age group are normalised at 100 to the under 25 years age group.
Source: Consumer Expenditure Survey, US (2002).

**Figure 4**

**Ratio of Public Health Expenditures to Household Income**
*(percent)*




Source: OECD Health and ADB databases.

$$Sav_{it} = 9.23 - 0.47 \cdot Cap_{i,t-1} + \varepsilon_{it}$$
$$student - t \quad (-4.72) \qquad N = 193$$

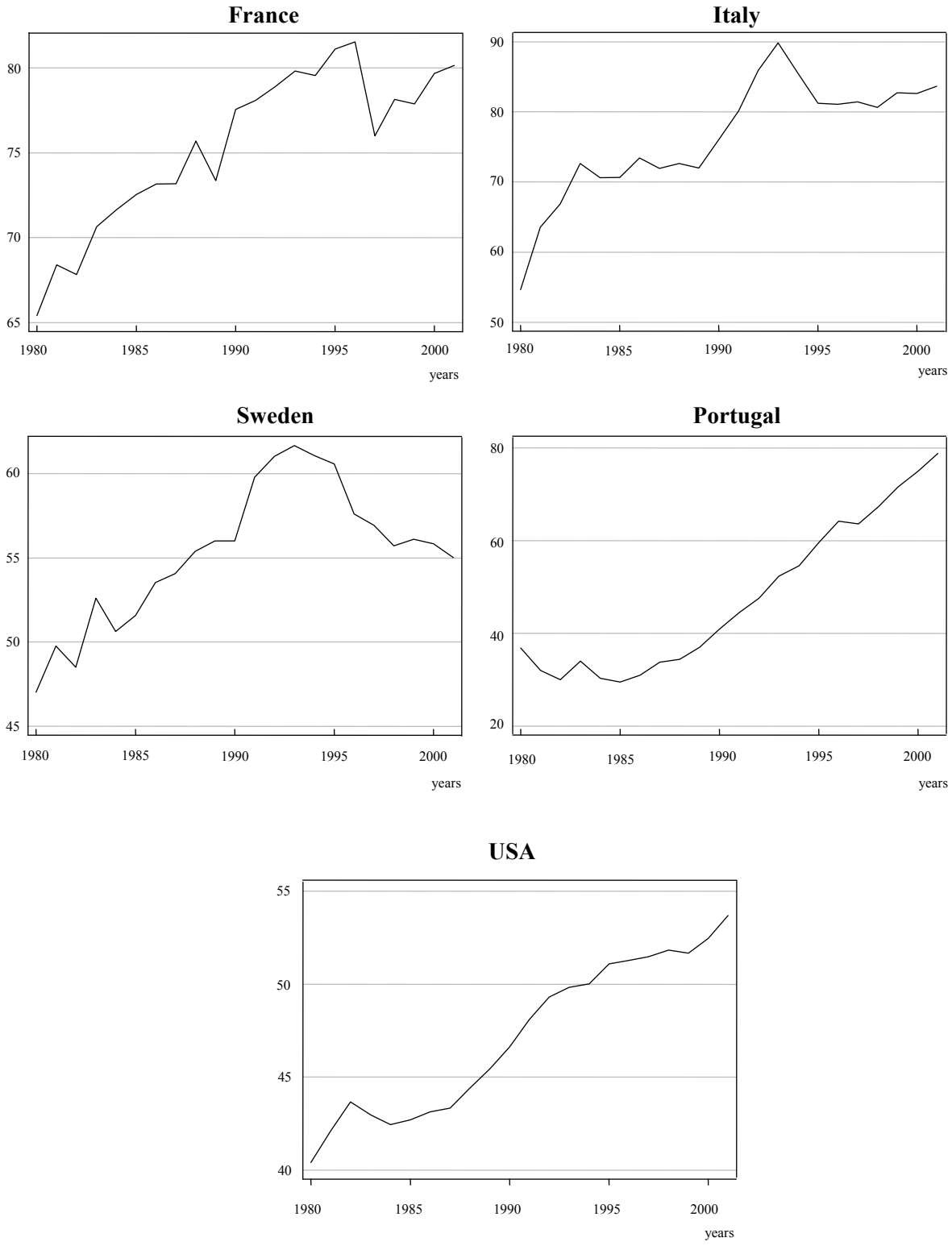
$$Sav_{it} = 11.4 - 0.12 \cdot Cap_{i,t-1} + Country\_Fixed\_effects + \varepsilon_{it}$$
$$student - t \quad (-4.40) \qquad N = 193$$

Capitalisation appears negatively correlated to saving rates. As our theoretical model suggests that PAYG systems should display lower not higher saving rates (see Figure 2), this is a saving-capitalisation puzzle. A possible explanation could be related to compensation between private and public savings or Ricardian equivalence (Barro, 1974). When government budgets are running on debt or public pension systems are not sustainable, households anticipate a required increase in future taxes and/or lower transfers and adjust their current level of savings accordingly. To check this point, we split our sample in two groups of countries: those offering a large coverage by PAYG and those having large fully-funded systems. The latter group include Australia, Canada, Denmark, Ireland, Netherlands, Switzerland, the UK and the US. All these countries have private pension assets close or above 100 per cent of GDP.

In both groups, the countries with the largest budget deficits also display the largest saving rates (Figure 6). The relationship is particularly strong for the countries dominated by PAYG systems.

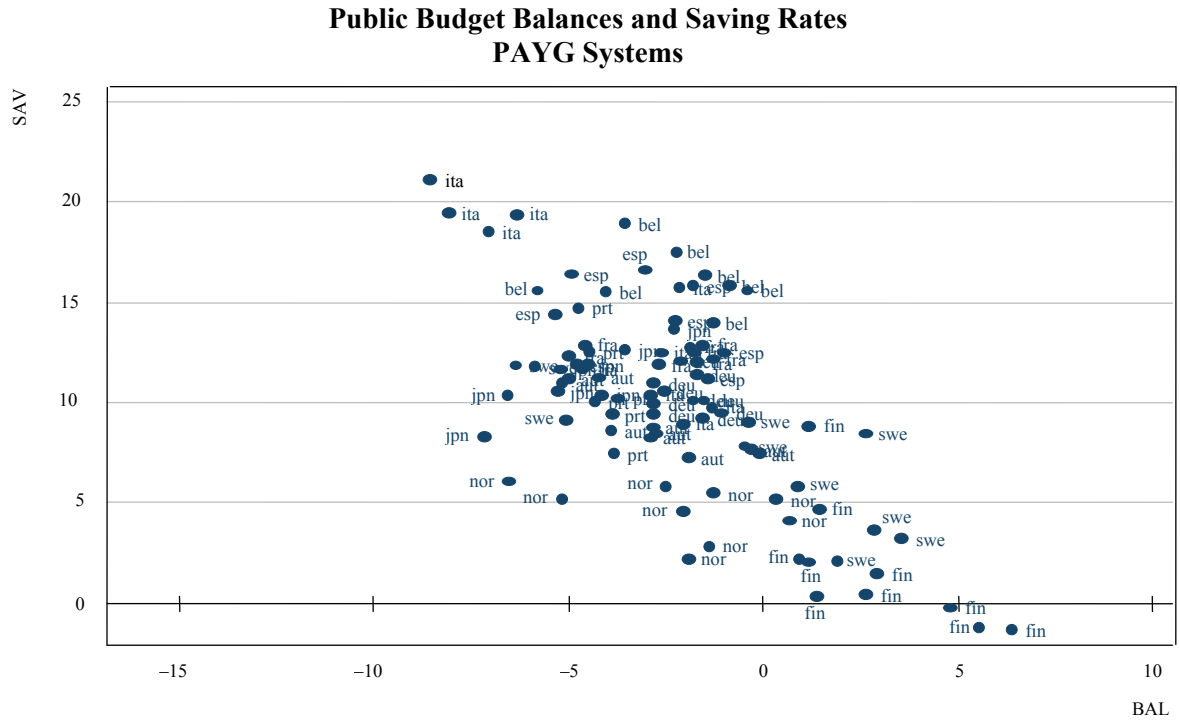
**Figure 5**

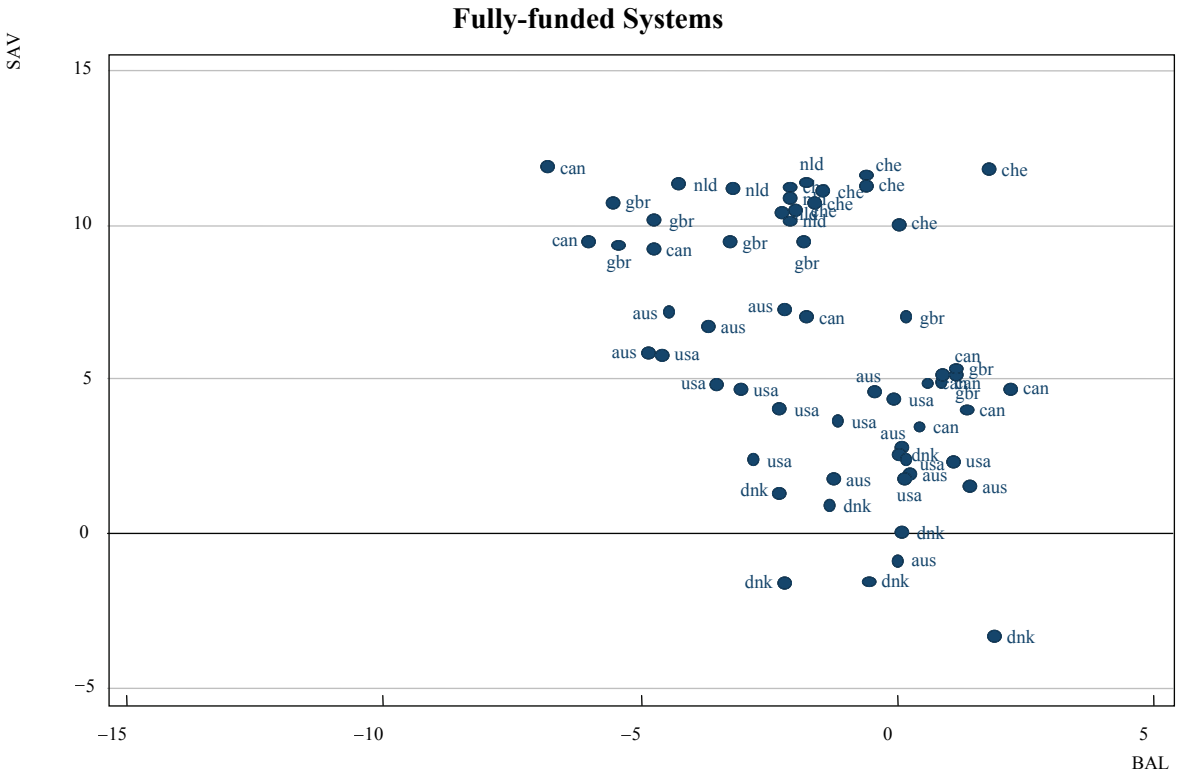
**Average Replacement Rates in OECD Countries**
*(percent)*




Source: OECD ADB data base and authors' calculations.

**Figure 6**




Legend: SAV: household saving rates (in percent of Household income); BAL: Public budget balance (in percent of GDP).
Source: OECD National Accounts and ABD database.

Now, if we run the same regressions for the sub-set of OECD countries with fully-funded systems we obtain the following results:

$$Sav_{it} = 0.06 + 0.84 \cdot Cap_{i,t-1} + \varepsilon_{it}$$
$$student - t \quad (5.45) \qquad N = 65$$

$$Sav_{it} = 12.9 - 0.12 \cdot Cap_{i,t-1} + Country\_Fixed\_effects + \varepsilon_{it}$$
$$student - t \quad (-4.55) \qquad N = 65$$

The OLS pooled regression model shows a positive impact between capitalisation and saving ratios. However, the introduction of fixed-effects changes the sign of the capitalisation coefficient. In other words, within countries, the increase in capitalisation is concomitant with a decrease in saving rates. A possible way to reconcile this result with our model would be to take into account the widespread increase of replacement rates, noted above. Despite the introduction of fully-funded systems, the latter could still induce a decline in savings.

## 5 Revisiting the ageing puzzles: empirical tests

Drawing from the above results, we are now in a position to test a reduced-from model embodying both the long-term determinants of the saving rates suggested by the theoretical model, as well as other determinants. The specification accounts for a variety of saving determinants identified in the literature (*e.g.* Edwards, 1996; Loayza, Schmidt-Hebbel and Serven, 2000; Musalem 2004). The list is as follows:

(i) *Short-term and macroeconomic determinants*:

- Public budget balance (in percent GDP)
- GDP per capita growth
- Long term real interest rate

(ii) *Social security and welfare systems determinants*:

- Ratio of Public health expenditures on Household income[14] (proxy for the provision of welfare goods)
- Average replacement rate (in public and private pension systems)[15]

(iii) *Structure of the population:*

- Shares of prime (25-59) and old-age (60+) population
- Ratio of life expectancy at 60 to life expectancy at birth[16]

To test for the hypothesis discussed above, we also introduced interaction terms. The first term is the product of public health spending ratio with the replacement rate. This captures the combined effect of the subsidization of health goods and pension income. By creating an excess income at older ages, it is expected to have a positive sign on total household savings. The second

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[14] Note that the ratio to household income is a better measure of the amount of transfers than GDP, as the latter by definition does not include the PAYG income.

[15] We used this variable because it the only available for a large sample of countries and years. A better proxy could eventually be the replacement rate of the retiring cohort in each year.

[16] As noted above, in the context of our two-period life-cycle model, the survival probability can be defined as the ratio of the numbers of years in retirement (period 2) to the numbers of years in period 1 (taken at 60 years). It is then straightforward to see that the term $p_i/(1+p_i)$ in equation (13) is equal to ratio of life expectancy at 60 divided by the life expectancy at birth.

term is the product of the replacement rate by the share of the old population. While a high replacement rate may discourage saving for the active population, it may also contribute to generate excess income after retirement.

The empirical test covers 18 OECD countries[17] and the period 1970-2003. Annex 1 provides descriptive statistics on the different variables used in the regressions. The estimates were carried out using country fixed-effects. A time trend captures an eventual spurious correlation among saving rates and explanatory variables (alternative specifications are also provided in Annex). We also present separate regressions for the sub-set countries with mainly PAYG and fully-funded systems.[18]

Most estimated coefficients are significant and have the expected sign (Table 1). The level of the public budget balance has a negative impact on savings, *i.e.* budget deficits tend to increase the saving rates. Among others, this result is compatible with the Ricardian equivalence, although the size of the estimated coefficient is below one indicating that there is no full compensation between public and private savings.[19] This helps explaining the saving-capitalisation puzzle, as suggested above.

The real interest rates impact positively saving rates, though the former not being significant in PAYG countries. The coefficient of GDP per capita growth is negative. But this control has often an ambiguous sign in saving equations. In line with the life-cycle model, an increase in the share of old-age population (60-99 years) has a strong negative impact on the saving rate for the total sample and for the PAYG systems. The share of prime-age population (25-59 years) is only significant for PAYG countries.

More importantly, in accordance to our theoretical framework, the generosity of pension systems and subsidisation of health goods impact negatively on saving rates. Both the Public health expenditure ratio and the average replacement rate have negative and significant coefficients for the overall sample. The magnitude of the effects for the health transfers is large. An increase of one percentage point of public health spending ratio to household income induces on average a decrease of 1.7 percentage points in the household saving rate (ranging from 0.5 to 2.5 percentage points in the sample).[20] In contrast, the combined effect of the replacement rate is rather small.

The estimates also show that larger health transfers combined with pension income has a positive impact on the saving ratio. This helps explaining the ageing-saving puzzle. The interaction between replacement rates and the share of old-age population has also a positive impact on savings. This result is compatible with the fact that old-aged households could display excess income when there is no perfect consumption smoothing (see footnote 10).

Finally, the sign of the life expectancy ratio is negative but not significant. This is compatible with equation (11) above, showing that the impact of survival probability on savings is not monotonic. The time-trend is also not significant. In annex additional specifications were also carried out, basically confirming the results from the base specification.

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17 Unfortunately, not all variables were available to all OECD countries thus the sample had to be restrained to Australia, Austria, Belgium, Canada, Denmark, Germany, Finland, France, Italy, Japan, Netherlands, Norway, Poland, Portugal, Spain, Sweden, UK and the US.

18 PAYG systems: Austria, Belgium, Germany, Finland, France, Italy, Japan, Norway, Portugal, Spain and Sweden; Fully-funded systems: Australia, Canada, Denmark, Netherlands, Switzerland, UK and the US.

19 This is line with other empirical results in the literature (e.g., Serres and Pelgrin, 2003; de Mello, Kongsrud and Price, 2004).

20 See column 1 of Table 1 and Annex 1 (the total effect is calculated as –3.56+0.034x52.6).

**Table 1**

**Econometric Estimates of Household Saving Rate***

| | Total | PAYG systems | Fully-Funded Systems |
|---|---|---|---|
| | (1) | (2) | (3) |
| Public budget balance | **–0.477***** | **–0.444***** | **–0.443***** |
| | **(–6.814)** | **(–5.977)** | **(–3.261)** |
| Real interest rate | **0.183**** | 0.0818 | 0.299** |
| | **(2.356)** | (1.016) | (2.073) |
| GDP per capita growth | **–0.426***** | **–0.544***** | **–0.343***** |
| | **(–5.628)** | **(–6.789)** | **(–2.778)** |
| Share of pop 25-59 | 0.165 | **0.693**** | 0.676 |
| | (0.607) | **(2.168)** | (0.962) |
| Share of pop 60-99 | **–2.031***** | **–1.734***** | –1.681 |
| | **(–3.509)** | **(–2.790)** | (–1.605) |
| Public health exp. ratio | **–3.277***** | –0.864 | **–3.822***** |
| | **(–5.622)** | (–1.026) | **(–2.921)** |
| Public health exp. ratio*replacement rate | **0.0250**** | –0.0170 | 0.0294 |
| | **(2.158)** | (–1.202) | (0.854) |
| Replacement rate | **–0.588***** | –0.0761 | –0.268 |
| | **(–3.726)** | (–0.477) | (–0.540) |
| Replacement rate*Pop 60-99 | **0.0282***** | **0.0190*** | 0.00668 |
| | (2.878) | **(1.917)** | (0.231) |
| Ratio Life exp. 60/Life exp. birth | –31.72 | –61.47 | –10.03 |
| | (–0.420) | (–0.605) | (–0.0739) |
| Time trend | 0.113 | 0.180 | –0.1000 |
| | (0.863) | (1.135) | (–0.344) |
| Constant | **65.56**** | 23.78 | 37.51 |
| | **(2.468)** | (0.647) | (0.771) |
| Number of observations | 245 | 134 | 111 |
| Number of countries | 18 | 11 | 7 |
| R-squared (within) | 0.647 | 0.719 | 0.716 |
| F-Test | 36.0 | 26.0 | 21.36 |
| *p*-value | 0.0 | 0.0 | 0.0 |

* Defined as household saving on household income. All models include country Fixed-effects (not reported). *T*-statistics are in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The Hausman specification test of the fixed-effects vs. the random-effect model is also provided (*p*-values in parenthesis indicate the fixed-effect cannot be rejected at 95 per cent confidence level).
PAYG systems: Austria, Belgium, Germany, Finland, France, Italy, Japan, Norway, Portugal, Spain and Sweden; Fully-funded systems: Australia, Canada, Denmark, Netherlands, Switzerland, UK and the US.

## 6 Concluding remarks

Some empirical facts on consumption, pension and saving do not fit well with theory. Four types of puzzles have emerged: an ageing-consumption, an ageing-saving, a saving-capitalisation and a saving-longevity puzzle. While most studies in the literature have analysed these puzzles separately, the originality of this paper is to integrate these four puzzles together. We developed a life-cycle theoretical model. Inspired from this model and a number of other determinants of savings analysed in the literature, we then estimated a reduced-form econometric model.

Our empirical results show that the four puzzles are linked together. The changing structure of consumption with age, together with a large subsidy for welfare goods and increasing replacement rates provides an explanation for both the ageing-consumption and ageing-saving puzzles. If old-age consumers shift their consumption structure towards goods that are heavily subsidised and receive increased retirement income, this induces a decline of consumption and a surplus of saving at older ages. Accordingly, higher replacement rates and larger public provision of health care contribute negatively to the savings rate. Furthermore, the level of the public budget balance has a negative impact on savings. This explains the observed saving-capitalisation puzzle. Finally, in line with standard life-cycle effects, we also showed that an increase in the share of the old-age population has a strong negative impact on the saving rate.

Finally, concerning the longevity-saving puzzle, our estimates did not provide significant results. Nonetheless, our theoretical model can explain why with large replacement rates an increase of the survival probability may induce a negative effect on savings.

## ANNEX 1

**Table 2**

**Descriptive Statistics of the Variables used in the Econometric Estimates**

| Variable | Obs. | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|---|
| Household saving ratio | 612 | 10.08 | 6.26 | –12.82 | 30.23 |
| Public budget balance | 529 | –2.78 | 3.45 | –16.38 | 7.84 |
| Real interest rate | 599 | 3.05 | 3.64 | –17.82 | 14.25 |
| GDP per capita growth | 675 | 2.18 | 2.37 | –9.16 | 10.70 |
| Share of pop 25-59 | 507 | 46.08 | 2.89 | 37.44 | 51.79 |
| Share of pop 60-99 | 522 | 16.76 | 3.10 | 10.53 | 24.85 |
| Public health exp. ratio | 535 | 9.39 | 2.68 | 3.13 | 16.22 |
| Public health exp. ratio*replacement rate | 329 | 526.20 | 181.14 | 194.71 | 961.48 |
| Replacement rate | 392 | 52.61 | 13.78 | 28.78 | 89.87 |
| Replacement rate*Pop 60-99 | 355 | 929.74 | 347.44 | 369.78 | 2007.54 |
| Ratio Life exp. 60/Life exp. birth | 681 | 0.26 | 0.01 | 0.23 | 0.30 |

## ANNEX 2
## SENSITIVITY ANALYSIS WITH ALTERNATIVE ECONOMETRIC ESTIMATES

In order to test the sensitivity of the results to alternative specifications, we also carried out estimates using the random-effect model (Table 3) and the dynamic panel estimator using the Arellano-Bond (1991) method (Table 4). Note that, according to the Hausman test, the random-effect model is not accepted against the fixed-effect model (our preferred specification).

In general, the signs of estimated coefficients are robust. The long-term real interest rate, the GDP per capita growth and public budget balance keep the same signs and roughly the same magnitudes. The share of old-age (60+) population also remains negative, while the effect of the share of prime-age populations is positive. The health expenditure ratio (the proxy for the provision of welfare goods) is robustly negative, as well as the replacement rate. The interaction terms are also robust as they display the same signs as in the base specification. The coefficient on the relative life expectancy only appears negative in the case of the random-effect panel and for funded systems.

**Table 3**

**Econometric Estimates of Household Saving Rate, Random-effect Model***

| | Total | PAYG Systems | Fully-funded Systems |
|---|---|---|---|
| | (1) | (2) | (3) |
| Public budget balance | **–0.482***** | **–0.506***** | **–0.322**** |
| | **(–6.775)** | **(–4.432)** | **(–2.147)** |
| Real interest rate | **0.149*** | 0.194 | 0.227 |
| | **(1.907)** | (1.573) | (1.403) |
| GDP per capita growth | **–0.415***** | **–0.435***** | **–0.479***** |
| | **(–5.390)** | **(–3.229)** | **(–3.126)** |
| Share of pop 25-59 | **0.524**** | **0.774***** | **2.918***** |
| | **(2.192)** | **(5.551)** | **(9.375)** |
| Share of pop 60-99 | **–1.234**** | –0.343 | 0.163 |
| | **(–2.402)** | (–0.898) | (0.155) |
| Public health exp. ratio | **–3.539***** | **–2.468***** | **–4.160***** |
| | **(–6.349)** | **(–3.653)** | **(–3.373)** |
| Public health exp. ratio*replacement rate | **0.0343***** | **0.0268**** | **0.0616**** |
| | **(3.109)** | **(2.158)** | (2.165) |
| Replacement rate | **–0.524***** | **–0.612***** | –0.148 |
| | **(–3.364)** | **(–2.752)** | (–0.412) |
| Replacement rate*Pop 60-99 | **0.0179**** | **0.0148**** | –0.0211 |
| | **(2.018)** | **(1.977)** | (–0.870) |
| Ratio Life exp. 60/Life exp. birth | –60.07 | 36.98 | **–368.2***** |
| | (–0.897) | (0.856) | **(–4.196)** |
| Time trend | 0.00446 | –0.0650 | **–0.645***** |
| | **(0.0386)** | (–0.745) | **(–6.086)** |
| Constant | **49.28**** | –0.785 | 16.61 |
| | (2.066) | (–0.0372) | (0.675) |
| Number of observations | 245 | 134 | 111 |
| Number of countries | 18 | 11 | 7 |
| R-squared (within) | .. | .. | .. |
| Wald-test | 377.3 | 402.8 | 307.9 |
| Hausman-test (p-value) | 37.23 | 99.64 | .. |
| | (0.0) | (0.0) | .. |

* Defined as household saving on household income. *T*-statistics are in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The Hausman specification test of the fixed-effects vs. the random-effect model is also provided (*p*-values in parenthesis indicate the fixed-effect cannot be rejected at 95 per cent confidence level).

PAYG systems: Austria, Belgium, Germany, Finland, France, Italy, Japan, Norway, Portugal, Spain and Sweden; Fully-funded systems: Australia, Canada, Denmark, Netherlands, Switzerland, UK and the US.

**Table 4**

**Econometric Estimates of Household Saving Rate, Dynamic Panel Estimates***

| | Total | PAYG Systems | Fully-funded Systems |
|---|---|---|---|
| | (1) | (2) | (3) |
| Lagged dependent variable | **0.435***** | **0.354***** | **0.388***** |
| | **(10.57)** | **(5.898)** | **(6.127)** |
| Public budget balance | **–0.232***** | **–0.284***** | **–0.211*** |
| | **(–4.181)** | **(–4.551)** | **(–1.901)** |
| Real interest rate | **0.153**** | **0.197***** | 0.145 |
| | **(2.491)** | **(2.824)** | (1.331) |
| GDP per capita growth | **–0.395***** | **–0.491***** | **–0.335***** |
| | **(–7.373)** | **(–7.815)** | **(–3.688)** |
| Share of pop 25-59 | 0.102 | 0.213 | 0.451 |
| | (0.476) | (0.789) | (0.762) |
| Share of pop 60-99 | **–0.958*** | **–2.143***** | 0.251 |
| | **(–1.858)** | **(–3.388)** | (0.255) |
| Public health exp. ratio | **–2.351***** | –0.239 | **–2.043*** |
| | **(–5.027)** | (–0.280) | **(–1.931)** |
| Public health exp. ratio*replacement rate | **0.0197**** | –0.0170 | –0.000989 |
| | **(2.149)** | (–1.202) | (–0.0364) |
| Replacement rate | **–0.356**** | –0.267 | 0.297 |
| | **(–2.348)** | (–1.355) | (0.721) |
| Replacement rate*Pop 60-99 | 0.0133 | **0.0297***** | –0.0105 |
| | (1.514) | **(2.787)** | (–0.430) |
| Ratio Life exp. 60/Life exp. birth | 30.40 | –88.72 | –23.37 |
| | (0.548) | (–1.056) | (–0.232) |
| Time trend | 0.0403 | **0.287**** | –0.0794 |
| | (0.428) | **(2.164)** | (–0.342) |
| Constant | 26.57 | 48.67 | 0.891 |
| | (1.342) | (1.549) | (0.0221) |
| Number of observations | 215 | 116 | 99 |
| Number of countries | 18 | 11 | 7 |

* Defined as household saving on household income. Regressions were carried out using the dynamic Arellano-Bond estimator. *T*-statistics are in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
PAYG systems: Austria, Belgium, Germany, Finland, France, Italy, Japan, Norway, Portugal, Spain and Sweden; Fully-funded systems: Australia, Canada, Denmark, Netherlands, Switzerland, UK and the US.

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# PUBLIC PENSIONS AND THE LABOUR MARKET IN NEW ZEALAND

*Paul Rodway*[*]

*From 1977, New Zealand has had one of the simplest public pension systems in the world, a basic, universal pension – concentrating on the prevention of poverty in old age, with some success. The present set-up implies that without means tests, recipients can continue working, receiving a practically universal payment from their 65th birthday, and with only limited options for taking the pension before age 65.*

*This paper samples work done at the New Zealand Treasury about the drivers of the decision to cease being active in the labour market. Hurnard (2005) analysed how changes in the eligibility age for New Zealand Superannuation (NZS) twice in the past 30 or so years have influenced older people's decisions to participate actively in the labour market. Enright and Scobie (2009) have recently used survey data to quantify the separate effects of NZS, other income, health status, education, marital status, wealth, and so on, on the decision to participate for older workers, or to reduce the hours of working.*

*While labour participation of older workers has risen since the gradual lift in the eligibility age from 60 to 65 between 1992 and 2001, there still is a 50 per cent fall-off in participation between people aged 60-64 and 65-69 year olds. So New Zealand Superannuation, despite having no explicit financial disincentives, is still for many older than 65 a barrier to continued participation in the labour market. The coming acceleration of population ageing means that demand for older workers is likely to grow and that any barriers, real or imagined, should be removed.*

## 1 Introduction

This paper reviews recent work done in the New Zealand Treasury on potential drivers of older people's decisions to reduce the hours spent working or to withdraw completely from the paid workforce. It shows that the country relies almost on a universal public scheme where the objective is poverty prevention, rather than publicly supported income replacement.

Population ageing is likely to increase the number of people 65 and older over the next 40-plus years and produce little growth in the population between 15 and 64. This structural change will challenge New Zealand's long-term economic growth prospects and our ability to maintain a stable public debt path. A way of meeting part of this challenge might be for older people to work longer (either by extending their paid working lives or working for more hours or both) and public policy may have a role in facilitating such a change.

The paper is structured as follows. Section 2 describes the pension system in operation in New Zealand since 1977, while Section 3 shows how older people have participated in the labour market in New Zealand and compares this with participation in other OECD countries.

Section 4 then updates work done by Hurnard (2005) analysing how employment and retirement patterns among older people have responded to changes in public pension policy, especially to the age of eligibility for the universal pension (now called New Zealand

[*] New Zealand Treasury.

Superannuation, NZS). The modelling indicates that eligibility for NZS is accompanied by a fall in participation of at least 24 percentage points.

While the aggregate modelling says something about the effects of NZS on participation of older people, sorting out the relative effects of many potential drivers requires analysis of detailed survey results. Since Hurnard's paper was published, work on two surveys has given us some insights into this issue.

Then Section 5 picks up some of the results of Enright and Scobie (2009, forthcoming) about the factors associated with people aged 55-70 continuing in the labour force on a full- or part-time basis, rather than retiring. This study uses the first wave of a new longitudinal survey of health, work and retirement conducted by Massey University in 2006. Relative to being married to a non-working spouse, being separated, a widow/er or married with a working spouse tends to raise the probability of remaining in the labour force, while receiving NZS (or a benefit) lowers the working probability (by 16 percentage points). Levels of significance of these factors are briefly compared with results using Statistics New Zealand's Survey of Family, Income and Employment (2002-05) restricting the sample to 55 and older.

Finally, Section 6 draws some conclusions from these studies about the policy implications for labour participation by older New Zealanders.

## 2 Public pensions in New Zealand

A small country, as far from Europe as it is possible to be, New Zealand has conducted many social experiments, including introducing a public pension system in 1898. Since then, in this area, we have tried targeting, universality, different levels of generosity, dual public pensions, and changes in the eligibility age of our public pension system. The regime introduced in 1977 set up the broad outlines of the present NZS.

Pension systems have two main goals: first, to prevent destitution in old age by redistributing income to poor pensioners (social protection) and secondly to help workers maintain their living standards in retirement (earnings replacement). NZS follows the New Zealand (and Anglo countries') tradition of coming down firmly on the side of social protection.

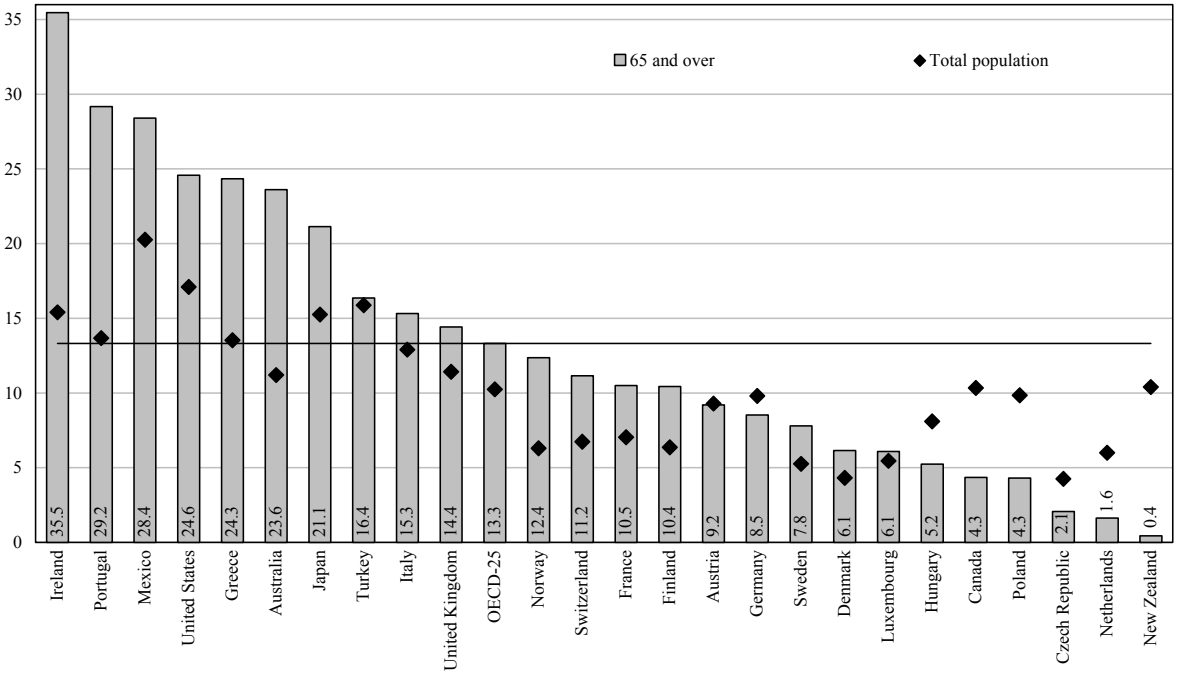
International and national reports rate New Zealand's universal flat-rate public pension scheme highly in achieving the objective of the prevention of poverty in old age. For many, NZS is a major source of retirement income. Figure 1 shows that the poverty rates for New Zealanders aged 65 and over compare very favourably with other OECD countries (also see OECD, 2009).

*Positive Ageing Indicators* (a report released by the Ministry of Social Development, 2007) says older people in New Zealand generally have adequate incomes that provide them with a reasonable standard of living. This assessment varies with population subgroups and is not so positive for older Māori and single people, especially single women. The adequacy of NZS payments is reflected in the low levels of poverty and hardship among the older population. The report says this conclusion also depends on the high levels of mortgage-free home ownership in the current cohort of older people. It is important, the report notes, that future generations of older people enter retirement as home-owners – either mortgage-free or with small mortgages – as mortgage-holders and those who live in rental accommodation are among the most disadvantaged.

That report ties NZS with other forms of savings and wealth. Are we saving enough so that consumption can continue beyond the years of paid work? Research by Scobie and his collaborators (2007, for example) on modelling consumption smoothing for 45- to 64-year-olds based on wealth surveyed in the Survey of Family, Income and Employment (SoFIE) suggests that the highest proportion of inadequate savers fall in the middle income group (couples with incomes

**Figure 1**

**Lower Poverty Rates among Older People than for the Total Population in One-third of OECD Countries**
**Poverty Rates for People Aged 65-plus and for the Total Population, 2000**
*(percent)*




Source: OECD (2005), *Society at a Glance, Social Indicators*.

between $15,000 and $50,000). As expected, for the majority of people in the lower income group (quintile 1) no further saving should be required as NZS offers a higher income than their projected pre-retirement income. Wealthy individuals and couples (quintile 5) would not need to save more than they are doing already. Overall, 70 per cent of single individuals and 50 per cent of couples are estimated to require no more saving for retirement. This work, in other words, suggests that for the majority, NZS is playing a role at providing a base for consumption in retirement for the lower income groups.

Since 1977, New Zealand has changed the parametric settings many times, often after heated debate, and has twice made changes, with little warning, to the age at which the pension can be taken up. Promises to improve settings are often part of political platforms and these settings are the subject of deals between potential coalition partners.

The latest change to the NZ pension system is the addition of an auto-enrolment scheme with private individual accounts (KiwiSaver), a variant of a compulsory scheme that was introduced in 1975 and lasted for only a year and another proposed scheme that was comprehensively rejected in a referendum in 1997. The first KiwiSaver accounts were opened on 1 July 2007 and it has been taken up enthusiastically so far by about 40 per cent of the labour force under 65.

NZS differs from systems in many other countries in several key ways. It is:

- universal,
- paid at a flat rate,
- almost impossible to access before 65,
- paid if working or not.

NZS is now available to everybody (subject to a residency requirement) on turning 65. It is paid out at a rate, for a couple, equal to around 66 per cent of the average ordinary-time earnings, net of tax, and generally grows with growth of the average wage.[1] At present about 520,000 people receive "Super," about 95 per cent of people aged 65 and older.

The fixed age of eligibility means there are very limited options for someone wishing to retire before that age, unlike the situation in many other countries. There is no trade-off between the amount of NZS and when you start to receive it. Before age 65, the only public support is through the income-tested benefit system, where payment is lower than NZS, subject to tight income tests, and other conditions (such as the requirement to look actively for work, or being sick or an invalid). The one exception is for the younger partner of someone 65 and older who can choose to receive NZS, but the combined NZS payment is abated against their joint incomes. This "non-qualified spouse" (usually female) can therefore receive NZS before 65 and explains the tendency for early retirement of some females.[2]

Since the late 1990s, NZS has not been income- or asset-tested. The payment level is unconnected to past income. Most importantly, a person can receive NZS and still remain in work. This means there is no implicit tax on earnings beyond age 65, since you can receive NZS while continuing to work. As a result of these institutional settings, the financial conditions around eligibility for NZS tend to discourage early retirement.

In addition, since 1999 it has been unlawful for an employer to require the retirement of an employee just on the basis of age. This has probably been a driver of the rise in employment rates among those above NZS eligibility age.

Two changes to the eligibility age have occurred since the mid-1970s: an instantaneous drop in 1977 and a progressive increase in the age from 1992 to 2001. As Hurnard notes, these two natural experiments enable us to estimate the strength of the labour force response to NZS eligibility age by older workers.

OECD's *Pensions at a Glance* (2007) examines the role of private pensions across the OECD. In 1990, the coverage in New Zealand was 23 per cent of workers. By 2006 only 14 per cent of the labour force was covered by private schemes. This fall may be a consequence of the success of NZS at poverty prevention over the past three decades. The OECD report concludes that for New Zealanders to reach retirement incomes at average OECD rates, voluntary provision needs to be boosted by something around 5-7 per cent of earnings for an average earner.

Shortly after the present pension system was introduced in 1977, the fiscal cost rose to around 8 per cent of GDP. Subsequently lowering of the relativity with wages, raising of the age of eligibility through the 1990s, lower birth rates in the 1930s, some income-targeting and a buoyant economy have brought the ratio of total payments to GDP down to 4 per cent. But the accelerating ageing of the population suggests that by mid-century the ratio will return to 8 per cent, or more.

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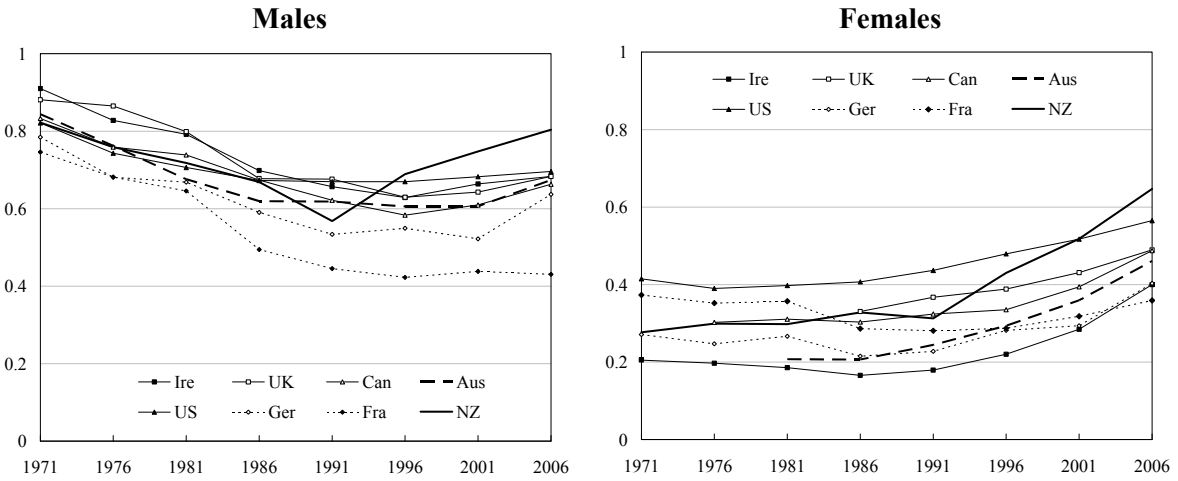
[1] It is indexed to the CPI, but the net amount paid to a couple must lie between 66 and 72.5 per cent of the net average wage. As wages generally grow faster than consumer prices, this usually means that it grows with wages.

[2] This gender difference is supported by OECD estimates of the average effective age of retirement in New Zealand for the period 2002-07: 63.9 years for women and 66.5 for men. These estimates are derived from changes in participation rates over a five-year period for successive cohorts of individuals aged 40 and over (OECD, 2009).

**Figure 2**

**Labour Force Participation Rates, 55-64, by Sex, 1971-2006**




Source: OECD Labour Market Statistics for countries other than New Zealand. NZ data are taken from Census documents (in 1971 and 1976, these have been adjusted for a change of coverage of "actively engaged").[3]

Public pension expenditure, health and aged care are the items in public spending that are most dependent on population changes and other pressures. Hence an awareness about what the effects of changing or not changing our public pension system mean for other spending is important for the on-going debate about fiscal sustainability over the coming decades.

## 3 Trends in older labour force participation

Across many OECD countries, the trend since the 1970s has been for people to retire at a younger age, despite evidence of rising life expectancy. Figure 2 shows the generally falling rates of labour force participation rates in selected OECD countries among males in the age group 55-64 and rising rates for females.

The figure for males shows New Zealand's experience stands in contrast with (some) other countries. All shared the declining trend in older male participation from 1971 to 1991. The reasons for this trend are the increasing coverage and generosity of retirement benefits and actuarially unfair returns from postponing retirement. This changed in New Zealand from 1991 onwards and has continued to 2006 (and beyond). Some countries have introduced policies that are starting to slow or reverse this trend. The picture is similar for older females, but the break since 1991 has been overlaid on a generally rising trend in participation.

It is also instructive to look at 2006 census data on full-time and part-time employment rates (Figure 3). For both men and women, the overall employment rate falls by about 10 percentage points between 64 and 65, the present age of eligibility for NZS.

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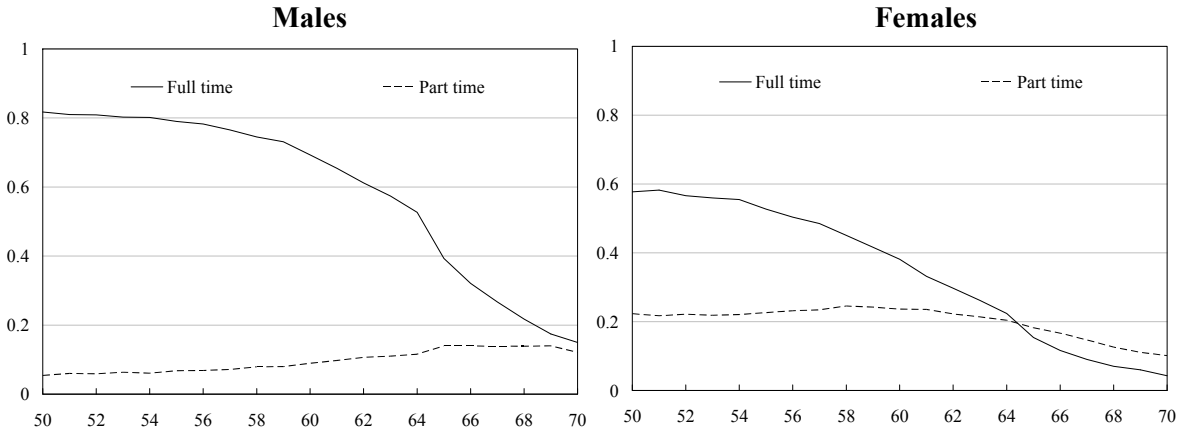
[3] There are two sources of NZ participation data: the 5-yearly censuses for single years of age, 15 to 90+, labour force status, and the Household Labour Force Survey, 5-year age groups, 15-19, . . .60-64, and 65+, quarterly, starting in 1986. Here we use the census numbers to cover the period of the eligibility changes.

**Figure 3**

**Full-time and Part-time Employment Rates, by Sex, 2006**




Source: Statistics New Zealand, Census 2006.

Many factors can influence individual decisions about when to leave paid work. Financial factors could include accumulated assets, current and prospective earnings and the value of any pensions. Examples of non-financial reasons for leaving the labour market include poor health, family care responsibilities, the retirement of a spouse, informal age-based discrimination, layoffs, and a wish to do voluntary work or to enjoy more leisure time.

The next section uses aggregate census data and an analysis of changes in public pension policy settings to estimate the strength of each of these factors. The following sections summarise work using unit record data of a cross-sectional survey (so far) and a longitudinal survey to explain the variability of individual retirement behaviour.

## 4 Effect of NZS on aggregate participation

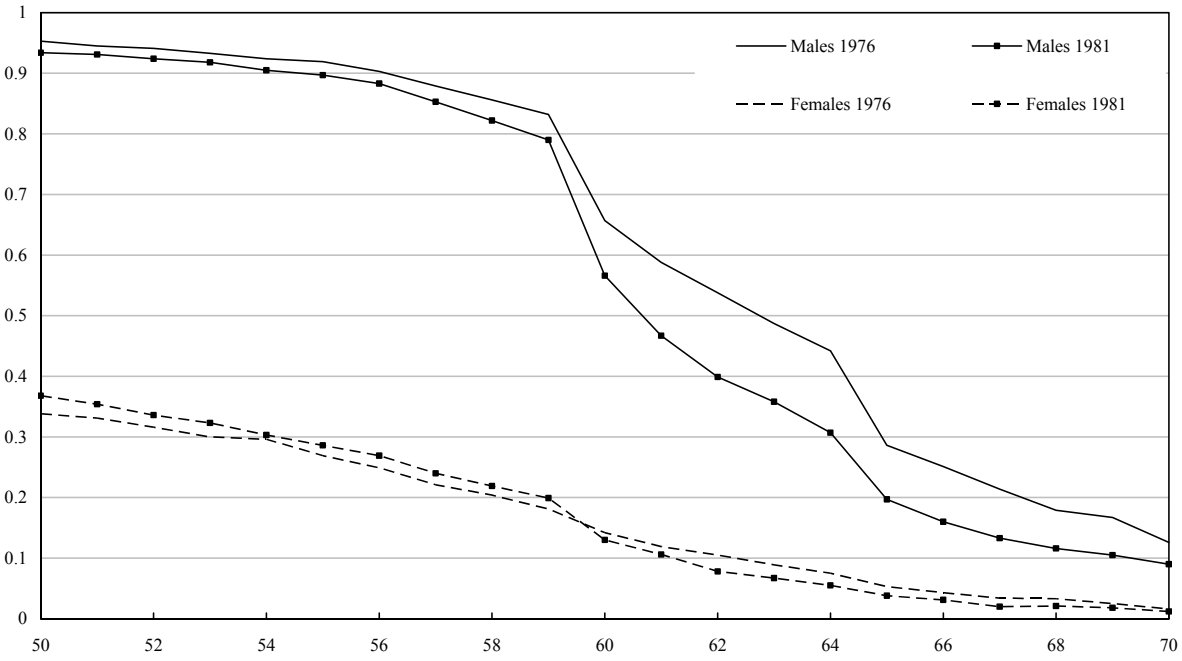
This section updates the work of Hurnard (2005) in using a simple aggregate model to explain the effect of changes in the age of eligibility on participation trends. Two policy changes in opposite directions are used to estimate the effects of these changes. These were very rapid policy decision processes and transitions compared with those in other countries.

The first change occurred in 1977 when the qualifying age for universal superannuation was suddenly dropped from 65 to 60 and at the same time the amount paid was boosted. For 40 years to the mid-1970s, New Zealand had two pensions: the universal pension for those 65 and older and an income-tested Age Pension already available at 60 and claimed by about one third of 60-64 year olds. Figure 4 shows the proportion of men in full-time employment aged 60-64 fell much more than those of a slightly younger age group. Those aged 65 and older show the effect of the larger pension on offer. The trend towards higher participation by women in their 50s becomes reversed from 60 in response to eligibility for superannuation.

The second change happened between 1992 and 2001. In 1989, the government announced that the prospective rise in pension costs would be addressed by gradually lifting the eligibility age from 60 to 65 between 2006 and 2025. Then the economy went into recession. With little debate or warning, the government moved the qualifying age progressively back up to 65, starting almost

**Figure 4**

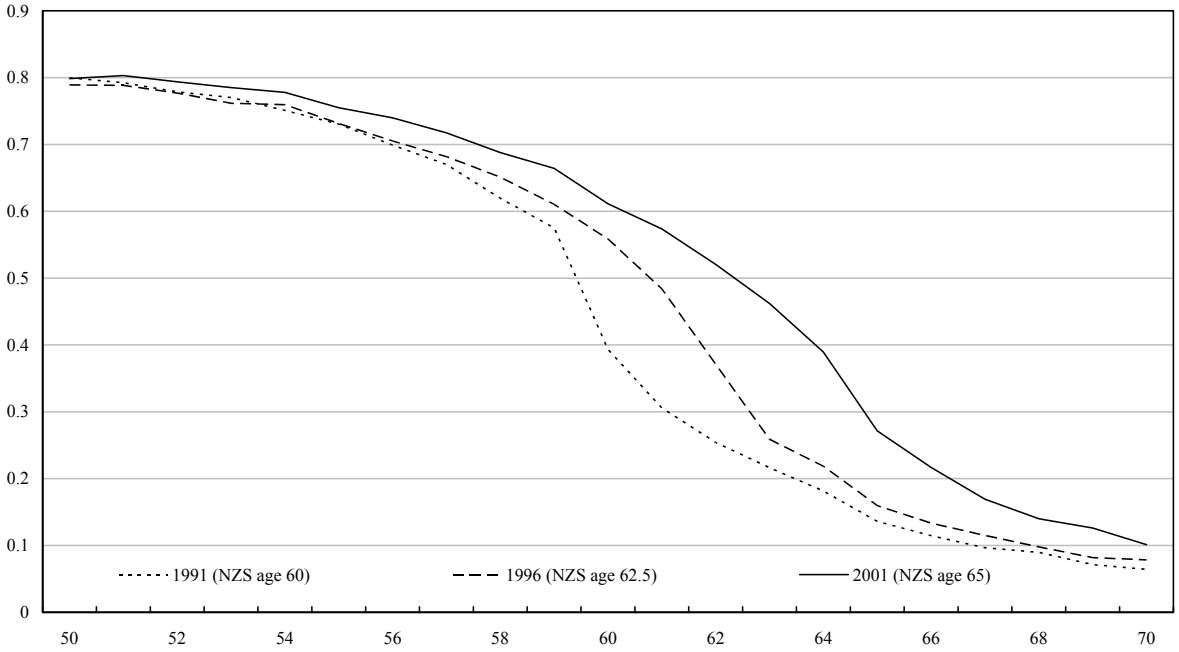
**Changes in the Full-time Employment Ratios, by Sex, 1976 and 1981**




Source: Rochford (1985).

**Figure 5**

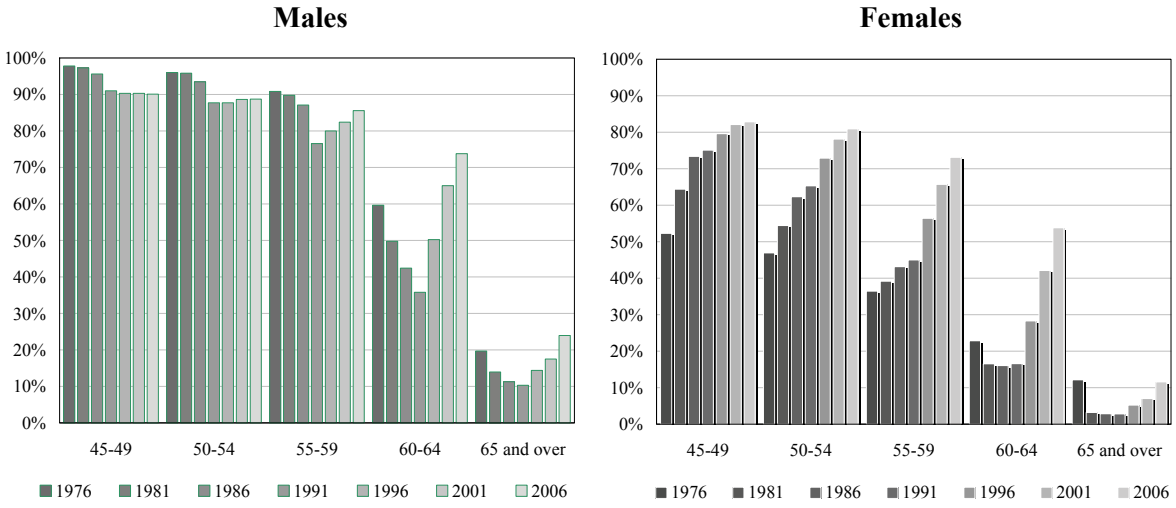
**Changes to Male Full-time Employment during the Transition, 1991-2001**




Source: Statistics New Zealand, census data.

**Figure 6**

**Labour Force Participation Rates, by Age Group, by Sex, 1976-2006**




Source: Statistics New Zealand Census documents and Hurnard's adjustments of data for 1976.

immediately with the transition taking place over the following decade. The short notice disrupted the retirement plans of older workers, but a Transitional Retirement Benefit, income-tested but not work-tested, helped to ease the transition. The 1991 census captured labour market behaviour before the announcement and the transition was complete by the 2001 census. The 1996 census marked the half-way point. Figure 5 shows the rise in participation rates for males aged 60-64 was 20 percentage points or more between 1991 and 2001.

The data for the Hurnard study consist of census participation rates for people aged 45 and older for the seven census years from 1976 to 2006 covering the period of eligibility age changes. Definitions of the labour force participation have changed over the years, reflecting the exclusion of part-time employed and then the change in the number of hours per week constituting part-time employment. The data from 1976 are adjusted to reflect the current definition of a labour force participant: someone who works regularly for one or more hours per week or is unemployed and seeking work in the week prior to the census.

From Figure 6, note that rates for younger females generally rise from census to census, while rates for the males generally are static or falling. Also the 60-64 year age groups show a change in trend compared with the younger groups for both sexes.

Hurnard developed a relatively simple model that controls for the general unemployment rate, age group, whether that age group is currently eligible for NZS, gender and a secular rising trend in female participation. This model can explain a high proportion of the variation in participation rates.

All the coefficients in Table 1 are statistically significant at the 99 per cent level except for one age-group dummy. When the unemployment rate, an indicator of the tightness of the labour market, rises, participation falls. Both male and female participation lowers with age, as you might expect as a result of factors such as the maturing of private savings and rising health problems. Over the period, when eligibility for NZS is triggered, male participation drops by a further 24 percentage points. For females, there is a direct fall of a further 8 percentage points after they

**Table 1**

**Determinants of Labour Force Participation**
**Dependent Variable: Age Group/Gender Participation Rates in Census Year**
*(percent)*

| Explanatory Variables | Coefficient | *t*-stat |
|---|---|---|
| Constant | 98.76 | 66.62 |
| Unemployment rate for year to census date *(percent)* | –1.19 | –6.16 |
| Eligibility of age group for NZS (0, prop,1) | –24.25 | –8.80 |
| Female eligibility for NZS (0, prop, 1) | 16.35 | 2.95 |
| Female near eligibility for NZS (0, prop, 1) | –11.27 | –3.87 |
| Female (0,1) | –42.79 | –19.77 |
| Log time trend for females not eligible for NZS (trend based on 1976=1, 1981=2, …) | 18.41 | 16.16 |
| Dummy, males 50-54 | –2.05 | –1.24 |
| Dummy, males 55-59 | –8.60 | –5.18 |
| Dummy males 60-64 | –26.29 | –11.79 |
| Dummy, males 65 and older | –52.89 | –16.44 |
| Dummy, females 50-54 | –6.97 | –4.20 |
| Dummy, females 55-59 | –15.25 | –6.57 |
| Dummy females 60-64 | –24.92 | –6.47 |
| Dummy, females 65 and older | –36.04 | –7.91 |
| Adjusted *R* square | | 0.99 |
| Observations | | 70 |

Source: Update of Hurnard (2005) to include Census 2006.

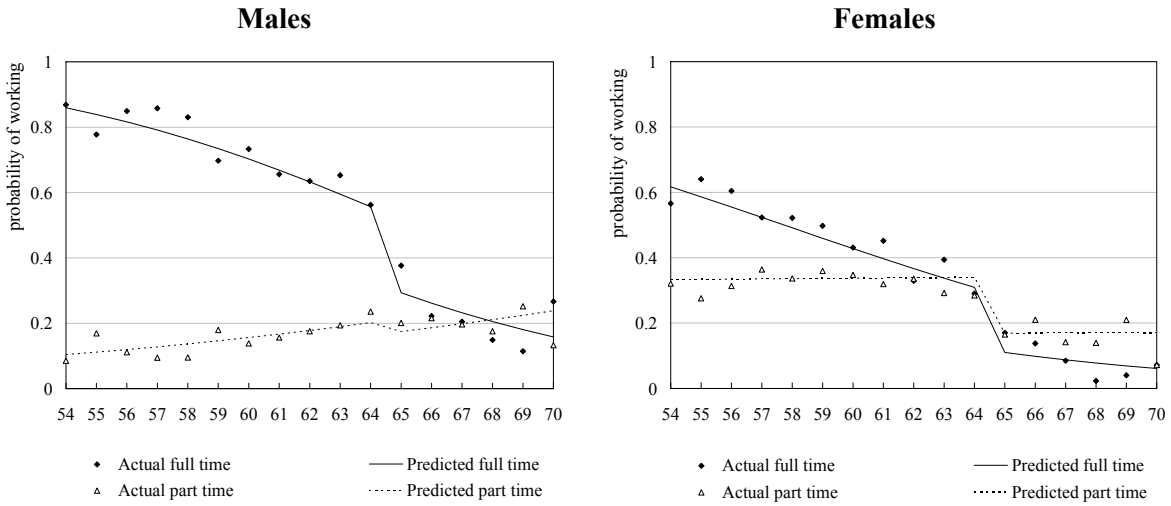
become eligible for NZS (–24.25+16.35). Put another way, if the eligibility age in 1991 had been 65 instead of 60, then participation rates of people aged 60-64 would have been 24 points higher.

The regression results also indicate that average participation rates for women fall if they are within five years of becoming eligible for NZS. This "non-qualified spouse" effect is estimated to lower participation in the near-eligible band by 11 percentage points. This reflects the "joint retirement" decision by couples when the male (typically) starts to receive NZS. An estimated 6 per cent of couples take this option.

It is worth remarking that eligibility for NZS lowers participation rates for men and women, despite the incentive to stay on working (no legal retirement age, NZS is not work tested, absence of early retirement provisions, crowding out of private provision). For many in the lowest quintile of income, NZS is a good replacement for income received in the year before 65. For many, 65 is still a strong signal for retirement.

**Figure 7**

**Unconditional Probabilities of Working Full or Part Time, by Age and Sex**




Source: Enright and Scobie (2009).

## 5 Other drivers of older participation

The next stage of analysis is to examine unit record data in an attempt to sort out what factors are driving people to decide whether to participate, or not, in the labour market, or to change from full-time to part-time work. Since Hurnard, the results of two surveys have become available: Statistics New Zealand's longitudinal Survey of Family, Income and Employment (2002-05) and the Massey University's Health, Work and Retirement survey (2006, first wave).

Enright and Scobie (2009) have drawn on results of the HWR survey. This survey is designed to investigate factors surrounding work and retirement for those aged 55 to 70. It is a national sample of around 6,000 respondents with a heavy over-sampling of Māori.

Among many other things, their paper addresses the question whether the age of eligibility for NZS affects the decision to remain in the labour force. It examines such questions, using logistical regressions to predict behaviour based on binary and continuous data.

"Retirement" is not tied down precisely in the survey. As some respondents say they are continuing to work after retirement, it may mean for them the period after age of eligibility for NZS.

Figure 7 certainly supports the proposition that there is a deterrent effect. For males in the sample, the probability of participation in full-time work falls with age as was also shown in the census data (figure 3). There is a predictable drop at 65, but even so almost 20 per cent of males remain in full-time employment at 70. Contrast this with part-time employment which rises with age, except for only a small fall back at 65. Despite this, at age 66 more than 40 per cent remain active in the labour force.

The female patterns have some differences. The probability of being in part-time employment is much higher than for males until age 68 and drops at 65 by as much as the full-time rate. At the age of eligibility of 65, participation rates for males and females fall by more than 20 per cent. This is twice the size of the fall in the British state pension at age 65. Enright and Scobie attribute this difference to NZS being more generous and universal.

**Table 2**

**Factors Associated with the Decision to Work, by Sex**

| Explanatory variable | Male | Female |
|---|---|---|
| Physical health | *** | *** |
| Mental health | *** | ns |
| Age | --- | --- |
| Secondary education | ns | *** |
| Tertiary education | * | *** |
| Years in New Zealand | *** | * |
| Separated | *** | *** |
| Widow/er | *** | *** |
| Never married | ns | *** |
| Married with working spouse | *** | *** |
| On a benefit | ns | -- |
| Receiving NZ Super | -- | -- |
| Receiving other super | --- | ns |
| No. of dependents | *** | ** |
| Plan to stop work | --- | --- |
| Family health important | * | ns |
| Positive retirement reasons important | - | ns |
| Negative retirement reasons important | * | ** |
| Income of other family members | ns | ns |
| Wealth | ns | ns |

ns = not significant at the 10 per cent level.
*** = significant at the 1 per cent level; ** = significant at the 5 per cent level; * = significant at the 10 per cent level.
Source: Enright and Scobie (2009).

While the data indicate falls in participation at 65, it is difficult to sort out from this how much is due to NZS and how much is due to other factors such as health, marital status, age, ethnicity, region, income, wealth, other forms of super, and so on. These need to be controlled for. To this end, Enright and Scobie run logistical regressions with dependent binary variables such as "working," equal to one if the respondent is in the labour force, and zero otherwise.

As an example, Table 2 shows only those variables that are significant (generally). Health status, as measured by the mental component score, has no significant effect on the labour force participation decisions of women. This contrasts with males, whose decisions to work are strongly related to both their physical and mental scores. Having a tertiary education significantly raises the probability of males and females are working. Compared with being married to a non-working

**Table 3**

**Factors which Change the Probability of Males Remaining in the Labour Force**

| Variable | Unit Change | Probability of Remaining in the Work Force *(percent)* | | |
|---|---|---|---|---|
| | | Initially | After the Change | Marginal Effect |
| Married with working spouse | Binary | 76 | 94 | +18 |
| Widowed | Binary | 76 | 93 | +16 |
| Separated | Binary | 76 | 91 | +14 |
| No. of dependents | 1 | 85 | 90 | +5 |
| Tertiary education | Binary | 88 | 91 | +4 |
| Family health important | Binary | 88 | 92 | +4 |
| Negative aspects of retirement important | Binary | 89 | 92 | +3 |
| Physical health | 5 units | 90 | 92 | +2 |
| Mental health | 5 units | 90 | 91 | +1 |
| Years in New Zealand | 5 years | 90 | 91 | +1 |
| Age | 1 year | 90 | 89 | –1 |
| Positive benefits of retirement important | Binary | 92 | 88 | –4 |
| Receiving NZ Superannuation | Binary | 92 | 76 | –16 |
| Receiving other superannuation | Binary | 91 | 75 | –16 |
| Plans to stop work entirely once retired | Binary | 93 | 63 | –29 |

Note: Variables whose coefficients are not statistically significant are omitted from the table.
Source: Enright and Scobie (2009).

spouse, for both men and women, being separated or widowed significantly lifts the probability of working, as does having a working spouse. Receiving a benefit or NZS significantly lowers the chance of being in the labour force for both males and females.Surprisingly, the level of total wealth and the level of income of other household members have no effect on the probability of males or females working. Enright and Scobie suggest that the wealth results might be because the survey does not record liabilities and so cannot test for the effect of net wealth. In addition, the implied stock of wealth associated with NZS forms a major share of the total retirement wealth of many New Zealanders, but is not included in the wealth questions. This may reduce the incentive to accumulate wealth and hence it may be possible that some of what is actually a wealth effect is being picked up by the highly significant effect of receiving NZS.

In interpreting the effects in a logit regression, it is useful to consider the magnitudes as well as the significance. Tables 3 and 4 therefore show the estimates of the marginal effects – the

**Table 4**

**Factors which Change the Probability of Females Remaining in the Labour Force**

| Variable | Unit Change | Probability of Remaining in the Work Force *(percent)* | | |
|---|---|---|---|---|
| | | **Initially** | **After the Change** | **Marginal Effect** |
| Separated | Binary | 50 | 92 | +42 |
| Married with working spouse | Binary | 50 | 87 | +37 |
| Widowed | Binary | 50 | 84 | +34 |
| Tertiary education | Binary | 73 | 84 | +11 |
| No. of dependents | 1 | 78 | 86 | +8 |
| Negative aspects of retirement important | Binary | 79 | 85 | +7 |
| Physical health | 5 units | 81 | 83 | +2 |
| Years in New Zealand | 5 years | 81 | 82 | +1 |
| Age | 1 year | 83 | 81 | –2 |
| Receiving NZ Superannuation | Binary | 85 | 68 | –16 |
| Receiving a benefit | Binary | 83 | 61 | –22 |
| Plans to stop work entirely once retired | Binary | 87 | 56 | –31 |

Note: Variables whose coefficients were not statistically significant are omitted from the table.
Source: Enright and Scobie (2009).

percentage point change in the probability of working for a one unit change (or in the case of the health variables, five units) in the significant variables.[4]

The probability of remaining in the labour force, in contrast to being retired (no paid work), is calculated by setting all variables in the logit regression, except the one of interest, to their mean values for continuous variables or zero for binary variables. The calculation is then repeated with a change made to the variable of interest. For the physical and mental health scores a difference of five units was chosen, as a change of this magnitude is deemed to be clinically significant.

Male and female results are broadly similar. Changing marital status produces the largest changes in the probability of working. The probability that males who are not separated or divorced are in the workforce is 76 per cent. For those who are, the probability of working rises to

[4] The health variables in the table are indexes constructed from 22 questions in the survey. The study also estimates the separate effects of 19 chronic diseases on the probability of remaining in the work force, again holding constant as many variables as possible. Arthritis, blood pressure and heart conditions are the illnesses having the largest aggregate affects on LFP. In all studies of the effect of health on retirement, there is the question of causality; Is it possible that work status influences health? And can this influence be corrected by appropriate statistical methods? Enright and Scobie attempted to find suitable instrumental variables which might determine health status, but not influence the labour-supply decision. These attempts proved unsuccessful.

**Table 5**

**Factors Influencing the Choice of Full-time Work among Those in the Labour Force**

| Variable | Male | Female |
|---|---|---|
| Physical health | ns | ns |
| Mental health | ns | ns |
| Age | --- | --- |
| Māori | ns | *** |
| Main urban | ns | * |
| Tertiary education | - | ns |
| Separated | ns | *** |
| Widowed | ** | ** |
| Married with working spouse | *** | ns |
| Receiving a benefit | --- | --- |
| Receiving NZ Superannuation | --- | -- |
| Receiving other superannuation | --- | -- |
| Has a super scheme | ns | *** |
| No. of dependents | *** | ** |
| Income of other members of household | --- | ns |

Note: ns = not significant at the 10 per cent level.
*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.
Source: Enright and Scobie (2009).

93 per cent or so, meaning that the marginal effect is a rise of around 16 percentage points. For females, the figures rise from 50 to 92 per cent for those separated or divorced, a marginal effect of 42 percentage points. At the other extreme, a clinically significant improvement in physical health raises the probably by only 2 percentage points for both sexes. NZS shows up, after holding other things constant, as having an appreciable and significant negative effect on the decision to remain in the labour force (–16 percentage points).

The survey has some insights on the choice between full- and part-time work, given that a person is employed (full = 30 or more hours per week). In this case, the logit regression model is estimated with a binary dependent variable set at 1=full-time and 0=part-time using only those employed in the sample. The levels of significance for factors were similar to the decision to work or not outlined above. The exception was the health measures, where the probability that a person in the labour force chooses full-time employment is not significantly related to either the physical or mental health scores. So while physical health status has a significant effect on the decision to join the labour force, the survey indicates that if a person is employed, their choice about full- or part-time work does not depend on their health status.[5]

Both sexes have a lower probability of working full-time as they age, receive a benefit or have income from superannuation and where the income of other family members is higher. On the other hand, they are more likely to be in full-time employment if they are Māori (in the case of

[5] The discussant expressed scepticism that a "clinically significant" change in physical or mental health could have only a small marginal effect. The authors concede that perhaps a five-unit change is too small to produce sensible effects on participation.

females), are separated or widowed and have a working spouse (for males), and have more dependents.

The very large longitudinal SoFIE survey also throws some light on the effects of health status on labour market participation. Holt (2009) has used the first three waves in a major study of this relationship covering ages from age 15. SoFIE does not contain direct information about the effect of NZS. Enright and Scobie restrict the SoFIE sample to 55-70 and find similar levels of significance for various factors as for the HWR survey. Being on a benefit significantly reduces the probability of older people working in both surveys.

## 6 Conclusions

This paper is a brief guide to some recent work done at the New Zealand Treasury, principally on the effect of New Zealand Superannuation on the labour market behaviour of older people. The first study, using aggregate time series data, deals with the effects of changes to the age of eligibility for New Zealand Superannuation on the effects of on the decisions by older workers to retire. The second, covering a much wider set of issues than just this topic, draws on a recent survey of about 6,000 individuals and shows the effect of factors such as New Zealand Superannuation, health status, education levels, and marital status, on the decisions by older workers to retire or reduce their hours.

These results add to the international evidence on the question of the disincentive effect of pension policy on the decision to remain in the labour force, even under the fairly benign arrangements in New Zealand.

Many factors, financial and not, can affect the employment decisions of older workers. Enright and Scobie have shown that changes in marital status compared with a base of having a non-working spouse are associated with a large rise in the probability for remaining in work. Smaller rises occur with better health status. Becoming eligible for NZS or receiving a benefit tends to be associated with a large fall in the probability of working.

The acceleration of population ageing means that, under the present structure, payments of NZS will double as a share of GDP over the next 30 plus years (Treasury, 2006). Driving this are the post-war baby boom, more people surviving to 65, and rising life expectancy at 65. Health status may be improving, but the signs are mixed. Functional disability rates appear to be falling, but chronic disease rates may be rising. This makes it difficult to tie down long-term health costs and whether the effect of improving health status on participation can be depended on to lift participation of older workers.

Changing the parameters of NZS would help both the economic growth and the fiscal position – weakening the indexation or indexing the age of eligibility to changes in period life expectancy at 65, but such changes have been ruled out by the current Government.

A decision to maintain present settings for NZS (principally, age of eligibility and indexation to average nominal wages) will mean that fiscal sustainability will require offsets in other areas of expenditure or potentially growth-harming rises in tax rates.

If health status continues to improve along with life expectancy at 65 and levels of education rise, more older people may continue to work past 65. This has several benefits. They maintain strong connections with society, potentially build greater retirement savings, and add to GDP and tax, at a time when the working age population under 64 is experiencing only weak growth because of population ageing.

KiwiSaver, the government-promoted defined contribution scheme, may help maintain the overall participation rates of older workers. Older higher income individuals will contribute more in tax, and are also likely to be more educated and experienced. Preliminary calculations, however, show that the contribution rates are not sufficient to provide sufficient annuity income, along with NZS, to achieve an acceptable income replacement rate for median- and high-income couples and individuals.

Policy changes that soften the fall in participation after age 65 will be beneficial for individuals, the economy, and the fiscal position. One suggestion is to allow NZS payments to be diverted to a worker's KiwiSaver account which unlike now would be permitted to continue for several years after 65. This would allow people a choice to continue working and get a larger payment of NZS due to returns on their savings when they finally stop paid work.

The present severe recession may produce a fall in participation of older workers as firms reduce their staff. On the other hand, the loss of wealth by older workers, reflected in the price of houses and equities, associated with the recession over the past year, may cause people in their 60s during the next decade to decide to remain in work after 65 to recoup these losses.

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# AN AGEING EUROPE AT WORK: ARE THE INCENTIVES TO WORK SUFFICIENT TO PROVIDE ADEQUATE AND SUSTAINABLE PENSIONS IN THE FUTURE? LESSONS FROM THE OPEN METHOD OF COORDINATION

*Asees Ahuja*[*] *and Ruth Paserman*[*]

## 1 Introduction

Traditionally, pension systems have generally been designed for a different demographic and socio-economic situation than that prevalent today. Pension systems have typically been designed with contribution rates, working patterns, monthly benefits, and retirement ages that have been established to suit an era with shorter life expectancy, longer weekly working hours, shorter holidays, a different distribution of labour between men and women and higher fertility rates. The entry of women into the labour market has not been sufficient to address the increasing demographic dependency ratios due to longevity increases and low fertility rates.

The more than doubling dependency ratios in the European Union by 2050[1] illustrate the exertions on the public expenditure due to the ageing population and the growing proportion of the inactive population. The economic dependency ratios have worsened also due to shorter working lives (Figure 1). The relative costs of social security systems are expected to increase, including pension expenditure as well as expenditure on long-term care, health care and other social services for the elderly. At the same time a shrinking number of labour-active would bear the burden of the increasing expenditure.

On average, pension expenditure today, makes up more than 40 percent of social protection expenditure aggregated in EU Member States.[2] As the population ages, European countries have experienced a decade of ongoing reform to their old age pension systems to make them more financially sustainable and adaptable to changing demographics. On average, if there were no offsetting factors, such as the increase in employment rates, higher coverage of beneficiaries in schemes, increasing retirement ages, or lower benefit levels, demographic pressure alone would be estimated to relay into an increase in public pension by over 70 per cent in real terms in the EU15.Projections show that recent pension reforms will curb the rise in public pension expenditure from around 9 percentage points between 2007 and 2060 to 2.4 percentage points, so that so that projected expenditure would reach 12.5 per cent of GDP in 2060. At the same time, public spending on pensions is not expected to rise in parallel with the old-age dependency ratio. In 2060 people over the age of 65 will get, on average, a smaller share of GDP from public budgets.[3] This reflects, to a large extent, that the financial challenge addressed in pension reforms may have spilt over into a social or adequacy challenge.

Pension reforms providing expenditure sustainability must not do so solely at the cost of lower pensions, from a social sustainability point of view. The main instrument for policy exchange and coordination between the Member States in the area of pensions and social protection is the Open Method of Coordination (hereafter OMC). Lessons from the OMC implemented by the European Union has indicated the importance of emphasizing the need to increase the ratio of

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The views expressed in this paper are those of the author and do not necessarily reflect the opinions of the institution.

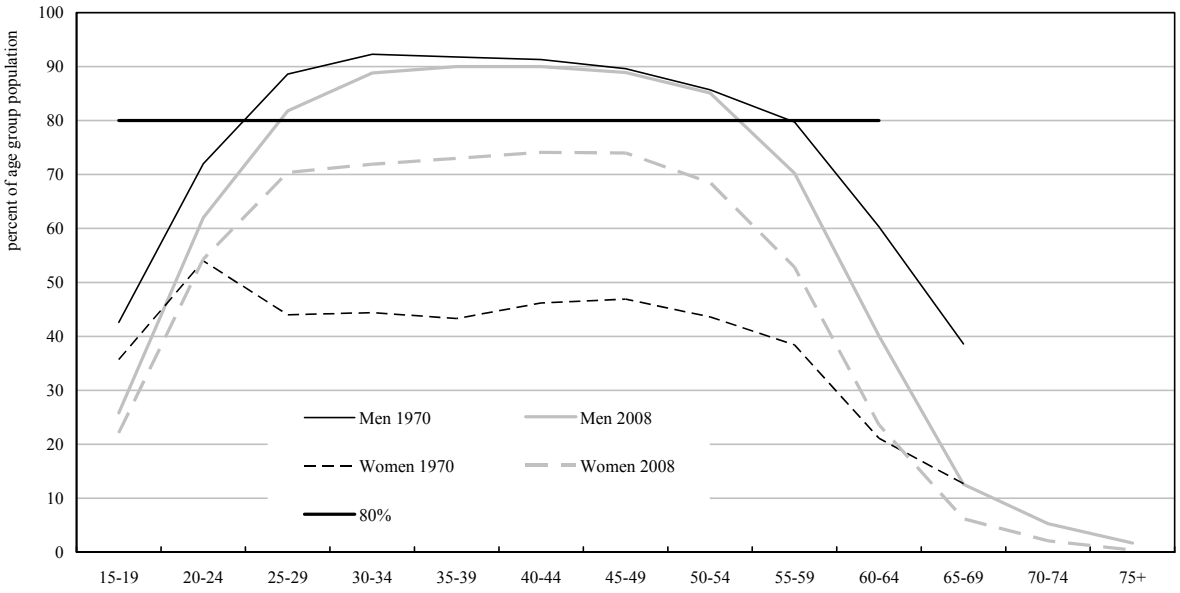
[1] The dependency ratio is measured as the ratio of people over 65 to people of working age (aged 15 to 64).

[2] Source: ESSPROS.

[3] Source: Calculations by the Ageing Working Group (AWG) of the Economic Policy Committee (EPC), Ageing Report 2009.

**Figure 1**

**Employment Rates by Gender in the EU-15, 1970 and 2008**




Source: OECD, OECD Stat database, *Employment in Europe* (2007).

labour active in order to ensure that financially sustainable and yet adequate pension can be provided despite demographic pressures and pension reforms.

The mathematics of the issue is straightforward. In an ageing society where more people are living longer and relatively people are working less, either more people have to work more or longer to sustain the same relative monthly pension benefits as in the past, contribution rates have to be increased or the relative monthly benefits have to be cut. Most countries have chosen a mixture of these solutions in order to deal with the pressures on their pension from an increasing number of benefit recipients. Many pension reforms have, therefore, incorporated legislations into their pensions systems to prolong working lives and to give increased incentives and possibilities for individuals to work longer.

The aim of this paper is to look at the effects of pension reforms on the prolonging of working lives and how successfully they help attain the goal of reaching financially sustainable and adequate pensions as observed within the OMC for the 27 Member states (EU27) of the European Union (EU). Section 2 of this report defines the role and summarize the main findings of the OMC in the area of pensions in the context of the Lisbon Strategy. Section 3 analyses the different types of incentive structures that have been used in pension systems in EU Member States. Section 4 discusses possible impediments to these incentive structures through related financial security schemes and labour market conditions, whilst Section 5 shows the importance of information formation in order to ensure the effectiveness of work incentives.

The main source of the findings in this paper are from the OMC, unless stated otherwise, primarily from the Joint Report of 2009 and the two part study on Promoting longer working lives through pension reforms by the Social Protection Committee (SPC).[4]

[4] For more information, please refer to: http://ec.europa.eu/social/main.jsp?catId=757&langId=en

## 2 The OMC and pension policy

### *2.1 The Open Method of Coordination in the field of pensions in the context of the Lisbon Strategy*

Pension reforms require long term strategies. The process of reform itself is lengthy as pensions reforms are usually built on broad consensus as they are a fundamental part of our social protection systems and of social cohesion. Furthermore, Member States dedicate significant amounts of public expenditure to old age provision, which in light of demographic trends is set to grow significantly. Therefore reforms of pension systems should be seen both in the context of ensuring adequate and sustainable retirement provision, and in the context of sustainable public finances as a whole and sustainable growth across the EU.

The Laeken European Council of December 2001 recognised that there could be significant benefits by enhancing dialogue and cooperation on issues related to the reform of pension systems. It endorsed common objectives of adequacy, financial sustainability, adaptability, and a working method based on the OMC.

The basic structure of this coordination process is as follows: Member States and the European Commission have agreed to work within the OMC on social inclusion and social protection. The open method of coordination works through the common setting of objectives by the European Commission and the Council of Ministers, the reporting by the Member States on the basis of these objectives, and the Commission synthesising the findings in a report which is subsequently endorsed by the Council. Then, at the EU level, overall progress, challenges and arising areas of future concern are reported on, as are the type of action to be taken.

**Common objectives for pensions**

The common objectives of the OMC in the field of pensions are to provide adequate and sustainable pensions by ensuring: (g) adequate retirement incomes for all and access to pensions which allow people to maintain, to a reasonable degree, their living standard after retirement, in the spirit of solidarity and fairness between and within generations; (h) the financial sustainability of public and private pension schemes, bearing in mind pressures on public finances and the ageing of populations, and in the context of the three-pronged strategy for tackling the budgetary implications of ageing, notably by: supporting longer working lives and active ageing; by balancing contributions and benefits in an appropriate and socially fair manner; and by promoting the affordability and the security of funded and private schemes; (i) that pension systems are transparent, well adapted to the needs and aspirations of women and men and the requirements of modern societies, demographic ageing and structural change; that people receive the information they need to plan their retirement and that reforms are conducted on the basis of the broadest possible consensus.

Concerning pension reforms, there is agreement that pension systems should provide adequate retirement incomes in a financially sustainable way while adapting to societal and economic change and that the objectives of adequacy and sustainability are mutually reinforcing and need to be achieved together.

### *2.2 Main lessons learnt from the OMC*

The pension's strand of the OMC has shown that pension reform in Europe has basically been triggered by long term projections showing increasing pension expenditure and the financial unsustainability of pension systems. In order to, simultaneously, ensure the continued financial sustainability of pensions and provide an adequate replacement income at retirement Member States employed a mix of different types of pension designs: public and private, pay-as-you-go and funded, mandatory and voluntary. At the same time they have also sought to underpin changes to pension systems by improvements in labour markets, notably by raising employment rates of women and older workers.

Over the last decade reforms have improved sustainability by braking and counteracting the effects of declining ratios of working years to retirement years and of workers to pensioners. The 2006 report reiterated that financially sustainable systems must be balanced with adequate benefits. The 2007 and 2008 joint reports included in-depth analyses of specific issues, dissemination of policy findings and development of indicators for progress towards the common objectives. Amongst these issues were the three main findings in the OMC to date:

- the identified need for more people working more and longer and the subsequent creation of incentives to prolong working lives and close early exit pathways,
- a reinforcement of the link between contribution and benefits balanced by a reinforcement of minimum pensions for those that will not manage a full contributory history,
- greater pre-funding of pension schemes to help to smooth the demographic transition by bringing forward some of the pension expenditure.

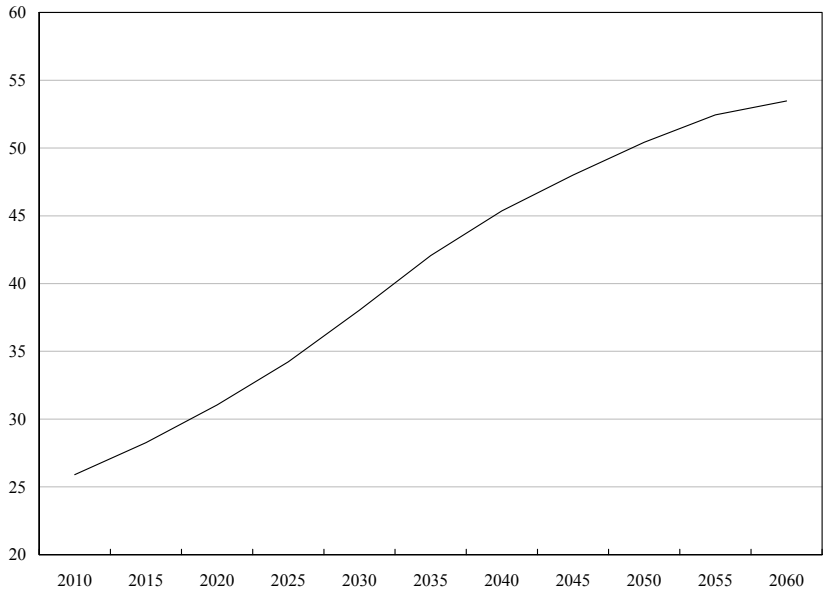
Most countries have recognised the need of more people working more and longer. Therefore, during reforms Member States have built work incentives into the design of pension systems. Some prolong working lives at the end of the individual's career, through actuarial benefit calculations based on remaining life expectancy calculations. Others provide financial incentives to promote labour activity throughout the career by increasing the minimum eligibility requirements of contributory years for a full pension or strengthening the link between contributions and benefits.

## 3 Incentive structures in pension systems

Meeting the pension challenge is essentially about balancing the periods of life out of work with those in work and hence closing the gap between shorter contributory lives and longer retirement periods – with the first resulting from later labour market entrance and decreased employment rates of older workers and the second triggered by premature exit and longevity. Maintaining the adequacy and sustainability of pension provision in an ageing society depends crucially on more people working more and longer. The 2007 Joint Report identified the need for 16 out of 25 Member States to promote longer working lives and increase the employment rates of older workers further in order to cope with future burdens on pension and social security systems without compromising the adequacy of benefits (CZ, DK, GR, ES, FR, IT, CY, LT, LU, MT, NL,

**Figure 2**

**Projected Old-age Dependency Ratio in EU 27, 2010-60**
*(percent)*[*]




[*] This indicator is defined as the projected number of persons aged 65 and over expressed as a percentage of the projected number of persons aged between 15 and 64.
Source: Eurostat.

AT, PT, SI, FI, and SE).[5] The 2009 Joint Report reemphasized this message stating the need for more people to work more and longer throughout their careers. Some Member States have sought to respond through new initiatives in pension and labour market policies as depicted in the latest round of National Strategy Reports for 2008-10. Despite progress in recent years in many Member States (for instance LV, BG, LT, DE, SK, EE and NL), there is still a need for extending working lives across the Union even further as the working age population shrinks in comparison to the overall population.

Pension systems can support labour market objectives through the inclusion of all labour active groups, by signalling appropriate ages of retirement and by establishing economic incentives (bonus/malus systems) in support of desired behaviour. Although activity and employment rates are influenced by a whole range of factors unrelated to pensions, the norms about retirement and retirement practices are primarily influenced by the institutional framework created by the state legislation. Rules of pension accruals, the pensionable age and designs of early retirement benefits represent signals for workers and employers that impact on the process of age management.

As Members States are seeking to reestablish a sustainable balance between contributory working years and years spent in retirement they are faced with a combined need for: lowering the entry age, widening the contributory base, lowering the incidence and length of careers breaks and increasing the effective labour market exit age. A number of Member States have widened the financial base of a pension system through increases in the contribution rates or by promoting coverage of groups previously not covered (self employed, atypical workers). However, most efforts have been directed at influencing the effective labour market exit age.

Recent pension reforms in EU member States have included different types of designs and incentive structures to encourage lengthier careers or a mix of these. Typically, most incentive structures for longer working lives in retirement systems are focused on extending working lives closer to retirement rather than earlier in the career. More focus is often put on postponing labour market exit and typically, the incentive structures include increasing statutory retirement and pension eligibility ages; improving flexible retirement options, allowing and encouraging people to

[5] Please see Annex 1 for a list of the EU 27 abbreviations.

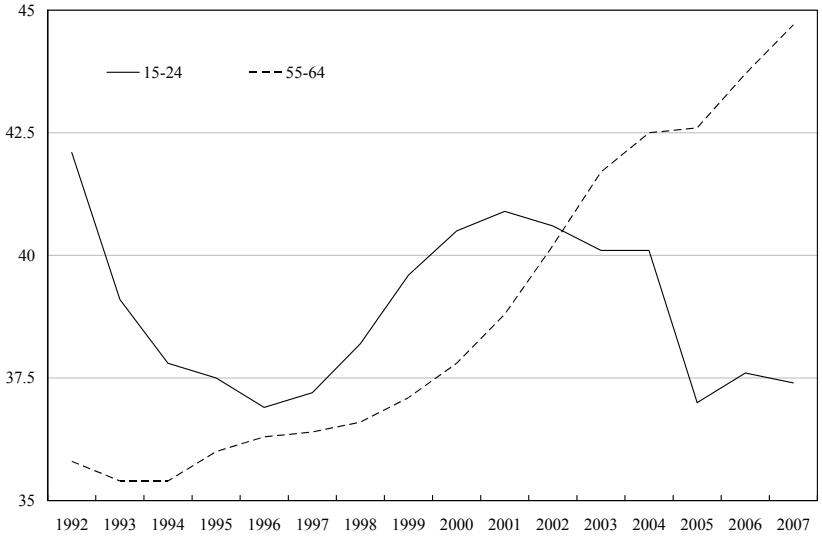
continue working, by allowing for possibilities to combine work and retirement; and introducing more actuarial calculations of pension benefits and bonus/malus systems which give reductions and increments in benefits for earlier or later retirement. The positive effects of reforms during the last decade to encourage delayed exits from the labour market effects can be seen in the improving employment rates of older workers.

In most cases, incentives to extend working lives need to be given also to younger workers, especially in light of the observed increase in labour market entry ages. High unemployment figures for younger workers also indicate that young people are not entering the labour market to the same extent as before. A common approach is to increase the link between contributions and benefits by moving towards a life cycle approach by extending the number of years needed to obtain a full pension.

Since the young of today are the old of tomorrow high unemployment levels among the young might

**Figure 3**

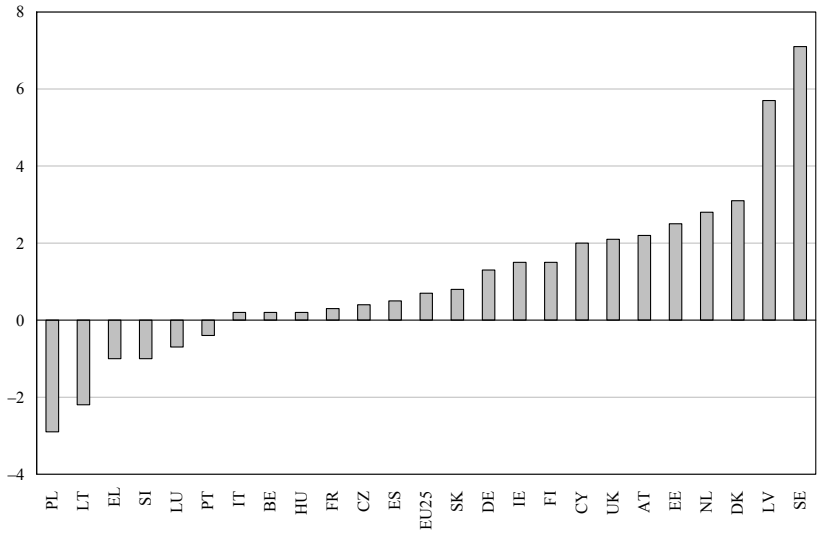
**Employment Rates for Workers in Different Age Groups Over Time**




Source: Eurostat, *EU Labour Force Survey*.

**Figure 4**

**Change in Employment Rates Between 2000 and 2008 for the Population aged 65 and over in the EU**
*(percent)*




Source: Eurostat, *EU Labour Force Survey*, 2000 Spring and 2006 Second Quarter Results.

lead to lower pensions in the future and thus higher future poverty rates. Even more so if persons caught in unemployment during their working life are unable to affect their pensions levels later by prolonging their working lives to make up for the long periods out of gainful employment. This can cause a persistent poverty trap. High and persistent unemployment rates among the young also threaten the generational contract between young and old, inherent in most pension systems.

It is also interesting to note that developments in employment rates for the age group 65 and over also show rises in the vast majority of Member States since the year 2000. This indicates a move toward older workers staying in work beyond the age of 65, which has traditionally been considered the age for retirement in most EU Member States. The overall change in the employment rates of those above the age of 65 and their actual level is still low at an EU level averaging at around 4 per cent.

### *3.1 Raising retirement ages and increasing flexibility*

Politically, pension reforms are difficult to initiate and implement due to the inter-generational nature of pension systems. Legislating increases in the retirement age of the statutory scheme is one of the more effective and definitive methods of delaying retirement, but also one of the more difficult reforms to implement. The legislated retirement age is socially connected with a sense of right and tradition and thus is politically unpopular to increase. The inter-generational characteristics of most statutory pension schemes add a perceived sense of unfairness if an increase in the retirement age is implemented. Furthermore, rules regarding the receipt of benefits from other social protection systems may also be connected to the statutory retirement age, sometimes making it economically expensive to carry out such increases.

As of today, there are Member States where the statutory retirement age is below 65 with no current legislation to raise this age. (e.g., BG, EE, FR, IT LV, LT, HU, MT, SI, SK). A number of EU Member States have, however, legislated an increase in the statutory retirement age, but often the legislation is softened in its design. For example, most Member States have chosen to phase in the reforms on retirement ages over a long period, thus being raised primarily for younger cohorts (e.g., CZ, DK, DE, LT, MT, UK). This also tends to dampen some of the current political responsibility with regards to the actual implementation of these legislated reforms (see Annex 2).

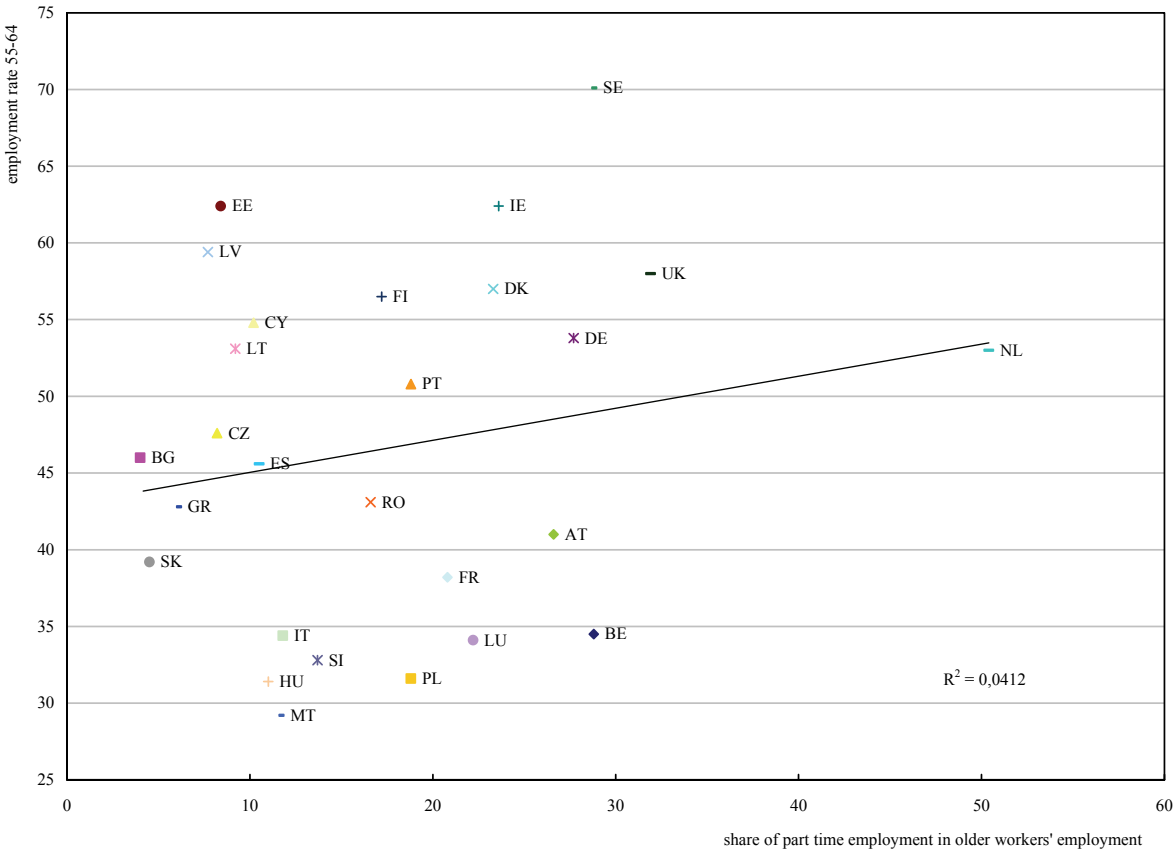
In many Member States, a more viable solution to increasing the retirement age is to primarily aim for an equalisation of retirement ages between women and men. Some Member States foresee such an equalisation in the near future (e.g., BE, LV, HU) whilst others, even in this case, have longer transitional rules (e.g., EL, EE, LT, MT, AT, CZ).Whilst closing the gap between the retirement ages for men and women, Some countries still do not legislate a full equalisation (e.g., BG, RO, SI), whilst others have so far not taken any steps in this direction (e.g., PL).

Other Member states have instead chosen to introduce a flexible minimum pension eligibility age at which old-age pension benefits can be received (often below 65) but with actuarial reductions to the pension the earlier it is retrieved (e.g., FI, SE). Under specific circumstances more flexible paths out of employment into retirement can help to promote longer working lives especially if possibilities to combine work and retirement are given, particularly for groups that may not have chosen a full-time employment over full-time retirement.

The increase in the employment of older workers over the past decade is partly due to a rise in part-time work, notably by men. About 25 per cent of employment among older workers in the EU-15 is now part-time and 22 per cent in the EU-27. Therefore, a number of Member States have designed their systems allowing individuals to take a share of their pension whilst continuing to work (given particular conditions). This type of provision is reported in a number of Member

**Figure 5**

**Share of Part-time Employed as Compared with Employment Rates for Older Workers in the EU, 2008**




Source: Eurostat (2008), *EU Labour Force Survey*, annual.

States (CZ, ES, FR, IT, NL, FI, and SE).[6] Experience in Member States however shows that whilst possibilities for work time reduction can be essential for facilitating and encouraging people to remain in work after 60, introducing more flexible retirement provision requires a careful design to ensure the desired results. If the structure of incentives and the focus on a proper target group of workers (for instance in terms of age) is badly designed, the flexibility may lead to a shortening rather than an extension of working lives. Ineffective designs may also not be able to lure groups others than those that would have extended their working lives in any case leading dead weight costs for the pension systems.

The introduction of increased flexibility, therefore, also calls for increased monitoring of retirement behaviour and of the actual labour market exit age. In all but a few exceptional cases (Table 1), labour market exit on average takes place prior to the legislated retirement or old-age pension eligibility age, indicating the opposite effects of flexible rules and the possibility to exit the labour market early through other types of financial security schemes.

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[6] SPC Working longer study.

**Table 1**

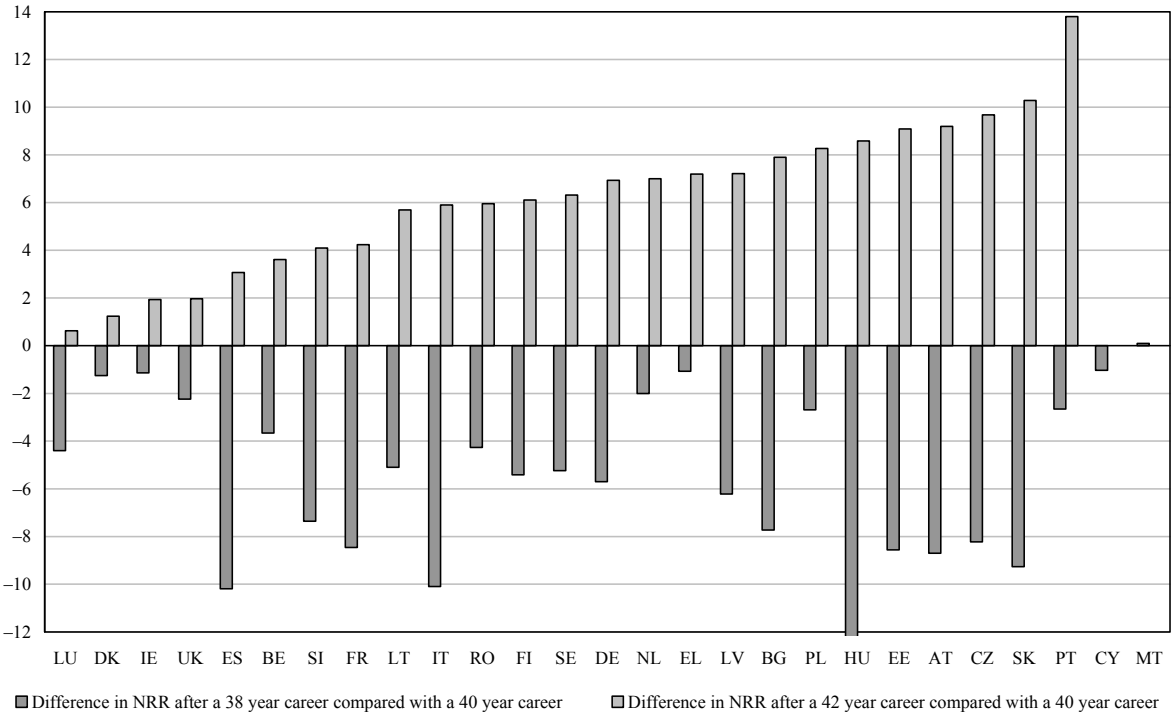
**Standard Pension Eligibility Age and Labour Market Exit Age**

| Country | Legislated Minimum Retirement Age | | Effective Exit Age from the Labour Market | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| Belgium | 65 | 64 | 61.2* | 61.9* |
| Bulgaria | 63* | 59* | 64.1 | 64.1 |
| Czech Republic | 61y 6m | 59y 8m | 61.8 | 59 |
| Denmark | 65 | 65 | 62.5 | 61.3 |
| Germany | 65 | 65 | 62.1 | 61.6 |
| Estonia | 63 | 59y 6m | 62.6+ | 62.6+ |
| Ireland | 65 | 65 | 63.5 | 64.7 |
| Greece | 65 | 60 | 61.8 | 60.4 |
| Spain | 65 | 65 | 61.8 | 62.3 |
| France | 60 | 60 | 58.7 | 59.1 |
| Italy | 65 | 60 | 60.5 | 60 |
| Cyprus | 65 | 65 | : | : |
| Latvia | 62 | 61 | : | : |
| Lithuania | 62y 6m | 60 | : | : |
| Luxembourg | 65 | 65 | : | : |
| Hungary | 62 | 60 | 61.2** | 58.7** |
| Malta | 61 | 60 | : | : |
| Netherlands | 65 | 65 | 62.1 | 62.1 |
| Austria | 65 | 60 | 61.3 | 60.6 |
| Poland | 65 | 60 | 61.4* | 57.5* |
| Portugal | 65 | 65 | 62.9* | 62.3* |
| Romania | 63* | 58* | 65.5 | 63.2 |
| Slovenia | 63 | 61 | : | : |
| Slovakia | 62 | 62 | 59.7* | 57.8* |
| Finland | 63-65 | 63-65 | 62.3 | 62.5 |
| Sweden | 61-67 | 61-67 | 64.2 | 63.7 |
| United Kingdom | 65 | 60 | 63.8 | 62.6 |

Source: Eurostat
Note: * 2007 data, ** 2005 data, *** 2004 data, + common data for both sexes.

**Figure 6**

**Difference in Net Theoretical Replacement Rates for an Average Earner Working until the Age of 63 and 67 with 38 and 42 Contributory Years Respectively as Compared with Working until the Age of 65, 2044-48**
*(percent)**




Source: SPC/ISG.

### *3.2 Giving financial incentives to delay retirement*

A common way to promote longer working lives for older workers pursued in recent reforms is to strengthen the bonus-malus system in schemes with delayed and early retirement possibilities. This is a crucial instrument in prolonging working lives as pension eligibility ages become more flexible. Workers who decide to work longer are rewarded for every additional month or year in work.

In a number of Member States higher accrual factors as a reward for later retirement, or lower accruals as penalties for early retirement, were recently introduced or increased (e.g., BE, BG, CZ, ES, GR, HU, NL, PT and UK). The incentive structures differ significantly between Member States as can be interpreted using calculations on theoretical replacement rates.[7]

Calculations show that in most Member States delaying retirement results in higher theoretical replacement rates, while earlier retirement usually results in lower theoretical

[7] Theoretical replacement rates defined in accordance with the methodology agreed upon by the Indicator Sub-Group (ISG) of the Social Protection Committee (SPC), show the ratio of pension income to earnings at the point of retirement increase or decrease with delayed or early retirement. For more information, please refer to: http://ec.europa.eu/social/main.jsp?langId=en&catId=443&newsId =551&furtherNews=yes

replacement rates. In all but a few Member States (e.g., DK, ES, FR, HU, IT, LU, SI, UK), the increments in pensions for prolonged working lives are higher than the fall in replacement rates with earlier retirement. In most cases the difference is small, but there is a trend towards rewarding late retirement more than early exit is penalised.

Yet, experience is showing that the impact of these specific measures can be rather limited. For instance the pension bonus introduced in France by 2003 reform attracted only 7.6 per cent of older workers to defer retirement in 2007. In Sweden, the use of the flexibility in the retirement ages is being exercised, but just as many people tend to take out their retirement earlier as later compared with the previously fixed retirement age of 65. These examples show that people may be more attracted to the idea of early retirement rather than the financial incentives provided for delayed retirement. In many countries the flexibility of systems is not used also indicating a lack of information and the strong establishment of previously fixed retirement ages. The reestablishment of such norms is sometimes confirmed through other schemes and social insurance systems.

In some Member States no specific incentives are given for extending working lives beyond the actual retirement age in the statutory retirement schemes (e.g., IE, LU, MT, NL, CY). Typically, these schemes are defined-benefit where the possibilities for flexible retirement are restricted, as in Malta. In other cases they are flat rate schemes where the number of contributory years needed for a full pension is lower than those used in the calculations of theoretical replacement rates and thus do not show any incentives to work longer after 40 years of contribution and at the age of 65 (e.g., IE, LU, NL). In these Member States there are, however, greater incentives to work longer in the private sector occupational pension schemes. Although the work incentives are usually lower than in other Member States' statutory schemes in all the above mentioned countries except the Netherlands. In Member States where the pensionable age is planned to be higher than 65 in 2046 (e.g., DE, UK), the effects of deferring retirement beyond the legislated retirement age are not captured by the exercise.

On the other hand, those Member States with the highest changes in replacement rates per extra year worked are also typically countries that have large defined benefit components, but with more flexible retirement conditions (e.g., CZ, EE, AT, PT, SK). In notional-defined contribution schemes the financial incentives for delaying retirement are typically calculated on an actuarial basis taking into consideration remaining life expectancy at the point of retirement (e.g., SE, PL, LV, IT), whilst in defined contribution schemes the transformation of investments into an annuity are also often actuarially calculated.

The effectiveness of actuarially calculated incentive structures needs to be further monitored to ensure that the financial incentives are sufficient to postpone retirement. At the same time, the generosity of the incentives in defined-benefit schemes need to be balanced with their cost in the pension system and also deadweight problems connected to the risk of subsidising those who would in any case have postponed retirement.

### *3.3 Extending contributory periods*

Minimum contributory periods in order to receive a full pension are generally being extended. As the time spent in retirement is generally increasing due to increasing longevity, so must the time spent contributing to one's pension in order to avoid an imbalanced burden on working age populations, which can decrease their incentives to work.

Contribution periods required for a full pension have been recently increased in some Member States (e.g., CZ, FR, AT), so the link between contributions paid into the system and benefits paid out has been tightened. In France, for example the statutory retirement age is the same as before, however, the contribution period needed for a full pension has been recently increased.

**Table 2**

**Average Seniority at Retirement and Remaining Average Life Expectancy at 60, 2006**

| Country | Average Seniority at Retirement of New Flows of Retirees in Statutory Retirement Schemes Seniority (Including Non-contributory Periods) | | Life Expectancy at 60 | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| Belgium | 42.6 | 30.5 | 80.8 | 84.9 |
| Bulgaria | n.a. | n.a. | 76.2 | 80.3 |
| Czech Republic | 44.4 | 39.6 | 78.2 | 82.4 |
| Denmark | 35.7 | 20.3 | 80 | 83.3 |
| Germany | n.a. | n.a. | 81.1 | 84.8 |
| Estonia | 45.6 | 42.9 | 75.9 | 82.2 |
| Ireland | 27.5 | 20.8 | 80.8 | 84.5 |
| Greece | 40.3 | 30.4 | 81.4 | 83.9 |
| Spain | 40 | 31.7 | 81.7 | 86.5 |
| France | n.a. | n.a. | 82 | 87 |
| Italy | 34.9 | 27.9 | 81.4** | 85.9** |
| Cyprus | n.a. | n.a. | 81.8 | 84.2 |
| Latvia | 30 | 29 | 75.2 | 81.1 |
| Lithuania | 37.5 | 34.2 | 75.5 | 81.5 |
| Luxembourg | 42.9 | 38.8 | 80.7 | 84.4 |
| Hungary | 39.9 | 38 | 76.5 | 81.6 |
| Malta | 29.1 | 23.5 | 80.1 | 83.8 |
| Netherlands | n.a. | n.a. | 80.8 | 84.5 |
| Austria | n.a. | n.a. | 81.1 | 85.1 |
| Poland | 36.5 | 33.3 | 77.7 | 82.9 |
| Portugal | 32.3 | 23.9 | 80.4 | 84.6 |
| Romania | n.a. | n.a. | 76.7 | 80.5 |
| Slovenia | 30 | 24 | 79.4 | 84.3 |
| Slovakia | n.a. | n.a. | 76.5 | 81.4 |
| Finland | 30.9 | 28.6 | 80.6 | 85.5 |
| Sweden | 40 | 34 | 81.8 | 85.2 |
| United Kingdom | 42 | 26 | 80.9* | 83.7* |

* 2005 data, ** 2004 data.
Source: National Data and Eurostat.

In other countries, the lengths of contributory periods have been redesigned to correspond more to the pension eligibility ages rather than the concept of a full pension. The pension is instead calculated in accordance with the number of years during which the pension is accrued. In both these cases there is clear move towards extending the number of contributory years in pension schemes, a so-called life-cycle approach.

The issue of the balance and the link between contributions and benefits as well as the transparency of this link are important for the financial sustainability of both defined-benefit pensions systems (that are common among statutory pay-as-you-go systems), and for defined-contribution schemes, for which it is inherent in the system.

Experience in some Member States shows that extending contributory periods is politically more acceptable than the increasing the pension eligibility age in statutory schemes. Increasing the link between benefits and contributory periods also encourages longer working lives during the whole period of the career rather than just at the end of the career. It encourages shorter career breaks, earlier entry into the labour market and delayed retirement.

A lifecycle approach to contributory periods also allows for a more fair calculation of pension benefits as it is closer to the concept of "getting what you paid for". This is often to the advantage of those with a longer and more flat earnings career rather than those with a short and steeply increasing earnings career. Therefore, if the right to receive a full pension depends on the contribution period, people who start working at a late age are not unduly rewarded. For example, women and low income earners often have earnings careers that develop more slowly than those of men and high income earners. For women, this is due to the wage structure in typically female dominated professions, career breaks and a higher degree of part-time work. Reforming pension provision to incorporate such a design gives encouragement to work longer, minimise career breaks and to move out of the black economy.

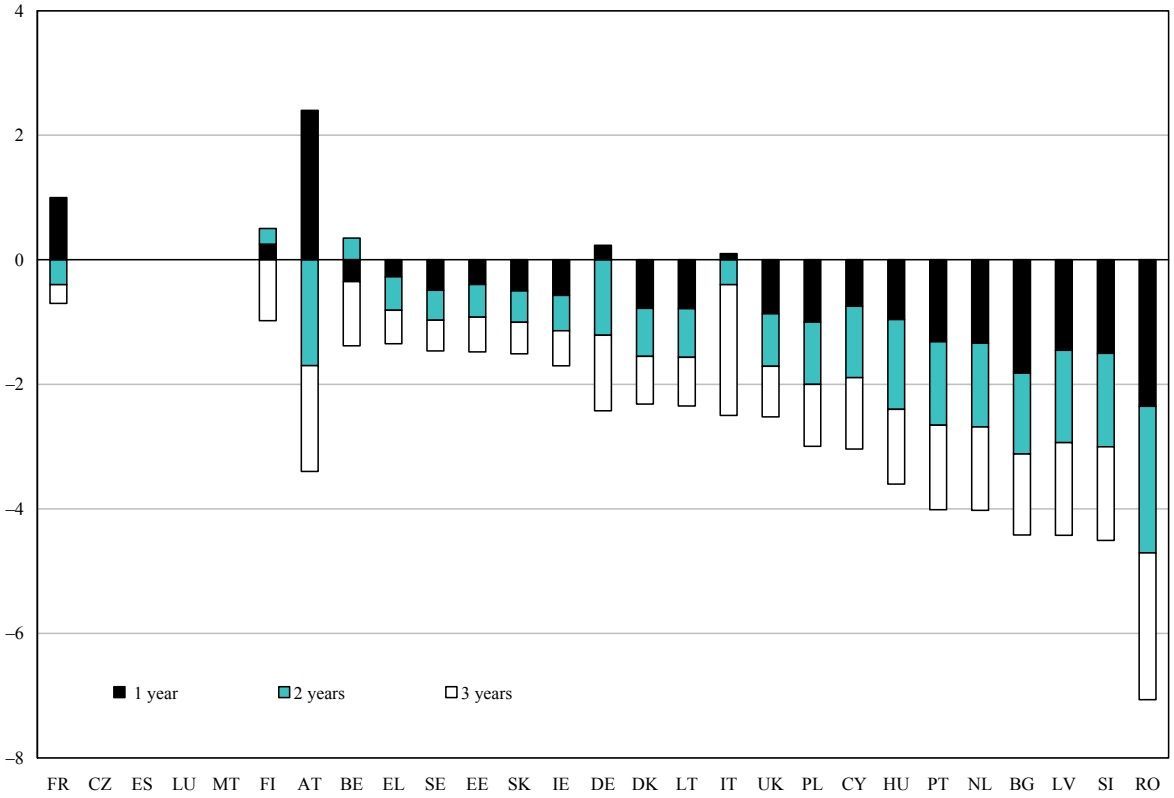
Reinforcing the link between contributions and benefits, however, has to be also combined with a careful monitoring of the accrual of pension rights during breaks in careers that reasonably should not be penalized, such as child care, other caring responsibilities, unemployment, sickness or education leave.

Calculations of theoretical replacement rates can show us how different types of career breaks are protected within the pension system. For example, given that the distribution of care burdens today are still mainly borne by women, it is important to monitor the effects of policies whereby replacement incomes and pension entitlements are given for care-related absences from the labour market in order to avoid the arising of new dependency traps. As caring years have a significant negative effect on women's long-term participation in the labour market in many Member States, a careful balance must be struck between care crediting and incentives to get women back into paid work.

In many Member states, absences from the labour market for childcare are typically protected to a certain extent for the first few years of absence and usually the protection is equally spread over these years (Figure 7). In a few Member States pension rights for up to three years of absence are so well protected that calculations show no drop in replacement rates (e.g., CZ, ES, LU, MT, FI). Whilst this improves the adequacy of benefits accruals during childcare absences, the work incentives in the system can be questioned. In the Czech Republic, the retirement age for women is decreased depending on the number of children they bear and the years of retirement before the age of 65 are accredited giving no change in the replacement rates. In Malta, where the minimum statutory retirement age is 61 and only 30 contributory years are needed for a full pension, the replacement rates do not change with a prolonged or shortened retirement age in this exercise which is based on a 36 year contributory period. However, recent legislation credits social security contributions for interrupted careers of up to 2 years.

**Figure 7**

**Difference in Net Theoretical Replacement Rates for an Average Earner Entering the Labour Market at 25 and Retiring at the Statutory Retirement Age with a 1, 2 and 3 Year Career Break for CHILDCARE Compared with No Break, 2046***




* The calculations assume two children are born and that the timing of the childcare years is such that full childcare benefits are received for each child. Retirement at the legislated statutory retirement age for women is calculated here. Please note that the values for CZ, ES, LU and MT are equal to 0 and should not be interpreted as missing.
Source: SPC/ISG.

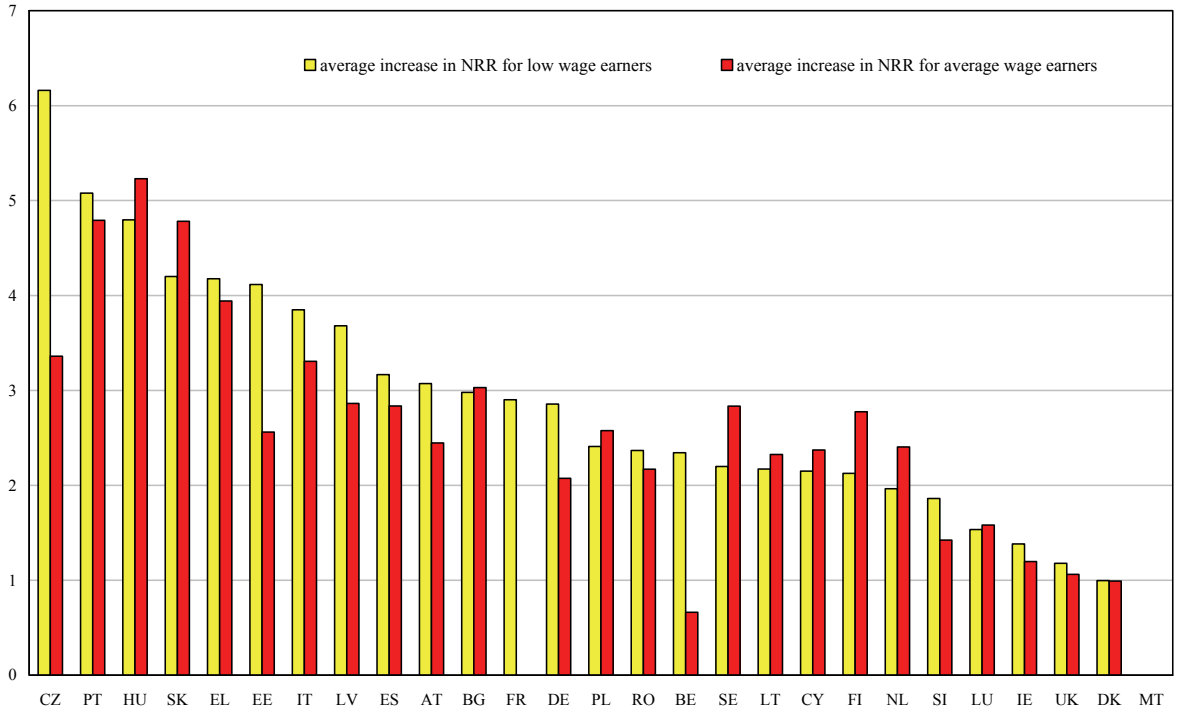
In some countries childcare credits are connected to the birth of the child rather than an absence from the labour market (e.g., DE, FR, IT) resulting in an increase in pension entitlements when a child is born. In Romania, childcare breaks are less well protected than in most other Member States. In the BE, IE, NL and UK the decline on the state pension side is marginal, and results depend more on whether private pension schemes award care credits or not.

### *3.4 The effects of minimum pension provision on working longer*

When considering the role of minimum pension provision on the extension of working lives, however, it is important not to loose sight of the role of these pensions in maintaining adequate benefit levels and evading poverty in old age. Calculations showing the average increase in theoretical replacement rates for an extra year of work, indicate that incentives to work longer can be significantly lower for those more dependent on minimum pension provision incentives, therefore, the design of minimum pension need to be coherent incentive structures in standard earnings related schemes.

**Figure 8**

**Average Change in Net Theoretical Replacement for an Extra Year of Work between the Ages 60-68 for an Average-wage Earner and a Low-wage Earner Rates, 2046**
*(percent)*




Source: Calculations on Theoretical replacement rates carried out in the OECD APEX model.

The theoretical replacement rates for low wage earners would typically include minimum pension provision for these groups. By taking an average of the annual change in replacement rates for each year of prolonged working lives for an average earner and a low wage earner it is possible to see if minimum pension systems give a comparative disincentive to longer working lives. Most Member States retain incentives to work longer for those with lower incomes and in some the incentives are even stronger than for an average worker (e.g., BE, CZ, EE, HU, IE, LV, HU) (Figure 8). In these cases it is important to keep in mind that experience shows that low wage earners are often more reluctant to extend working lives than average wage earners. At the same time it is important to consider that the minimum pension guarantees are enough to give financial security and avert poverty in old age.

On the other hand, countries with a traditionally high level of minimum pension guarantee (e.g., SE, FI) or flat rate defined benefit pension with a lower number of contributory years than the 40 years used in the exercise display lower incentives to work longer for those with lower incomes in comparison to average workers (e.g., SK, AT). It is important to consider balancing the adequacy of pension benefits and the disincentives to work longer that they innately provide.

Most Member States perceive minimum income benefits as providing negative incentives towards longer working lives. This can depend on a number of issues. Firstly, if the eligibility criteria of the minimum pensions are set at a reasonably high fixed age, such pension cannot be used as an early exit pathway from the labour market. In most Member States minimum guarantee

pensions are rarely, if ever, available before a fixed statutory retirement age. The qualifying period for a minimum pension has, for example, recently been extended in some Member States (e.g., CZ, CY, ES, and RO). If a minimum pension scheme guarantees the major part of pensioners' income, and the contribution period is too short, it can act as a disincentive to stay in the labour market.

Secondly, if the level of the minimum pension is low, this may provide an incentive to work longer, yet bringing the adequacy of the protection provided by these pensions into question. In contrast, too high a minimum level of pension could provide a disincentive to prolong working lives beyond the minimum eligibility age. This, especially in combination with other labour market early exit routes may provide disincentives to work longer for some low-wage groups with incomplete contribution records, as the added value of working for these individual's pensions is in many cases minimal compared with spending the last few years before retirement on unemployment, sickness or disability benefits..

Thirdly, the means testing criteria can affect retirement behaviour. For example, if extra accruals of pension entitlements result in a one to one reduction of the minimum pension working longer may not be perceived as worthwhile. In some Member States, experience shows that disregarding work income in means tests gives possibilities to increase incentives to work longer. Ireland has introduced an income disregard of 100€ on earnings from work in the calculation of means tested pensions. Simultaneously cumulating minimum benefits and income from work is not possible in a few Member States (like in LT). Most Member States provide the possibility to cumulate at least a share of earnings from work and retain minimum benefits or pensions (e.g., DE, DK, NL, FI, SE).

## 4 Obstacles to work incentives in pension systems: early exit routes

The incentives to work longer incorporated in pension systems are often affected by other design features in the pension scheme or by other financial security systems. In the design of work incentives it is also important that complementary schemes and systems do not impediment the built-in incentives in the pension scheme. This, however, is often the case.

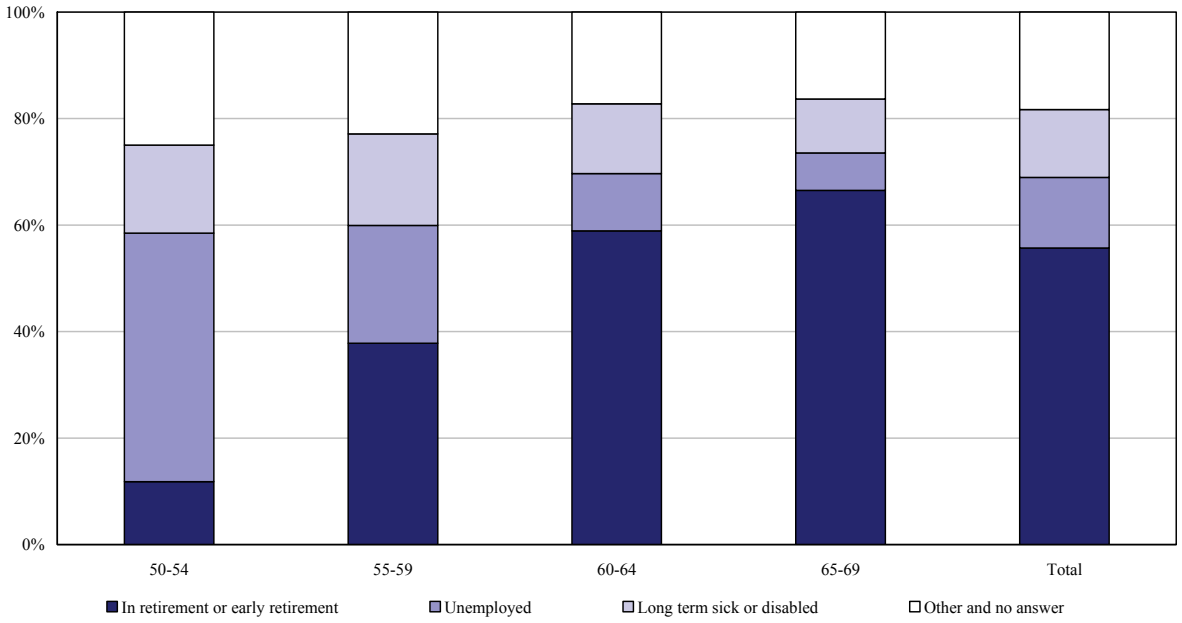
As pension and social security systems become more complex, there are also more actors involved in the design of these systems. Statutory pension schemes have different components with different purposes; some might be of a social safety net nature whilst others aim to provide an income related benefit. Statutory pension schemes are more commonly being complemented or replaced by privately managed provision where the work incentives might differ. This also gives a bigger role to private actors, rather than policy makers in the cumulative work incentives in a multi-tier pension scheme.

With increasing flexibility in the retirement decision, the role of other complementary social security systems, often under the jurisdiction of different policy makers, may end up affecting the incentives in the statutory pension schemes. In order to design efficient incentive structures it is vital that these are designed collectively with complementary systems.

The average age of exit from the labour market is often lower than the average age at which an old-age pension is drawn (See Table 1 above). Experience shows that transitions from the labour market into retirement are not direct and only half of older workers leave their last job or business to take up an old age pension. Only 35 per cent of older workers leave their last job or business to take up a pension. 20 per cent take up an early retirement benefit, 13 per cent leave due to unemployment and 12 per cent for reasons of long-term sickness or disability. Furthermore, a slight decline in direct transition from the labour market into retirement can be observed in the EU 25 Member States (Figure 9).

**Figure 9**

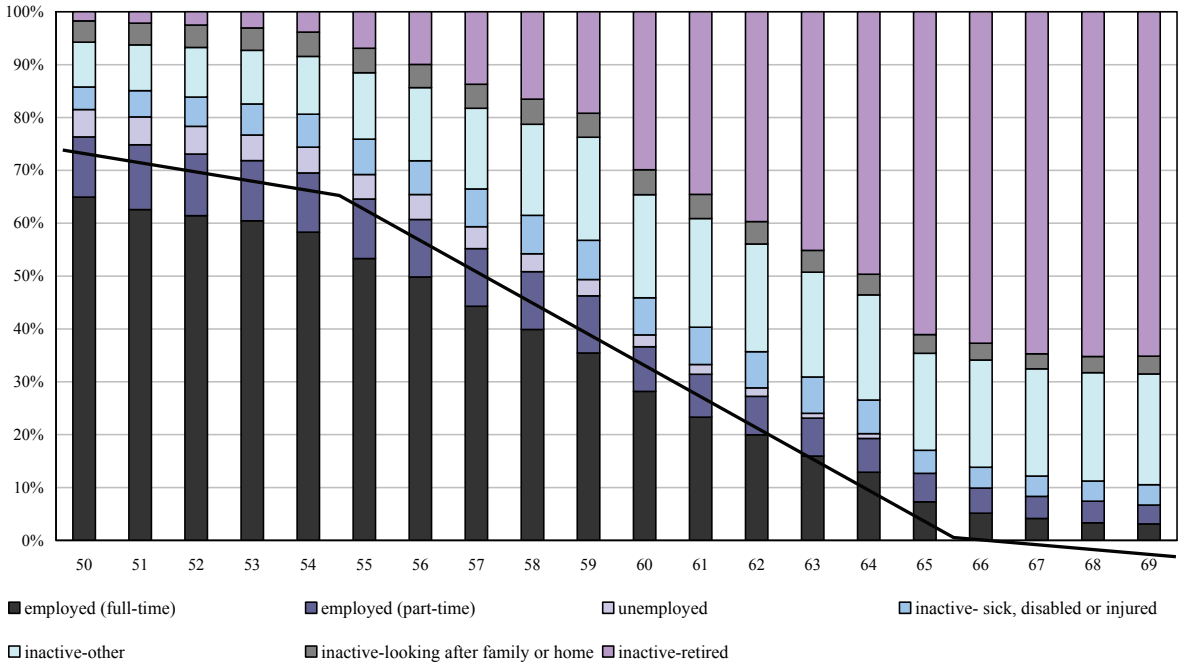
**Main Labour Status just after Leaving Last Job or Business in EU by Age, 2006**
*(percent)*




Note: The variable is based on self assessment. Unemployed may include government training, persons waiting to start a job, etc.
Source: 2006 *ad hoc* module LFS.

**Figure 10**

**Economic Activity by Age in EU27, 2006**




Source: LFS.

**Table 3**

**Take-up of Early Retirement Schemes in EU27**

| | Low (<3%) | Medium (Between 3% and 10%) | High (≥10%) |
|---|---|---|---|
| Take up as a share of population 55-59 | DK, ES, FR, LT, PT, SE | BE, DE, HU, LU, RO, SK | PL |
| Take up as a share of population 60-64 | CY, FR, HU, PT, RO, SE | DE, ES, IE, SK | BE, LU, DK, PL |

Figures generally refer to 2006.
These figures are generally taken from administrative sources are not necessarily completely comparable. Member States for which information is not provided do not have such information available. This table refers to specific early retirement schemes opened for all categories of the population.
Source: National replies to a questionnaire submitted to Members of the Social Protection Committee.

The main labour market exit pathways that have been identified are through invalidity or sickness benefits, early retirement schemes and unemployment benefits that have been specifically designed for older workers. Few workers may also leave the labour market through other systems such as with survivor's pension, or due to specific tax concessions granted to older workers leaving the labour market, but the take up rates of these benefits are minimal. For example survivor's benefits are often granted to those who have not been labour active in any case, whilst taxation rules show indications of curbing rather than promoting early exits in most member states. Whilst incentive structures in pension systems are being increased, complementary systems both with the social security systems and private schemes (often occupational) may affect negatively these incentives.

### *4.1 Early exits through early retirement schemes*

Specific early retirement schemes creating exceptions from general rules for certain occupational groups are common in a number of member states. The proportion of early or indirect exits varies considerably from one Member State to another, but can be a main reason for early labour market exit in some Member States. Differences range from approximately 20 per cent of those aged 55-59 in receipt of early retirement benefits in Poland and close to none in Sweden.

The type of early retirement scheme, the eligibility criteria and the groups to which it is directed are for great importance. Usually early retirement schemes are open to all categories of the population. Some countries with less flexible retirement options use such schemes to provide flexibility of working careers and a smoother transition to retirement (e.g., BE, RO, FI). In some countries, however, they are designed as a source of protection for professional groups that are identified as having arduous or hazardous occupations, a list that varies greatly between Member States. In a few Member States they are explicitly made available due to major economic restructuring (e.g., ES, FR, HU). In some cases the schemes were primarily expected or are still expected to contribute to reducing statistically recognized unemployment levels (e.g., BE, ES, IE, LU, PT).

The possibility to retire early along with flexible transition from work to retirement is recognized as key to actually prolonging working lives. In some statutory old age pension schemes this flexibility has been incorporated. If the idea is to utilise special early retirement schemes to provide this flexibility it is important to create incentives for delaying the take up of early

retirement benefit in these schemes as well. This also pertains to the flexibility in the transition to retirement for special occupational groups, often for those in so-called hazardous or arduous occupations. Most Member States allow certain categories of worker to take out early retirement benefits prior to the legislated statutory retirement or pension eligibility age. In some of these Member States this is also possible without actuarial reductions to old age pension benefits. However, the extent to which these schemes can be an impediment to work incentives also depends greatly on the earliest retirement age. In some member States this is as low as 50 years.

The use of early retirement benefits in economically strained times to cope with labour market issues can on the other hand become a long term disincentive to longer working lives. This is primarily due to the fact that once these financial security systems have been put into place it can be politically difficult to dismantle them, thus having a serious long term impacts on the employment rates of older workers. Employers may also encourage early retirement possibilities in times of financial strain to ease necessary redundancy processes. This, however, would give a disproportionate affect on the labour market participation of older workers in times of economic strain. Ensuring that employers bear all or at least a significant share of these costs can reduce such behaviour (e.g., BG, DK, HU, SI).

Nevertheless a number of Member States are adopting reforms to discourage the take-up of or close access to early retirement paths from the labour market, but not without difficulties. These reforms include increasing the age of entitlement to early retirement (e.g., BE, CZ, SK, UK), equalising the rules of access for both genders (e.g., DE, HU), plans to limit the number of professions entitled to benefits (e.g., PL), tightening the rules of access to recently introduced schemes that turned out to be unexpectedly popular (e.g., FR), or simply phasing out the schemes (e.g., IE). Other Member States strengthen the financial disincentives to retire early, by increasing the value of penalty factors (e.g., CZ, GR, PT, UK). Another solution adopted is suspension of early pension benefits for those who earn more than a minimum wage (e.g., HU). Since January 2006 the Netherlands has tightened fiscal treatment of early retirement and pre-pension schemes, and a reform of unemployment benefits is aimed at preventing the use of the scheme as an early retirement path.

Yet some Member States have delayed planned reforms (e.g., IT, AT, PL) decided to slow down the process of tightening the minimum requirements for early retirement. To what extent this is a result of the current economic recession or simply due to the political unpopularity of such decisions is difficult to determine. Also announcing restrictions on early retirement schemes can provoke early retirement choices as individuals feel pressured to take up such benefits before the restriction are imposed (e.g., FR, LT, PL, SK). However, shorter working lives and less hours worked implies lower economic growth and activity and through this lower and less sustainable pensions.

### *4.2 Early exits through disability schemes*

In some member states, the take up of sickness benefits and disability schemes in older workers are quite high. The high take up rate and in countries with increasing life expectancy and healthy life years raises issues as to whether there is a issue of such benefits being used as a way to exit the labour market early or if there is genuinely a health issue that needs to be addressed. For example, invalidity and sickness benefits may have become a tool to manage labour market difficulties in the 1980s and 1990s. Recent work from the OECD[8] highlights that developments in

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[8] M. F. Forster Sickness (2007), *Disability and Reintegration strategies: A Comparative Overview*, Santander, 16-20 July, available at: http://www.oecd.org/dataoecd/43/60/39154239.pdf

**Table 4**

**Take-up of Specific Invalidity Benefits in EU27**

| **Take-up of Invalidity Benefits as Share of Population 55-59** | | |
|---|---|---|
| **Low (< 5%)** | **Medium (5-15%)** | **High (>15%)** |
| | BG, LV | EE, HU, LT, PL, RO, SK |
| IE, PT | BE, DK, LU, SI | MT, UK |
| ES | CY, DE, FR, NL | FI, SE |
| **Take-up of Invalidity Benefits as Share of Population 60-64** | | |
| **Low (< 5%)** | **Medium (5-15%)** | **High (>15%)** |
| LV, SK | BG, EE, PL, RO | HU, LT |
| PT | BE, IE, SI, UK | DK, LU, MT, NL |
| CY, ES, FR | DE | FI, SE |

Source: National replies to questionnaire submitted to Members of the Social Protection Committee. Figures generally refer to 2006.
Note: These figures are generally taken from administrative sources are not necessarily completely comparable. Member States for which information is not provided do not have such information available.

sickness and disability benefits are not necessarily related to trends in objective or subjective health indicators but are influenced by policies and social phenomena. Namely, in some countries it can be socially less stigmatising to be out of work because of health reasons than unemployment. It can also be observed, that many people with health problems can work, and want to work. Having policies based around an assumption that they cannot work can be fundamentally flawed. Helping those people to work is potentially a "win-win" policy: it helps people avoid exclusion and have higher incomes, at the same time as raising the prospect of higher economic output in the long term.[9]

A number of member states have identified the above mentioned as a reason to reform their sickness and disability benefit schemes. Member States have sought to extend working lives by curbing exits through sickness and disability schemes (e.g., CZ, DK, ES, HU, MT, NL, PL, AT, SE). Measures generally involve rehabilitation efforts in connection with stricter eligibility rules and greater cooperation between institutions involved to allow for a quicker transition back into the labour market.

Changing attitudes to the acceptance of being in receipt of sickness or disability benefits, changing eligibility criteria for different types of health conditions, and putting more financial responsibility on employer's for the cost absences for ill health (both work and non-work related) are common approaches.

Restricting the use of sickness and disability schemes as pathways for early exit should, however, not preclude the use of such schemes for the contingencies they were meant for. Member

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[9] *Sickness, Disability and Work: Breaking the Barriers (Vol. 1): Norway, Poland and Switzerland*, published 7/11/2006, available at: http://www.oecd.org/document/25/0,3343,en_2649_37411_37600345_1_1_1_37411,00.html and *Transforming Disability into Ability*, published 27/02/2003, avaible at: http://www.oecd.org/document/14/0,3343,en_2649_37411_35290126_1_1_1_37411,00.html

States are looking for ways to integrate people into the labour market according to their capabilities and the dichotomy of "employable" versus "unemployable" persons with disabilities is being challenged.

### *4.3 Private pension provision and the incentives to work longer*

Member states have identified that relative benefit levels in pension systems are bound to decline in the future given pension reforms that have been carried out. To avoid this projected decline whilst still sustaining financial stability in pension expenditure, Member States have been promoting the development of private pensions.

Individually funded and pre-funded pension provision has often been viewed as providing a possibility where the costs of future pensions are shifted to the present as opposed to pay-as-you-go schemes and as being schemes where the returns on contributions are higher.

In most Member States a combination of providing incentives to extend working lives and increasing privately managed pension provision is being implemented. Some Member States promote or mandate extra contributions for occupational and private pension provision (e.g., BE, DK, DE, IE, SE, UK). A number of Member States that have introduced mandatory funded schemes by allowing for a transfer of contributions from old pay-as-you-go systems to the funded schemes or by an increase of overall contribution rates to statutory pension schemes (e.g., BG, EE, HU, LT, LV, PL, RO, SK, SE).

The interplay of the two strategies, providing work incentives in statutory defined benefit, pay-as-you-schemes and increasing privately managed pension provision, is vital to the success of providing adequate pensions in the future.

Privately managed pension provision typically shifts a lot pension risk from the provider to the beneficiary. This is especially true for defined contribution funded (both pre-funded and individually funded) schemes, which are becoming more predominant. Privately managed pension provision in most countries involves that individuals make active choices regarding their pension. This type of an active choice instigates an interest at an earlier stage in a person's contributory life in even other types of choices that can affect the pension of an individual, such as career choices, through a sort of spill-over effect. In many countries, however, most systems allow for a default choice when and active choice is not made which works adversely to this aim.

On the other hand, supplementary pension schemes occupational or private, mandatory or voluntary can give a significant addition to the statutory pension. These pensions, historically, have also had elements that have reversed certain work incentives legislated in the statutory pension schemes contributing to earlier retirement. These impediments can include the possibility to withdraw an occupational pension earlier than the statutory retirement or pension eligibility age or the receipt of lump-sum payments facilitating earlier exits from the labour market.

In a few Member States, early exits through supplementary private pensions used to be a common practice, though now diminishing (e.g., BE, UK). In Some Member States there are still specific private pension schemes designed to provide early retirement (e.g., FR, IE, NL, SI, SK, FI, SE), but in a growing number of Member States supplementary pensions cannot be used for bridging early exits from the labour market and old age retirement through statutory retirement schemes (e.g., DK, EE, PL, BG, CZ and CY).

The early take-up of private pension benefits depends strongly on eligibility rules and age limits. In some cases, a lower age is fixed by law (e.g., BG, DK, PL, FI) or by wide extending agreement between labour market actors as in the case of Sweden. The eligibility age for private pension provision can be as low as 50 in some cases (e.g., UK, IE and CZ) In some Member States,

private pension benefits are, however, actuarially reduced in case of early withdrawal (e.g., IE, UK, SE) providing the same kind of incentives to work longer as in statutory schemes with the similar design. Some Member States consider the frequent use of private pensions to bridge between early exit and statutory retirement age attributable to low awareness of the consequences of such behaviour. For instance, in the UK, employees are often even unaware of actuarial reductions of their private pension in the case of early labour market exit.

The effects of the current economic situation on privately managed pension schemes where the beneficiary bears much of the investment risk is an area that need to be monitored carefully in terms of longer working lives. Most existing funded schemes have experienced a fall in asset values during the recent financial turbulence. Low returns can lead to pension benefit levels that force the incapable to continue to work longer but it is important to note that the share of income from such schemes is quite limited for those in or close to retirement today. However, the experiences of the turbulence in financial markets can act as an early warning signal of the need to evaluate the situation as we move towards a higher amount of funded and prefunded pension provision. A lack of knowledge of the effects of investments on these systems can also lead to people making the wrong investment or retirement choices. For example, early withdrawal of a pension in a time of downturn can lead to unnecessary low benefits.

In this sense, the importance of information and knowledge regarding one's pension is crucial for incentives to be effective. This also has significance with regard to an individual's choice to invest in individual private pension savings. An incomplete picture of one's pension provision from different schemes affects the choices that individual's make concerning their retirement decision, such as career choices, including breaks from gainful employment, saving levels for retirement and labour market exit and the extension of working lives. . Early exits through unemployment schemes

Unemployment benefits are a key reason for early labour market exit in some Member States. As calculations for theoretical replacement rates show how results drop for unemployment breaks in an individual's career (Figure 11). In many Member States unemployment breaks lead to a bigger drop in replacement rates than for instance childcare breaks (e.g., CZ, DE, EE, EL, ES, IT, CY, LU, AT, PL, SK, FI, SE, UK).[10] In some Member States, the drop in replacement rates are six percentage points or more in after three years of unemployment (e.g., SK, RO, FI), bringing the adequacy of protection of pension entitlements during unemployment into question, which has to be balanced with the financial incentives for individuals to return to the labour market.

At the same time, in a number of Member States specific unemployment schemes are opened, that do not count in the general unemployment level. This provides a form of hidden unemployment of older workers that may not be visible in the normally calculated unemployment figures. Specific schemes of this type may include, extended benefit disbursement periods (e.g., CZ, EL, FR, IT, LT, AT, PL, SI, FI) extra benefits paid after the expiration of standard unemployment benefits (e.g., BE), or relaxing of other eligibility criteria, for example with regards to job search. Whilst these types of special conditions or too generous benefits systems for periods of unemployment may protect older workers from a difficult labour market situation, they can also act as a disincentive to work longer, and become an old-age poverty trap. Therefore, while many Member States do not have any distinguishing rules for unemployment benefits for older workers, others are attempting to progressively phase out such rules (e.g., DK, DE, FI).

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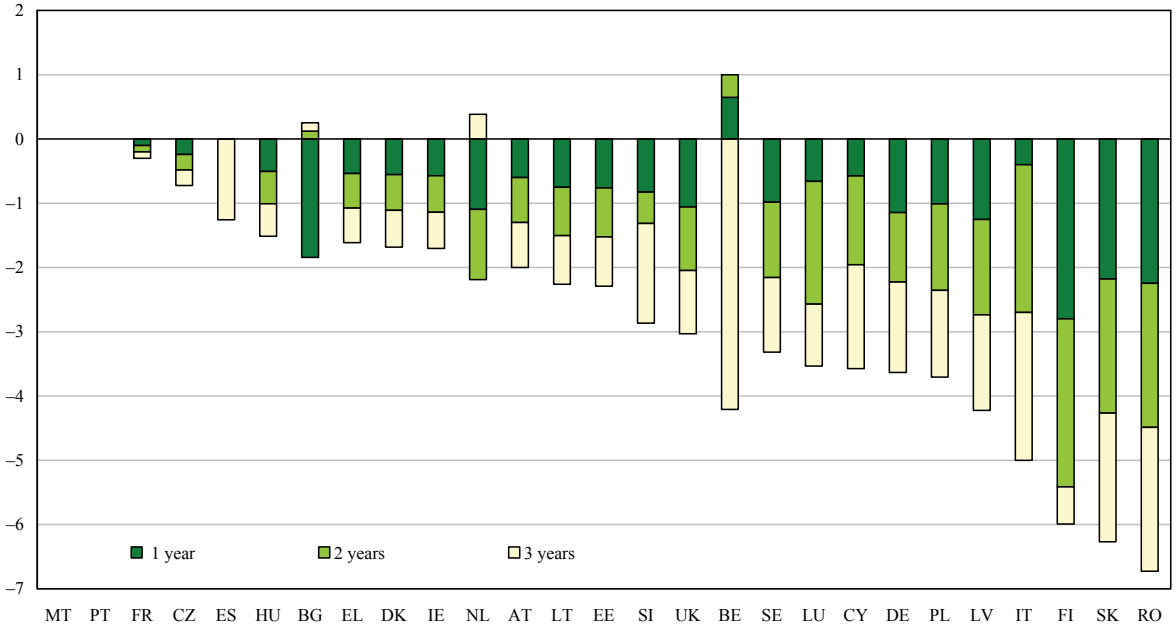
[10] In BE, this has to do with the nature of the calculation. Unemployment is assumed to take place at the end of the individual's career. In BE this entails that the individual loses the entitlement to the pension bonus which is given to those who work beyond the age of 62, as compared with a person who continues to work. If the unemployment is instead assumed to take place earlier in the career the results would be as those for the childcare case.

**Figure 11**

**Difference in Net Theoretical Replacement Rates for an Average Earner Entering the Labour Market at 25 and Retiring at the Statutory Retirement Age with a 1, 2 and 3 Year Career Break for Unemployment Compared with No Break***




* The unemployment break is assumed to take place in the years just prior to old age retirement which is assumed to take place at the legislated statutory old retirement age for men.
Source: SPC/ISG.

## 5 Information and the effectiveness of incentives

With these increasingly complex structures it is also vital that collective information including all complementary schemes gives individuals a clear picture of their retirement options and their subsequent effects on benefit levels. In order to ensure effectiveness of the incentives to work longer it is important to ensure transparency and information regarding the design of these incentives and how they affect a person's pension benefits ad entitlements. For example, the link between contributions paid in and benefits paid out has to be clear for the general public, since pension contributions, by and large, are viewed by the public as general taxation rather than as a build-up of individual pension rights. This can especially be the case if employers pay the contributions. Some Member States have clarified the link between benefits and contribution by imposing a part of the contributory burden on the individual (e.g., CZ, DE, EL, FR, IT, LV, LT, LU, HU, AT, PL, FI, SI, SE SK).

Pension reforms have taken place in most Member States and have often become a continuous process. In this context, it is becoming increasingly difficult for the people concerned to understand how the changes introduced affect them and how they should respond. At the same time pension reforms are also demanding more choices of the individual that affect their pensions by increasing flexibility around retirement conditions and prolonging maximum and minimum contributory criteria. Therefore, without transparency and general knowledge of the systems the incentives to work longer that may have been built into the system will be futile.

**Table 5**

**Take-up of Specific Unemployment Schemes for Older Workers in EU27**

| | Low (< 3%) | Medium (3-6%) | High (>6%) |
|---|---|---|---|
| Take up as a share of population 55-59 | UK, SE, SK, LU | EE, CZ, LT, MT | BE, CY, FR |
| Take up as a share of population 60-64 | CZ, BG, LT, PL, UK, SE, SK, LU | FR, CY, NL | BE, FI |

Note: These figures are generally taken from administrative sources and are not necessarily completely comparable. Member States for which information is not provided do not have such information available. In DE a special scheme for 58+ unemployed individuals could make up an estimated 5 per cent of the population aged 55-64. However, this scheme is about to phase out as of 2008.
Source: National replies to questionnaire submitted to Members of the Social Protection Committee. Figures generally refer to 2006.

There is widespread recognition in Member States that the level of financial literacy among the general public is inadequate for people to be able to make educated choices between the various options open to them. All the increased individual responsibilities and risks imply that information policy should play a more important role in pension policy.

Additional to this there is also a recognised problem of short-sightedness suggesting that even knowing and understanding the significance of different choices may not ensure sound consumer choice simply due to a lack of interest in one's pension, or interest arising too late. This is especially pertinent in systems where there is a life cycle approach to earning pension entitlements making decisions made in the early years of a person's career important to the pension eventually paid out.

In efforts to complement other types of pension formation a growing number of Member States are now also providing or developing calculations of how these pensions rights may translate into a pension income, based on projections given certain economic assumptions (e.g., BE, DE, DK, IE, ES, FR, LT, FI, SE, UK). In Finland, the projections are only provided for those closest to retirement, as projections for younger cohorts are considered too hypothetical. Yet with a move towards longer contributory periods it would seem important that individuals understand the effects of shorter careers early on. As the pros and cons of different approaches are weighed, even younger cohorts might appreciate forecasting tools which provide different scenarios depending on economic assumptions, contributory years and point of retrieving the pension.

However, many countries have recognized that at the same time projections are usually provided for each scheme in isolation even though individuals ideally would need to know how their different entitlements combine into a full package of potential retirement income. But in a few of the Member States with widespread occupational and private pension provision, steps are being taken to develop web-based pension portals where people can check how their pension accruals from different schemes would come together in an overall amount of pension income (e.g., DK). This will help citizens to avoid making retirement decisions based on incomplete or fragmented information.

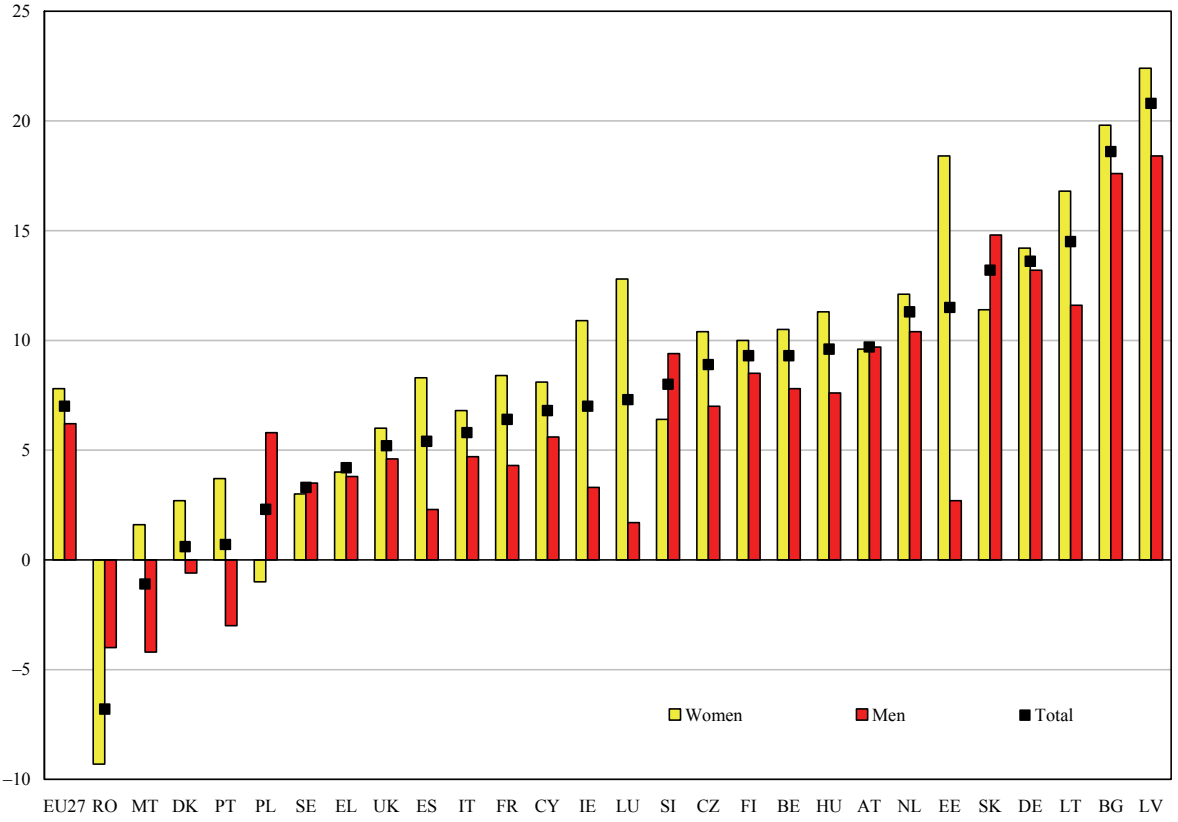
## 6 Labour market conditions for older workers

### *6.1 Developments 2001-08*

The European Union has identified a target under the growth and jobs strategy is to reach a

**Figure 12**

**Change in Employment Rates of Older Workers (55-64), 2001-07**
*(percent)*




Source: Eurostat, *Labour Force Survey*, Annual averages.

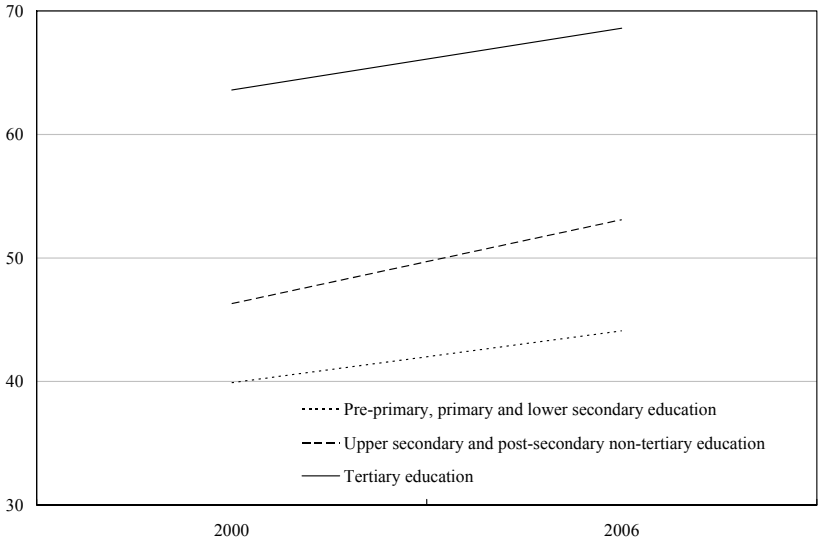
50 per cent employment rate for older workers by 2010. In 2007, the employment rate for older workers in the EU-25 was 45 per cent compared to 37 per cent in 2001, and 11 countries now exceed the 50 per cent target (Figure 12). This general increase in employment rates results from two main factors. Firstly, the relative share of people aged 55-59 – who have a higher employment rate – has grown due to the ageing of the baby-boom generation. In addition, most Member States experienced a higher increase in the employment rate for women than for men between 2001 and 2007.

Moreover, since 2000 the increase in the employment rate among 55-64 year olds has benefited all categories of workers, although it has been relatively slower for the less qualified within the EU25: it has been 5 points for the less qualified, compared to 6 or 7 points for medium or highly qualified (Figure 13). At the same time the evolution of employment rates for the less qualified was more favourable for the age bracket 25-54, probably reflecting targeted employment measures.

The employment rates of older workers are often monitored as an indicator of the effect of pension reforms on the extension of working lives. It is, however, clear that incentives structures included in pension reforms have only a small role to play unless complemented by a labour market that supports these initiatives.

**Figure 13**

**Employment Rates of Men 55-64 by Skill Levels, EU25**




Source: Eurostat, *Labour Force Survey*.

The National Strategies show that there are two commonly used instruments to boost the labour market activity of older workers. First, Member States are actively adopting a culture of lifelong learning, offering more training designed to make older workers' skills more adaptive and to help them keep their jobs (e.g., AT, BG, and CZ). This plays in line with the life-cycle approach to contributory periods in some pension schemes as well. Second, subsidies are offered to employers to boost financial incentives to employ older workers (e.g., AT, DK, ES, LT, HU, and SE). In Germany, financial incentives are also given to unemployed older workers to reenter the labour market by offering a compensation allowance to unemployed people aged 50 or more who accept a low-paid job. On a European level, the European Social Fund (ESF) contributes to the financial sustainability and adequacy of pension systems by encouraging activities related to life long learning, active ageing and prolonging working lives (e.g., AT, HU, SK). Some Member States are also using European anti-discrimination law in their promotion of better age management (e.g., DK, NL, UK).

Additionally, European legislation on age-based discrimination (Council Directive 2000/78/EC) states that less favourable treatment of employees on the grounds of age needs to be objectively justified. A recent court ruling has, however, confirmed that reaching the pension eligibility age or statutory retirement age could be a sufficient reason to terminate the employment without it being considered discriminatory.[11]

However there is still a need to fight age discrimination and to open up employment opportunities for older workers, including opportunities for training and retraining.

### *6.2 The effect of the crisis on labour market conditions*

In May 2009, the European Commission revised its forecast with regard to the financial and economic downturn in the EU. The forecast predicts a contraction of GDP in the EU by 4 per cent in 2009 and to stagnate during 2010. In line with this, employment rates are expected to fall

[11] Case C-388/07 The Incorporated Trustees of the National Council for Ageing.

significantly and EU-wide unemployment rates are expected to reach almost 11 per cent in 2010 as compared with 7.0 per cent in 2008.[12]

The economic crisis has already had an impact on the labour market and employment growth has come to a standstill whilst unemployment rates have started to rise. The number of employed people will decline by 2.5 per cent in 2009 and by 1.5 per cent in 2010 or by about 8.5 million jobs. Some categories of workers are expected to be more affected by the stagnation on the labour market such as new and young workers, the low skilled, employees holding temporary contracts, EU mobile workers, migrants and the elderly.[13]

The current situation can cause further delay in the establishment of younger workers on the labour market. This can have a long term impact on the pension levels of these individuals, possibly causing pension benefit adequacy problems later as is displayed by the calculations in Figure 11. This can be especially pertinent in systems where contributory years have been extended. This problem is compounded by the increase in long term unemployment.

The long-term unemployment share for older workers (percentage of unemployed for more than 12 months) is especially high, at 55 per cent. Sustaining a well-functioning labour market and a high activity rate among the population of working age can be especially difficult in times of economic downturn. Often groups that are extra vulnerable are more susceptible to unemployment and lay-offs, including older workers who can often be considered both a more expensive yet more ineffective source of labour. Such labour market behaviour can, however, lead to more significant problems later on in the sustainability of pension systems and other financial security systems. The reason for this is that often older workers are more difficult to reintegrate into the labour market. For example, if early retirement systems or specific unemployment's schemes are used these may provide more long-term and generous benefits than those provided to other groups, as a way of enticing an easier redundancy. The individual incentives to reenter the labour market are then often smaller and the labour market demand for a person who has been absent for a longer period tends to diminish.

In earlier economic crises, older workers tend to be amongst the majority of those affected by redundancies. It is important to implement proactive labour market policy strategies that keep older workers in the labour force and that help to curb such labour market distortions as the impact of the current labour market and economic situation such as redundancy packages, and early retirement.

Most Member States have taken measures to preserve employment, support activation and promote reintegration in the labour market, and anticipate and manage the impact of restructuring. However, most of these measures build on existing labour market policies that have developed along the principles of flexicurity and active inclusion. It is important that all labour market actors work together in order to keep a balance in the age distribution of the labour market and those in unemployment considering that certain groups such as young and older workers are already proportionately underrepresented on the labour market.[14]

Integrated plans in Member States to cope with the current economic downturn indicate an understanding of the multi-faceted nature of the crisis.[15] A common approach is to cushion the impact of the crisis by giving support in the field of employment to both employers and workers

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[12] European Commission Economic Forecast Spring 2009, available at: http://ec.europa.eu/economy_finance/publications/publication_summary15046_en.htm

[13] Source: DG ECFIN.

[14] Source: National replies to questionnaire submitted to Members of the Social Protection Committee.

[15] Updated joint assessment by the Social Protection Committee and the European Commission of the social impact of the economic crisis and of policy responses, available at: http://ec.europa.eu/employment_social/spsi/spc_opinions_en.htm

and by investing in the economy. Labour market measures that have been observed include flexible working-time arrangements (e.g., BE, DE, NL, SI); measures to raise the employability of workers, including the most vulnerable through enhanced training programs (e.g., DE, HU, NL, AT, PT); or public support to SMEs (e.g., BE, BG, AT, PT, FI, SE). Other examples of measures to preserve jobs entail cuts in non-wage labour costs (e.g., BE, BG, DE, PT, SI, FI, SE) and corporate income taxes (e.g., PT, SI). Specific measures are also targeted at older workers and aim at avoiding the use of early retirement schemes (e.g., PL, PT).

Measures to support activation and promote reintegration in the labour market, especially of the most vulnerable include the strengthening of public employment services allowing in particular for more individualised support (e.g., BG, DK, DE, FR, SI); greater access to training (e.g., BG, DE, FR, FI, PT, UK) including training schemes targeted at specific groups of workers (e.g., PT), subsidised employment for those furthest away from the labour market (e.g., FR), and to child care (e.g., AT) and other enabling services.

Preserving a close link to the labour market for those made redundant is an important measure. Although the current social costs of this may be high, it is important that a long-term thinking is maintained.

### *6.3 The crisis and the take up of benefits*

In light of the current economic downturn, it is also important to monitor the effects on the situation of older workers in the labour market and on their path to full retirement.The direct impact of the recession is most apparent in the increase in the take up unemployment benefits in 2008, and especially during the second part of the year. The impact of the crisis has also had a slight impact on the percentage of older workers claiming early retirement schemes (e.g., LV, LT, PL and SK).[16] The number and age and gender distributions of claimants of social assistance is not clear yet, however, most MS expect increased pressure on minimum income safety net schemes.

Areas more frequently pointed out as deserving special attention when adopting recovery packages or specific measures in the current context are linked to unemployment, the adequacy of safety nets, funded pension schemes, and access to housing. Moreover a number of Member States have also delayed pension reforms or the activation of automatic mechanism which in the current climate would otherwise lead to lower pension benefits.

Member States have taken action to reinforce the support to people's income through measures that include increasing the level of minimum income or minimum wage, extending the coverage or duration of unemployment benefits, reinforcing other social benefits, introducing tax rebates or exemptions for specific groups. They have done so either by advancing measures that were already planned or by adopting new measures, either on a temporary or permanent basis. These measures build on the active inclusion strategies that many Member States have started implementing, and attention is paid to avoiding that the new measures compromise efforts to build integrated approaches that combine income support, access to services and reintegration incentives.

## 7 Conclusions

Pension reforms have to deal with demographic developments and in particular increased longevity, which is a key driver for increasing pension expenditure in the future. This increase in a financially balanced scheme would require either higher contributions by workers or lower benefits

[16] In Poland the increase is also due to the ongoing reforms.

for pensioners, if the increase in life expectancy were spent in retirement. However, increases in life expectancy can be shared between the years in employment and retirement, thereby resulting in a better balance between life-time contributions and benefits.

The hesitation to maintain older workers, into the labour market can also depend on what is socially acceptable. There is, however, a growing recognition amongst policy makers and also amongst the general population for the need to extend working lives. The clearest example of this success is the recognition that has been given to the need to increase retirement ages. This is now becoming a politically legitimate and viable reform in some countries.

Giving flexibility to retirement choices and putting more responsibility on the individual in determining the pension ultimately received, also allows for a social dimension in work incentives. Individuals are allowed to prolong working lives according to individual ability and choice.

Creating incentives to work more and longer in pension systems is only part of the solution to extending working lives. The success of these incentives is dependent on their interaction with other benefit systems and on labour market conditions. If incentives in pension systems are counteracted in other social security systems, private or public, the incentives will not be as effective in attracting people to prolong their working lives. Moreover even the best designed incentive scheme will fail to take effect if the demand for older and younger workers is lacking on the labour market. This is clearly more of a problem in phases of employment destruction, but also in periods of employment growth it is important to ensure labour markets are open for younger and older workers.

## ANNEX 1

### List of Abbreviations of EU Member States

BE - Belgium

BG - Bulgaria

CZ - Czech Republic

DK - Denmark

DE - Germany

EE - Estonia

EL - Ireland

ES - Greece

FR - Spain

IE - France

IT - Italy

CY - Cyprus

LV - Latvia

LT - Lithuania

LU - Luxembourg

HU - Hungary

MT - Malta

NL - The Netherlands

AT - Austria

PL - Poland

PT - Portugal

RO - Romania

SI - Slovenia

SK - Slovakia

FI - Finland

SE - Sweden

UK - United Kingdom

## ANNEX 2

### Recently Enacted Changes in Retirement Age in the EU Member States

| MS | Measure | Decision | Implementation |
|---|---|---|---|
| BE | Equalisation of retirement age: gradual increase in retirement age up to 65 for women | 1996 | Gradual increase to reach age of 65 in 2009 |
| BG | Increase in retirement age up to 60 for women and 63 for men | 2000 | Since 2000 retirement age increase by 6 months per year: age of 63 for men reached in 2005.Age of 60 for women in 2009 |
| CZ | Increase in retirement age from 60 to 65 for men and from 57 to 65 for women (and to 62-64 for women who raised two or more children) | 1995, revised 2008 | Since 1996 retirement age increased by 2 months per year for men and 4 months per year for women |
| DK | Increase in retirement age from 65 to 67 for both genders (and further possible increases) | 2006 | Between 2024 and 2027. A framework for further increases in the retirement age after 2030 (adjustment mechanism based on trends in the remaining life expectancy) |
| DE | Increase in retirement age from 65 to 67 for both genders | 2006 | Gradual increase between 2012 and 2029 (one month per year starting from 2012 and two months per year from 2024) |
| EE | Increase and equalisation of retirement age (63 years) | 1999-2000 | Gradual equalisation till 2016 |
| GR | Increase in retirement age for women insured before 1993 in IKA-ETAM[17] from 57 to 60.<br><br>Increase in retirement age for women insured after 1992 to 65. | 1992 | Retirement age of 65 for those women insured since 1993 (to be achieved in 2058) |
| IT | Increase in minimum retirement age from 58 to 61 | 2007 | Gradual increase between 2008 and 2013 combining age and years of contributions |

[17] IKE-ETAM is social insurance fund covering most of private sector employees.

| MS | Measure | Decision | Implementation |
|---|---|---|---|
| LT | Increase in retirement age from 60 years for women and 62.5 years for men to 65 years for both genders | | Gradual equalisation between 2012 and 2026. Yearly increases by 4 months for women and by 2 months for men |
| LV | Increase and gender equalisation of retirement age (62) | 1996 | Increases in retirement age by 6 months per year: men reached retirement age of 62 in 2003, and women in 2008 |
| HU | Increase in retirement age from 60 years for men and from 55 for women to 62 for both genders | 1996 | Gradual increase by year every two years so that the retirement age of 62 was reached in 2001 for men and in 2009 for women |
| MT | Gender equalisation: increase in retirement age from 60 years for women and 61 years for men to 68 years for both genders | 2006 | Equalisation of the retirement age till 2013 |
| MT | Increase in retirement age from 62 to 65 for both genders | 2006 | Gradual increase between 2014 and 2026 |
| AT | Equalisation of retirement age: increase from 60 to 65 for women | 1990s Constitutional Court ruling | Increases by 6 month per year between 2024 and 2033 |
| RO | Increase in retirement age from 57 to 60 for women, and from 62 to 65 for men | 2000 | Gradual increase between 2001 and 2014 |
| SK | Equalisation of retirement age: increase from 60 years for men and 57 years for women to 62 years for both genders (women with children lose their right to retire at the age of 53-56) | | Gradual increase for men between 2004 and 2006, and for women between 2004 and 2010 (women with 5 children and more till 2015) |
| FI | Increase in retirement age from 63 to 65 for both sexes | 2009 | Retirement age will be raised by two months per year starting in 2011 |
| UK | Gender equalisation: increase in state pension retirement age for women from 60 to 65 | 2007 | Between 2010 and 2020 |
| UK | Increase in state pension retirement age for both genders from 65 to 68 | 2007 | increase to 66 between 2024 and 2026, 67 between 2034 and 2036, and 68 between 2044 and 2046 |
| UK | Increase in age when private or occupational pension can be drawn from 50 to 55 | 2008 | From 2010 |

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# RETIREMENT BEHAVIOUR AND RETIREMENT INCENTIVES IN SPAIN

*Isabel Argimón,[*] Marta Botella,[**] Clara I. González[***] and Raquel Vegas[***]*

*In this paper we analyse the role that Social Security wealth and incentives play in the transition to retirement in Spain. We use the labour records and other relevant information contained in a newly released database (Muestra Contínua de Vidas Laborales, 2006), to construct incentive measures stemming from the Social Security provisions in relation to retiring at old age and investigate the role played by such incentives and by other socio-economic variables on the retirement hazard. We compute the effects of the reform that took place in 2002, which made the requirements to access an old pension stricter in general. We carry out a dynamic reduced-form analysis of the retirement decision using a duration model.*

*Our results show that both the pension wealth and substitution effects have a significant role on retirement decisions, but that the latter has less relevance as from the reform introduced in 2002.*

## 1 Introduction

The sustainability of pay-as-you-go systems is a matter of concern in ageing economies, such as Spain, as they were designed at a time when demographic structures were characterised by a much lower life expectancy and a much higher fecundity.[1] Therefore, both, the number of people and the number of years that these people were in a situation to receive a public pension was much lower when the system was launched than nowadays.[2]

On top of such demographic developments, in recent years we have also observed a decline in the labour force participation of older workers. While in the seventies, the participation rates of males over 55 were above 50 per cent, in 2008 they do not reach 30 per cent. The combination of both factors has lead to the prediction that the ratio between people in working age and people of 70 or more years of age, which is nowadays around 5.5 in Spain, will be only 2.25 in 2055. So, a smaller proportion of people than what is currently the case will be providing the revenue that will be transferred to older people in the form of pensions. In this sense, the behaviour of older workers is reinforcing the negative impact that demographic factors have on the sustainability of the pension system.

The role of pension benefits rules in relation to labour market participation of the elderly is regarded as central in many countries, as not only they may be too generous in providing income support, but they may also create incentives to retire early from work. In this sense, three issues are relevant here: the amount of the pension that the system provides, the pattern of benefits associated with each age of retirement and the entitlement rights that define the conditions to be met to be able to claim a pension at each age. Parametric changes for the Social Security system have been and are being discussed in Spain under the so-called Toledo Agreement while some countries have

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[1] It is the decline in fecundity, more than the longevity increase, what explains the forecast that more than 30 per cent of total Spanish population will be older than 65 years of age in the middle of this century.

[2] In fact, the average number of years that a man aged 65 was expected to live from that age was around 12 in the middle of the 20th century, it has grown up to 15 now, and is forecasted to increase to 20 years in the middle of this century, according to the Spanish National Statistics Institute (Instituto Nacional de Estadística, INE).

already implemented large reforms. Many changes have been directed to reducing incentives to early retirement embedded in the pension system and to increase incentives to leave the labour market at a later age. Governments have also promoted active labour force measures that should stimulate the demand for elderly workers, thus contributing to raising or maintaining labour market participation of the elderly.

The goal of this paper is to study and quantify the role that Social Security provisions for old-age pensions are playing on the retirement decision of the elderly in Spain. We propose estimating a reduced form model for retirement to capture the effects of pension incentives on pension claiming, controlling for some socio-demographic characteristics. In particular, we analyse the probability of retiring at a given age, given that the person has not retired yet, as a function of individual variables.

Boldrin *et al.* (1999, 2004) have carried out an analysis of similar characteristics, estimating the probability of retiring at a given date. The objective of the work that we are presenting here is to widen such study in three main directions. On the first place, we propose estimating a duration model and not a point in time estimation, so as to allow a consideration of the determinants of the retirement decision at different ages, and, particularly to assess the role of the SS incentives for early retirement and for retirement at each age.[3] Moreover, we use a new database, the *Muestra Continua de Vidas Laborales (MCVL)*, which has recently been released to explore this issue further. The advantage of the MCVL for the analysis in relation to previous samples obtained from the same source, and used in empirical work,[4] is that the sample design is known and, therefore, it allows for a better and broader understanding of the results obtained. A duration approach seems to maximize the informative content of this database, as it allows to follow the workers' decisions across time. Finally, we address the quantification of the impact of the change in pension rules whose full implementation took place in 2002.

The paper is structured as follows. In the next section, we briefly summarise the empirical results obtained so far on the determinants of retirement for old people in Spain. Section 3 contains a description of the dataset that we use in the analysis. In Section 4 we discuss the empirical model that we estimate and whose results are summarised in section 5. Section 6 contains the conclusions. A Data Appendix is included, as well as an Appendix containing the main features of the Spanish Social Security pension system.

## 2 The empirical analysis of the role of social security on retirement decisions

The vast majority of empirical analysis carried out to measure the role of Social Security on retirement decisions has been done for the USA, while evidence for other countries, and specially Spain, is more limited.[5]

One of the most revealing evidence of the dependency between withdrawal from labour force and pension regulations in Spain is the presence of spikes in the benefit claiming moment around the ages of 60, the earliest age a pension can be, in general, claimed, and 65, the ordinary retirement age. Such pattern is also observed in other western countries (Gruber and Wise, 1999

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[3] Villagarcía (1995) and Muñoz (1995) apply the duration model approach to analyse the age of retirement, using the EPA database, which is cross sectional by construction. Because of the data source they cannot address the role played by SS incentives.

[4] A previous version of a similar database with information up to 1995 and whose description can be found in Martínez (1999), has been used in Boldrin *et al.* (1999 and 2004), Boldrin and Jiménez-Martín (2002), and Jimenez-Martín *et al.* (2000, 2006). The main drawbacks of such database are that the detailed sample design has not been disclosed and that it is not publicly available.

[5] This literature has been reviewed in detail in Diamond and Gruber (1999) and Coile and Gruber (2000). Evidence for other countries can be found in Gruber and Wise (1999, 2004), where also the case of Spain is addressed (Boldrin *et al.*, 1999 and 2004).

and 2004), where eligibility ages prescribed in country-specific provisions also play a major role in defining the observed pattern of retirement by age.

The microeconomic evidence that has been gathered so far shows that the Spanish early retirement provisions play an important role in the modal age of retirement and its pattern in different ages (Boldrin *et al.*, 1999, 2004) and that, in general, labour force transitions of elderly men depend on Social Security regulations (Alba, 1997; García-Pérez and Sánchez- Martín, 2008a and 2008b)[6] and their interdependence with health considerations (Blanco, 2000; Prieto *et al.*, 2002).

There are few papers that attempt at quantifying the impact of pension Social security incentives on labour force participation. In particular, Boldrin et al.,1999, 2004 and Jiménez, 2006 do so through changes in the social security framework. These works follow a regression-based approach, being based on reduced-form behavioural equations, to model the effect on the decision to retire of pension wealth, the incentives embedded in the pension system and individual demographic characteristics. Estimating retirement hazard rates, using a probit model on a sample of individual work histories randomly drawn from the historical files of Social Security affiliates, they conclude that a substantial portion of the retirement behaviour cannot be explained by Social Security factors. On the other hand, García Pérez and Sánchez Martín (2008b) find evidence of the relevance of the social security incentives on the transitions from unemployment for older workers. Using a sample of individuals aged between 56 and 70 from tthe European Union Household Panel (PHOGUE), wave 7 (2000), Utrilla de la Hoz and Ubago (2005) find that a replacement rate (pension over total income) below 80 per cent reduces the probability of retiring.

The effect of the successive pension reforms has been empirically addressed and point out, in general, to its effectiveness in lowering retirement. Jiménez (2006) carries out a simulation exercise that computes the effect of the Spanish old age pension reforms that took place in 1997 and 2002 and concludes that they reduce the hazard rates. A similar qualitative result is found in Gutiérrez-Domenech (2006), where, using a longitudinal survey of Catalan population, it is shown that the 2002 reform contributed to the increase in the staying-on employed probabilities of the individuals older than 60. On the other hand, Sánchez Martin (2005), using a calibrated overlapping-generations model finds that the overall effect of the 2002 reform is a clear drop in the average retirement age, as younger cohorts of low income workers benefit from the opportunity of leaving the labour force early.

As for the impact of truncations in the system, Jiménez-Martín and Sánchez (2000, 2006) show, through the estimation of the behavioural parameters of a structural model, that the existence of minimum pension's regulations has an impact on early retirement decisions. They find that the combination of age penalties and minimum pensions generate large incentives to early retirement for those workers with low wages and short labour histories. Jiménez-Martín and Sánchez (2006) conclude that there is a threefold increase in retirement at 60 with respect to the economy without minimum pensions and total early retirement (before or at 60) is almost 50 per cent larger.

Finally, there is the line of research devoted to analysing the sustainability of the pension system which is usually formulated within the framework of an overlapping generations model. The evidence gathered on the effects of delaying the normal retirement age a number of given years (Sánchez-Martín, 2003; Boldrin and Jiménez-Martín, 2003; Díaz-Giménez and Díaz-Saavedra, 2008) shows that this strategy has an important impact on the system deficit.

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[6] See García Pérez and Sánchez Martín (2008a and 2008b) for some results on the links between unemployment, retirement and their associated public insurance programmes calibrated with data from the MCVL.

## 3 The data

### *3.1 The MCVL*

The database *Muestra Continua de Vidas Laborales* (MCVL 2006) includes all the electronically recorded information that the Social Security administration keeps in relation to labour and contributory pension history for more than one million of individuals, whose anonymity is preserved. It is a 4 per cent random draw from a reference population, which is composed of all the people who at any time during 2006 had a registered record with the Social Security system, either because they were contributing or because they were receiving a pension. Therefore, it does include those that were unemployed for the whole 2006, either if they received a contributory pension or if they received unemployment benefits, as in the latter case, the National Employment Service pays their social contributions to the Social Security Funds. The sample does not contain any information relating to the scheme called the *Regimen de Clases Pasivas* that covers public sector employment, so that most civil servants cannot be included in the analysis. It must be pointed out that as a consequence of the definition of the reference population a large proportion of non-working females is also included, mostly as preceptors of a widowhood pension.[7]

Most of the labour, contributory and pension history of the over one million individuals has been recovered, so that their employment history can be reconstructed. The data contain, for each employment spell, information on *covered earnings*, which are the amount of the earnings that the Social Security regulations takes into account for the computation of pension rights. *Covered earnings* can be regarded as a good proxy for actual earnings, although they have both a ceiling and a floor: on the one hand, a minimum contribution must be paid over earnings, independently of the actual amount perceived, so that there is a minimum *covered earning* associated to it; on the other hand, earnings above a given ceiling do not pay contributions and therefore do not generate further rights. *Covered earnings* are used in the empirical analysis to proxy the wage variable.

Moreover, for each employment spell we have also information on length and type of contract, the Social Security regime and contributive group that are associated with the job and that define the amount of the contributions and the conditions to access the pensions, as well as information about the firm, such as its activity sector and location (province).[8] Available data also include some personal characteristics such as sex, age, place and year of birth. We can also know the place where the worker first affiliated, which could be regarded as the place where the first job was taken. Data on people's socio characteristics, such as marital status are poorly recorded in the sense that the available information corresponds to the situation when the affiliation took place, and in no case there is any reference to the spouse's working status, so that it is not possible to take into account the joint decision to retire.[9] As far as social transfers are concerned, the database contains information on periods and amounts enjoyed for old-age and disability pensions or survivors' pensions such as, orphanage, widowhood and family help. There is no data on other sources of individual wealth or other sources of income.[10]

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7 A detailed description of the sample can be found in Seguridad Social (2006), *La muestra contínua de vidas laborales. 2004*, and an overview in Argimón and González (2006).

8 Active policy measures to promote retaining or offering a job to old people cannot be taken into account as the dataset does not include enough information to do so.

9 The MCVL has been matched with information coming from the Census. In the Census' module "Co-inhabitants" there is information about the number of people living with the person in the MCVL dataset, their age and sex, but not their working status.

10 The MCVL has also been matched to Personal Income Tax data corresponding to one fiscal year. In that sense, information on additional sources of income could be obtained, but not in a longitudinal dimension.

**Table 1**

**Distribution by Year of Birth and Retirement Age.
Sample of Men Born between 1936 and 1946 Having Worked in the General Regimen and with a Relation with the Social Security in 2006**

| Born | Retirement Age | | | | | | Not Retired | Total |
|---|---|---|---|---|---|---|---|---|
| | 60 | 61 | 62 | 63 | 64 | 65 | | |
| 1936 | | 205 | 199 | 152 | 295 | 892 | 189 | 1,932 |
| 1937 | 880 | 201 | 162 | 149 | 295 | 866 | 195 | 2,748 |
| 1938 | 817 | 136 | 159 | 153 | 285 | 819 | 170 | 2,539 |
| 1939 | 652 | 103 | 135 | 134 | 243 | 732 | 190 | 2,189 |
| 1940 | 948 | 168 | 225 | 232 | 401 | 1,225 | 314 | 3,513 |
| 1941 | 704 | 140 | 187 | 192 | 332 | 981 | 893 | 3,429 |
| 1942 | 607 | 186 | 170 | 188 | 350 | | 1,956 | 3,457 |
| 1943 | 600 | 213 | 231 | 205 | | | 2,671 | 3,920 |
| 1944 | 554 | 200 | 220 | | | | 2,963 | 3,937 |
| 1945 | 546 | 209 | | | | | 3,449 | 4,204 |
| 1946 | 388 | | | | | | 3,597 | 3,985 |
| Total | 6,696 | 1,761 | 1,688 | 1,405 | 2,201 | 5,515 | 16,587 | 35,853 |

### *3.2 The sub-sample*

Given that we are only interested in retirement decisions taken by the elderly, we restrict our initial sample from the 2006 wave to people that are aged between 60 and 70 in 2006 (*i.e.*, those born between 1936 and 1946) and that have already become entitled to a pension benefit, defined in terms of being able to prove at least 15 contributory years. It means that we exclude those for which the Social Security system does not record any contributory life, those that have retired before their 60$^{th}$ birthday[11] and those who started receiving an old age pension before 1997, when a large pension reform was introduced.[12] We have also excluded those that receive an old-age pension coming from incapacity, as the determinants to claim such kind of pension are most likely linked to health factors, which are not comparable with the rest of the determinants.[13] We additionally restrict the sample to men as the labour history of women is quite different from the one for males, so that the determinants of their decisions may be rather different. Finally, to ensure homogeneity in pension rules, the sample is limited to those whose longest recorded labour relation has taken place in the General Regime, the Social Security scheme that gathers the largest proportion of workers.[14]

Finally, we also exclude some individuals with incomplete recorded contributory information so that the sub-sample we use for the analysis is composed of 35853 men, whose distribution by year of birth and retirement age is reflected in Table 1.

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[11] Early retirement before the age of 60 is only possible for dangerous and unhealthy jobs such as air pilots, some miners, railways workers, bullfighters and artists.

[12] Very few records relating to pensions awarded before 1997 are available.

[13] Moreover, the transition to the old-age retirement scheme is deterministic, so that disability pensions are converted into retirement pensions once the beneficiaries turn 65 years of age. These pensions receive a very favourable tax treatment.

[14] See Appendix 2 for a description of the regulatory framework.

## 4 Empirical framework

The earliest empirical work in this area considered reduced-form models of the retirement decision as a function of Social Security wealth and pension level. While the estimation strategies employed differed, depending mainly on the nature of available data, the results consistently suggested a role for Social Security. The main limitation of this type of studies is that they consider Social Security effects at a point in time, but cannot account for the impact on retirement decisions arising from the time pattern of social security wealth accruals. In order to address this shortcoming, different approaches were followed in subsequent analysis. The accrual of Social Security or other more forward-looking incentive measures were developed and their effect was analysed with the estimation of reduced-form models.[15] Alternatively, a different approach was to consider structural models where workers were facing a budget constraint which was discontinuous or kinked.[16] Another line of research is the "option value" model of retirement where it is postulated that not only the level of pension wealth or its increment with one additional year of work is a determinant of the retirement decision, but that what is relevant is the evolution of future wealth and work. So retirement decisions are modelled as a function of the difference between the utility of retirement at the current date and at the date that maximizes one's utility (Stock and Wise, 1990). In its structural form this model is difficult to implement, so numerous authors (Samwick, 1998; Gruber and Wise, 1999; Hakola, 2002; Blundell et al, 2002) have used the option value in reduced form models. More recently, applied general equilibrium models are also being used to explore the pensions issue (for instance, Imrohoroglu *et al.*, 1999) so that they need to be calibrated to be able to produce numerical results.[17]

The paper follows the hazard model approach followed in Grubber and Wise (2004), and Blundell *et al.* (2002), among others, to capture the effects of changes in social security wealth and other variables on retirement. Although the option value model is the theoretically most intuitive model and the structural model should provide more insight into the issue, we choose the simplicity of this reduced form technique because of the computational complexity of the alternative approaches.[18] Moreover, it is partially forward looking, as it allows for continuous updating of information as individuals grow older. That is, for an individual who complies with the requirements to retire at age t, the probability of retiring at age $t$+1 is modelled in terms of the ratio of annual wage earnings over pension benefits, public pension accruals and labour situation at time t. The retirement decision is analysed in this paper following a duration model approach that treats it as a dynamic discrete choice.[19]

We define $T$ (our duration variable) as the period between the age the person becomes entitled to receive a retirement pension until the age that person claims the benefit. We treat it as a discrete variable, defined in years, that changes as time goes by.[20] We let $C_i$ be the maximum number of years that we could observe the individual in the sample, which only depends on his year of birth and the moment he became eligible, so that it is constant. So, that, for example, if a

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15 Spataro (2005) proposes a set of alternative measures that feature the forward-looking aspect and applies them to Italian data.

16 The lifetime budget constraint is analogous to the standard labor-leisure budget constraint, with annual hours replaced by years of labour force participation, and annual earnings replaced by cumulative lifetime compensation. The kinks are produced by changes in the accrual rates (the rise in retirement income entitlement caused by continuing to work for one more year). See for instance (Burtless, 1986).

17 See Jimeno *et al.* (2006) for a survey of the features of different approaches used in the literature to study the effects of population aging on Social Security expenditures.

18 Moreover, Spataro (2002) finds that a reduced-form model is preferable to the structural option value model.

19 We assume that individuals will choose to remain with the current situation if the utility of remaining exceeds the utility of retiring.

20 We must remind that not all individuals in the sample are either working or have claimed an old-pension. Some of them are unemployed and receive benefits, some do not receive benefits, but are also contributing and some do not contribute. Moreover, some go through different labour situations before claiming the pension. (See Argimón, González and Vegas, 2007). The situation immediately preceding retirement is conditioned upon, but duration is defined independently of the situation.

person born in 1941, becomes eligible in 2001 (when he is 60), and only claims a pension benefit in 2003 (when he is 62), will have in 2004, $T$=3 and $C$=5. In our estimation we restrict $C_i$ to be at least 1 and no greater than 6 as we assume that the decision to retire only takes place between 60 and 66, as only very few people retire after that age, or do not retire at all. The dataset contains some individuals that either can only be observed before they take the decision of interest (*i.e.* claim pension benefit) because we only observe the individuals up to the year 2006 or either did not claim a retirement pension before the age of 66. In both cases, data is right censored. For these individuals we can only observe that $T>C$, so that they remain in the current situation for a larger number of years than the ones that the sample allows us to observe them. That is, we observe claiming at $T$ only if $T=<C$. Otherwise, we observe that $T>C$. We assume that $T$ is independent of $C$.[21]

The intensity of transition to claiming or the hazard function (*i.e.* the probability of an individual retiring precisely at time $t$, given that he has not retired before $t$), is defined as:

$$\phi(t_i \mid \mathrm{X}_i) = prob(T = t \mid T >= t) = prob(T = t) / prob(T >= t) = F[\theta_0(t) + \theta_1(t)x(t)]$$

where $X_i$ is a vector of explanatory variables, some of which are age dependent and others are constant and independent of the age. It provides the probability of not claiming benefits for exactly $t$ years relative to the group of individuals who have been not claiming for at least $t$ years. In other words, it gives the probability of retiring $T$ years after having become entitled to a pension, given that the person has not retired before.

A discrete duration model can be regarded as a sequence of binary choice equations (with cross equation restrictions) defined on the survival population at each duration.

We are, therefore, interested in the conditional distribution of $T$ in relation to variables $x$: $F(t_i \mid x_i)$.

So the likelihood function could be expressed as:

$$L = \sum_{i=1}^{N-C} \ln f(t_i \mid x_i) + \sum_{i=N-C+1}^{N} \ln(1 - F(t_i \mid x_i))$$

$$L = \sum_{i=1}^{N-C} \ln\left[\phi(t_i, x_i)\exp\left(-\int_0^{t_i} \phi(u, x_i)du\right)\right] + \sum_{i=N-C+1}^{N} \ln\exp\left(-\int_0^{t_i} \phi(u, x_i)\,du\right)$$

where $\phi$ is the vector of parameters to be estimated.

The dependent variable in the model is the probability of retiring (claiming a retirement pension) at a specific age, given that the person has become eligible to do so[22] and has not retired the preceding years.[23] The explanatory variables that have been included in the specification ($X_i$) can be grouped in three main categories: social security framework, personal characteristics, and

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[21] It must be reminded that for some cohorts we can only have observations of people retiring after a given age (60 for those born in 1936) or before a given age (for instance, at most at 60 for those born in 1946), in the latter case, given that this is the age when the sample was extracted, as shown in Table 1.

[22] It could be the case that they withdrew the labour market much in advance and remained unemployed or were inactive for some time. In fact, in the case of Spain, early retirement regulation stipulates that in some cases, workers need to be unemployed to be able to claim retirement pensions before the age of 65, the ordinary retirement age. Moreover, up to 2002, pension regulations required total or substantial withdrawal from any form of employment requiring affiliation to the Social Security System to be able to perceive an old-age pension. In 2002, partial retirement was regulated, so that employment and old-age pensions could be simultaneously enjoyed, while the mandatory retirement age at 65 was effectively abolished. An alternative would be to study the transitions from employment to a non-employment status, as in Gutiérrez-Domènech (2006).

[23] So, for each person, the decision moment is different and is defined in relation to his birthday, assuming that they are yearly decisions.

**Table 2**

**Descriptive Values of Social Security Incentives and Working Status. Sample of Men Born between 1936 and 1946, Having Worked in the General Regimen and with a Relation with the Social Security in 2006**

| | All period considered 1996-2006 | | | Before 2002 | | | After 2002 | | |
|---|---|---|---|---|---|---|---|---|---|
| | median | mean | *s.d.* | median | mean | *s.d.* | median | mean | *s.d.* |
| $SSW_t$ (1) | 199.30 | **222.50** | *96.83* | 195.83 | **211.84** | *87.02* | 201.35 | **228.17** | *101.21* |
| $SSA_t$ (1) | 6.89 | **6.73** | *12.95* | 10.12 | **9.79** | *12.20* | 4.97 | **5.09** | *13.04* |
| $PV_t$ (1) | 12.65 | **18.84** | *26.73* | 21.68 | **26.77** | *28.03* | 8.32 | **14.63** | *25.01* |
| $RR_t$ (2) | 57.61 | **67.36** | *35.50* | 50.77 | **57.61** | *26.56* | 61.93 | **72.55** | *38.45* |
| $l_{t-1}$ (2) | | **57.49** | | | **62.67** | | | **54.74** | |
| $u_{t-1}$ (2) | | **24.28** | | | **27.54** | | | **22.55** | |
| **N** | | **115,532** | | | **40,123** | | | **75,409** | |
| **n** | | **35,853** | | | **16,212** | | | **28,259** | |

N: Number of observations; n: people.
(1) In thousands of euros.
(2) In percentage.

labour characteristics. A detailed description of the variables that have been used can be found in Appendix 1.

We build up the traditional measures of the incentive mechanisms that are standard in this literature. In particular, we use the Replacement Rate ($RR_t$), which is the ratio of the expected pension benefits over wages, the Social Security Wealth ($SSW_t$), that is, the present discounted value of the future stream of pension benefits, the Accrual Rate ($SSA_t$) which measures the discounted increase in SSW from postponing retirement one year and the Peak Value ($PV_t$), that compares this year's social security wealth to the maximum social security wealth that could be attained in the future. They are constructed under the assumptions that the age of death is certain, no changes in social security regulation are expected by individuals and it excludes any tax considerations.

Table 2 provides information about the descriptive values of the incentive Social Security variables showing that, while the average stock of wealth was higher after the 2002 reform than before, the incentives linked to it were lower. On the other hand, the RR increased after the reform. It also contains information related to working status, distinguishing between those observations corresponding to a working situation ($l$) previous to the decision moment and those corresponding to an unemployment situation ($u$). The rest of the observations correspond to either an already retired situation or another situation where there is no work involved. Additional data concerning the rest of the variables can be found in Table 6 in Appendix 2.

We make that both the level of social security wealth and the different incentive variables enter the equation. The level captures wealth effects: the larger the value of wealth, the larger the demand of all goods, including leisure, if leisure is a normal good. The incentive variables capture a substitution effect: the higher the price for leisure, the lower its demand, so that if there is a larger financial incentive to additional years of work, then individuals will retire later. The specification chosen also allows us to test whether the sole act of being entitled is a determinant for retirement,

in the sense that the individual leaves his current situation as soon as he is entitled to collect a pension benefit. Finally, the impact of the regulatory change introduced from 2002 is also analysed, both as it could have affected the average probability of retiring and through its effects on the incentive mechanisms.

As for the labour characteristics, the control variables include the individual's labour situation the year preceding the decision date, distinguishing between working and unemployed, the activity sector and some measures of labour mobility or precariousness.

Finally, we also include some standard demographic controls such as age, education and health status. We also control for the collection of other benefits as they may interact with the old age pension. Finally, regional dummy variables and GDP growth are also included to control for the macro environment.

The duration dependence of the hazard rate is captured in two ways. On the one hand, following Bover et al (2002) we do not impose a specific functional form for duration, so that we introduce additive dummy variables for each of the possible discrete values of the duration variable. Durations of more than 6 years (which would necessarily imply that the person is at least 66) are treated as censored at 6 years, due to the relatively small number of observations under such circumstance. On the other hand, interaction of certain independent variables with the duration are included to see if the variable effects change with the number of years that a person takes to retire. Table 6 in Appendix 2 contains the summary of the variables used.

## 5 Results

The qualitative impacts of the variables on the hazards are discussed in terms of the sign and statistical significance of the estimated coefficients, which are reported in detail in Table A2 in Appendix 1. We present in that Table three different specifications with two different sets of Social Security incentive variables. So, under model A we present the estimated coefficients obtained for the basic specification, distinguishing between the Accrual Rate (SSA) as incentive variable, and the the Peak Value (PV). Model B tries to capture the impact of the 2002 reform through the inclusion of dummy variables that test for its relevance and effect on the response to the social security variables, while model C, also include dummy variables that capture the effect on the retirement hazard rate of being entitled to perceive the minimum or the maximum pension benefit at each age.

The size of the impacts of the Social Security measures on the probability of retiring is reported in Table 3. In particular, they are measured as the predicted effect of a change in the Social Security variable on the hazard, computing it as an elasticity, for the variables that are continuous. For the qualitative ones, its impact is computed from the change from 0 to 1 in the variable, so that they can be interpreted as the direct effect of having such characteristics on the probability of retiring. The more detailed quantitative impact of a change in all the variables included in the specification distinguishing by age is reported in Table A3 of Appendix 1.

### *5.1 Economic incentives and regulation*

As the results in Table A2 show, all the social security variables coefficients – for SSW, SSA and PV – are statistically significant with the expected sign. Increases in the total present value of the flow of pensions that a person will receive from the year she retires to the year she dies, *i.e.* an increase in SSW, increases the hazard. Increases in the difference of this amount

**Table 3**

**Quantitative Effects of Social Security Measures on the Retirement Probability***

| | MODEL A | | MODEL B | | MODEL C | |
|---|---|---|---|---|---|---|
| | ***SSA*** | ***PV*** | ***SSA*** | ***PV*** | ***SSA*** | ***PV*** |
| $SSW_t$ | 0.60 | 0.60 | 0.72 | 0.72 | 0.72 | 0.72 |
| | *0.29* | *0.29* | *0.34* | *0.34* | *0.33* | *0.33* |
| $SSA_t$ | –0.07 | | –0.04 | | –0.06 | |
| | *–0.03* | | *–0.02* | | *–0.02* | |
| $PV_t$ | | –0.07 | | –0.04 | | –0.03 |
| | | *–0.03* | | *–0.01* | | *–0.01* |
| $RR_t$ | 0.03 | 0.02 | 0.08 | 0.09 | 0.04 | 0.06 |
| | *0.01* | *0.01* | *0.03* | *0.04* | *0.01* | *0.03* |

* Quantitative effects are computed as the discrete differences of the logistic function evaluated at a 10 per cent increase in the variables' values with respect to the logistic function evaluated at the observed variables' values.
Results are obtained from the regressions presented in Table A2 where:
• Model A represents the basic model,
• Model B represents Model A including changes in 2002 regulation as control variables,
• Model C includes Model B and income level as control variables.
Median values are in italics.

derived from postponing the retirement (either one or more years) reduce the hazard, whether SSA or PV are used to capture the substitution effecta.

In order to provide an assessment of the explanatory power of the different variables, whose statistical significance has been tested, for the hazard rate, we propose using the Akaike (AIC) and the Bayesian Information criteria (BIC), as recorded in Table 4. By providing a criterion to choose among nested models, we can compare the relative explanatory power of the different variables to affect the probability of retiring. As shown, the pension wealth and the incentive measures are jointly significant (Table 4) for all specifications. On pure likelihood grounds, the specification that does include the peak value dominates the one with the more myopic incentive measure.

In spite of these effects being statistically significant, their size is not very large. As the figures in Table 3 show, a 10 per cent rise in SSW, increases on average around 7 percentage points the probability of retiring between 60 and 65 years of age. Moreover, these probabilities show a U-shaped form with age (Table A3), reaching the highest impact at 65, so that the closer the personis to that age the more responsive to changes in SSW she is.

As for the incentive variables, we find that increasing by 10 per cent the difference between what a worker would receive if she retired now and what she would receive if she retired one year later (increasing SSA) decreases the average probability of retiring between 60 and 65 by between 0.3 and 0.7 pp and by a similar amount if the 10 per cent increase would be in PV. The effects on the retirement probability of the SSA and PV incentives are also U-shaped in relation to age (Table A3), so that they are large at 60, decline then and later start increasing again.

On the other hand, the replacement rate, does show the positive expected sign for the whole sample, but it is not statistically significant, a finding which is confirmed by the results on the AIC

**Table 4**

**Relative Incidence of Social Security Measures on Retirement Decisions for All the Period Considered***

| | SSA | | | PV | | |
|---|---|---|---|---|---|---|
| **Contribution of** | **AIC** | **BIC** | **ln Likelihood** | **AIC** | **BIC** | **ln Likelihood** |
| Overall Model C | 65,659.72 | 66,210.18 | –32,772.86 *(57)* | 65,648.87 | 66,199.34 | –32,767.44 *(57)* |
| $SSW_t$ | 66,186.56 | 66,717.71 | –33,038.28 *(55)* | 66,164.28 | 66,695.43 | –33,027.14 *(55)* |
| $SSA_t$ | 65,694.62 | 66,225.77 | –32,792.31 *(55)* | 65,694.62 | 66,225.77 | –32,792.31 *(55)* |
| $RR_t$ | 65,659.82 | 66,190.97 | –32,774.91 *(55)* | 65,656.79 | 66,187.94 | –32,773.39 *(55)* |
| $SSW_t$ and $SSA_t$ | 66,212.33 | 66,724.17 | –33,053.17 *(53)* | 66,212.33 | 66,724.17 | –33,053.17 *(53)* |
| $SSW_t$ and $RR_t$ | 66,201.02 | 66,712.86 | –33,047.51 *(53)* | 66,188.33 | 66,700.17 | –33,041.17 *(53)* |
| $SSA_t$ and $RR_t$ | 65,703.37 | 66,215.21 | –32,798.69 *(53)* | 65,703.37 | 66,215.21 | –32,798.69 *(53)* |
| $SSW_t$, $SSA_t$ and $RR_t$ | 66,226.46 | 66,718.98 | –33,062.23 *(51)* | 66,226.46 | 66,718.98 | –33,062.23 *(51)* |
| *r2002* | 65,787.63 | 66,299.47 | –32,840.81 *(53)* | 65,792.13 | 66,303.96 | –32,843.06 *(53)* |

* Results are obtained from regressions under Model C of Table A 2. Degrees of freedom in parenthesis.
Number of observations: 115,532.

and the BIC criteria shown in Table 4.

From the calculations presented in Table 4 we could conclude that the wealth variable plays a larger role on the determination of the hazard rate than any of the incentive variables. That could imply that changing the quantity that is transferred through pensions is more relevant to retirement decisions than changing the built-in incentives in the regulation.

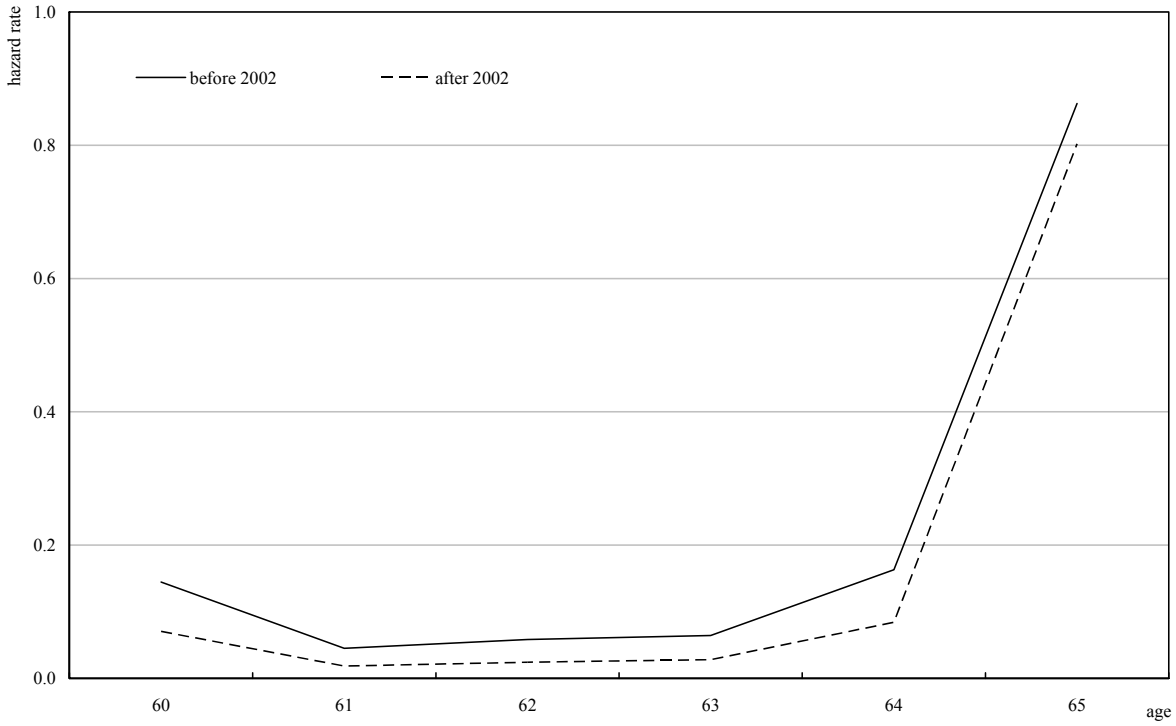
The observed probability of retiring between 60 and 65 before 2002 is higher than after 2002 and this relationship happens at every of the ages between 60 and 65 (Figure 1). The role of the 2002 reform on this change is tested with both the introduction of a dummy variable that takes value 1 from 2002 onwards and which may capture changes in tastes or other factors that are not channelled through the Social Security variables, and with the inclusion of this dummy variable interacted with the Social Security incentive and pension wealth.

If we use the sign and the *t*-ratios of both the dummy and the interacted variables to test for significance of the changes that were introduced in 2002,[24] we can conclude that the reform did not change the pattern of response to the wealth variable, but the response to the incentive variables, in general, reducing its impact on the timing of retirement (Table A2). That is: we need a larger value of SSA (or PV) from 2002 to reach the same impact on the hazard, as shown in Table A4, where a decomposition of the effects of the reform on the incidence of the different incentive variables is shown. This result could be explained as a consequence of the fact that one of the changes carried out under the reform improved the treatment for those that had more than 30 years of contribution, increasing for them the amount of the pension to be perceived at each age. The fact that most

[24] See Norton *et al.* (2004) for a discussion of such test.

**Figure 1**

**Predicted Hazard Rates before and after 2002 by Age**




workers (64 per cent) already had at least 30 contributory years (in particular, nearly a third had more than 34 years of contributions), may explain the finding that the reform reduced the incidence of the incentive structure. Additionally, the replacement rate becomes statistically significant for this period, so that a more myopic approach seems to result. Therefore, the observed reduction in the hazard rate does not seem to stem from the new regulation, which has reduced its incidence, but from a collection of other factors that are captured by the dummy.

The evidence gathered shows that those individuals that are being low topped in terms of the amount of their Social Security wealth have a higher retirement probability at 60 than those that are not (Table A4). It could be argued that the minimum pension mechanism blocks the effect of early retirement penalties so that it creates a strong incentive for low income earners to retire, that is specially strong at 60. From 61 onwards being low topped in wealth reduces the probability of retiring. In fact, the older the person, the higher is the reduction in the probability to retire. This result could be consistent with the idea that people might choose to carry on working in order to build up more pension rights, given the built-in incentives, arising from the higher dependency between the amount of the pension to be perceived and the latest wages that she receives compared to further in time wages, which, under the expectation that they increase with age could lead to a larger pension in the future.

The results also show that high earners (those that have their pensions capped) have a lower probability of retiring both at 64 and 65[25] (Table A4), in line with the findings in Villagarcía (1995), Jiménez-Martín and Sánchez (1999), Blanco (2000) and Labeaga (2008) that show that

[25] People from all ages can be low topped, but only people that are 64 or older can receive the maximum pension.

income plays a positive role on continuing in employment. This finding could result from the fact that, for those workers, financial incentives are not a good proxy for the marginal utility from working, A lower potential wage rate for a mature age worker is likely to be associated with a lower probability of labour force participation, as other things equal, a lower wage rate represents a lower opportunity cost of leisure and a higher replacement rate for government pensions.

### *5.2 Duration variables and cycle*

Given that individuals enter the sample as soon as they satisfy the requirements to claim a pension, we can interpret the significance of the dummy coefficient for duration 1 ($g1$) as a test for the relevance of becoming entitled to access the retirement benefits.[26] We could expect that if the preference for retiring is high enough, becoming eligible would be a main determinant of the decision to retire, and people will retire as soon as the regulation would entitle them to. The regression results report a non statistically significant coefficient for g1 (Table A2), so that it can be said that the fact of becoming eligible by itself is not a relevant ground for retirement. The results show also a non-monotonic duration dependence.

We will comment on the interrelation between duration and the effect of some of the covariates when we present the results for the latter.

Early-retirement may result from fluctuations in the economic cycle. Our results show that the propensity to retire is pro-cyclical, so that the hazard retirement rate is higher during macroeconomic expansions, feature that has been observed in other studies about retirement decisions (Montizaan, Cörvers and de Grip, 2007). A possible explanation of this result could be the fact that asset cycles are highly correlated with the evolution of the business cycle. If people rely on their investments to fund their consumption in retirement, besides what they can get from the retirement pension, they are particularly vulnerable to market downturns. That could be the reason why in periods of economic prosperity, prospective retirees are more optimistic about the evolution of their other sources of income and therefore decide to retire earlier. On the other hand, Muñoz (1995), pooling the EPA data, provides evidence that in a recession individuals retire earlier.

### *5.3 Age*

In our specification, we also include age dummies to account for differential effects arising from age itself. These dummies should capture the effect of growing older "per se", and not through the different coefficients in the calculation of pension rights that are age dependent. The results show that, even when controlling for eligibility criteria and Social security variables, 65 is a prevailing retirement age.

### *5.4 Working status, sector of activity and other labour history related variables*

The activity status prevailing during the year before the decision is taken could be relevant for the retirement hazard. In particular, the sample allows us to distinguish between four labour status: working, receiving unemployment benefits and thus also contributing to Social Security, contributing without working nor perceiving unemployment benefits (special agreement), and not contributing.

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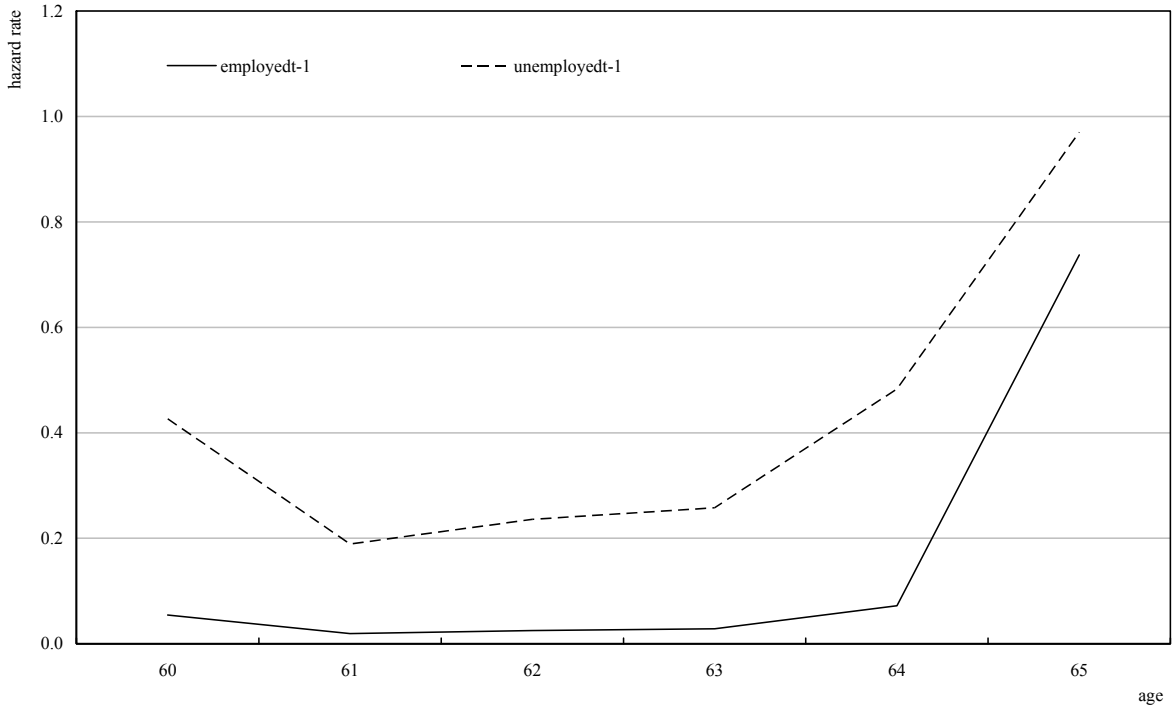
[26] See Appendix 2 for a description of these conditions.

**Figure 2**

**Predicted Hazard Rates According to Previous Working Status and Age**




The results show that a person working at a particular year has a lower probability of retiring the following year than a person who was not working, even when we condition on social security incentives. They also show that being unemployed the preceding year increases the probability of retiring. Such findings may only reflect the predominance of special early retirement programs that exist for unemployed old people.[27] We also find that the size of these effects varies with age, as can be seen in Figure 2, showing a U-shaped form.

We also include as a covariate the activity sector, which allows us to distinguish between those working in the service sector and those working in the industry sector. The estimated coefficient is, however, not statistically significant, in contrast to other works where the sector of activity is found to be playing a role (Conde-Ruiz and García, 2004; Blanco, 2000; Villagarcía, 1995; Muñoz, 1995).

The next pair of variables try to capture the quality of the labour relations, through the consideration of the number of contracts that have been recorded for a given work history up to the eligibility moment and the average length of these contracts.

The results show that job rotation (proxied by the total number of labour relations that a person has had) has a negative impact on the retirement hazard, impact that fades away as duration increases. The sign of the coefficient suggests that the higher the labour rotation the lower the probability of retiring between 60 and 65. This result could be in consonance with the findings that workers with a firm-specific training history retire earlier than workers with a general training background (Montizaan, Cörvers and de Grip, 2007).

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[27] See García Pérez and Sánchez Martín (2008b) for an analysis of the transitions from unemployment for older people.

On the other hand, the average length of the contract seems to play a significant role in the decision to retire only as time unfolds. Although in general, the higher this average the more stable the individual's working life has been, it is not a sophisticated measure of a precarious career as the same average may result from quite different job histories.

### *5.5 Individual characteristics and other*

The results obtained for the negative role of higher education on the probability of retiring is in consonance with what is obtained in most empirical work (Villagarcía, 1995; Gutiérrez-Domènech, 2006).[28] One explanation of such finding may result from the theory that states that low-ability workers are induced to retire early because of the intra-generational redistribution built in early retirement provisions via the utility from leisure (Conde-Ruiz and Galasso, 2003). The effect of education is reinforced by duration, so that the lower probability of retiring of a higher educated worker is larger the more time it has elapsed since becoming eligible.

As for the health status, the results show a lower hazard for those receiving disability benefits the year before. Such counterintuitive finding may just reflect the fact that those receiving disability benefits, besides having a poorer health, will probably be the ones receiving retirement disability pensions when they turn 65, the only age in which this type of pensions can be awarded and which we are not including in our analysis.

Receiving public transfers other than unemployment or disability benefits reduces the retirement probability, which may be a consequence of liquidity constraints.

Dummy variables for the region (Autonomous Community) where the worker initially registered are included in the specifications, as a way to capture other differences in the economic environment. Coefficients are not reported but are available under request.

### *5.6 Counterfactual Regulation Schemes*

Finally, we have performed a counterfactual exercise with the aim of shedding more light on what these magnitudes are likely to mean in reality, by calculating the effect over estimated retirement probabilities of small changes in the economic incentive mechanisms underlying the Spanish public pension system. The reason for applying only tiny changes to the baseline is to avoid the Lucas' critique, while providing a sensitivity analysis.

So we have computed the pension wealth that a person would receive under three alternative regulatory schemes, which imply very small changes over the current regulatory situation.[29] We have computed for each individual in the sample the SSW and incentive measures that result from the assumed setting. We then have obtained counterfactual predicted retirement probabilities so that we can compare them with the one predicted under our estimates, which act as a benchmark.[30] In particular, we compute the changes in relation to the population that in the sample are subject to the rules prevailing in 2002. In general terms, each of the three alternative regulatory schemes tries to change only one item in the pension rules.

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[28] Muñoz (1995), on the other hand, finds evidence that the education has a quadratic effect, so that those individuals with little or with a lot of studies retire later than those with an intermediate level of education.

[29] In general terms the current system is characterised by requiring at least 15 years of contribution and with the pension being at least 50 per cent of a proxy of gross average lifetime earnings (regulatory base), which raises to 100 per cent after 35 or more years of contribution See Appendix 2 on legislation for a detailed description of the system.

[30] The new probabilities are obtained using the specification in column 1 of Table A2.

**Table 5**

**Effects of Alternative Settings on Retirement between Ages 60 and 65***

| | Benchmark | Setting A | Setting B | Setting C |
|---|---|---|---|---|
| Predicted retirement probability(1) | 77.08 | 76.33 | 76.82 | 76.95 |
| Predicted retirement age | 62.92 | 62.93 | 62.93 | 62.92 |
| Change in number of retired people(1) | - | –1.53 | –1.58 | –0.08 |
| by age: | | | | |
| 60 | - | –1.80 | –1.63 | 0.00 |
| 61 | - | –2.45 | –2.09 | 0.00 |
| 62 | - | –2.48 | –2.10 | 0.00 |
| 63 | - | –2.59 | –2.26 | 0.00 |
| 64 | - | –2.06 | –1.90 | 0.00 |
| 65 | - | –0.60 | –1.09 | –0.20 |

(1) In percentage.
* The effects are estimated for the period beginning in 2002.
Setting A: Capping the pension to 96% of the Regulatory Base at 35 years of contribution and to 48% at 15 years of contribution.
Setting B: 18 years of contribution to claim a pension. Retiring after 65 implies 3% increase.
Setting C: Retiring after 65 implies 2% increase and 3% if 40 years of contribution.

The first counterfactual scenario, setting A, would consist of an overall reduction in the amount of the pension perceived at all ages. It caps the pension to 96 per cent of the regulatory base, not allowing individuals to get the 100 per cent of it at any retirement age.[31] Even if no change in the number of people retiring is produced, such scenario implies a reduction of the pension burden in relation to the benchmark.

Setting B affects mostly the incentive structure as it requires more years of contribution to claim a pension (18 years instead of 15), so that the increase ladder becomes stepper. Moreover, at the age of 66, if the person has more than 35 contributory years, an additional increase in the amount of the pension is added.[32] Under this scenario, it cannot be initially established whether or not the burden rises.

Setting C proposes changes in the short-term incentives to stay beyond 65, in the sense that it only introduces higher retirement benefits for each additional year beyond 65 that an individual remains not retired.[33] If effective, it could raise the burden, not the implementation year but in the middle and long run.

Table 5 shows the computed counterfactual predicted retirement probabilities for these three scenarios, the average predicted retirement age over the age interval 60-65 and the changes in the number of retirees in the same interval and its disaggregation by ages. All the changes analysed result in an extremely mild increase on the average retirement age and a reduction in the number of

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31 Under this scenario, with 15 contributory years the pension amount is only 48 per cent of the regulatory base. Moreover, up to 25 years of contribution a 3 per cent increase each year would be added, and from 26, the increase would be 2 per cent per year up to 96 per cent of the regulatory base at 35 or more years of contribution.

32 Under this scenario, there is a 3 per cent increase up to 25 contributory years, while since then the increase is 3.22 per cent up to 35. At 66 with more than 35 years of contribution the increase is also 3.22 per cent. Only 2.6 per cent of people at 60 have a labour history shorter than 18 years.

33 It reproduces part of the changes introduced by the "Acuerdo sobre Medidas en Materia de Seguridad Social", of 13 July 2006, which were implemented two years later. In particular, at 66 with at least 35 years of contribution a 2 per cent increase in the pension is added, raising it to 3 per cent for those individuals with at least 40 years of contribution.

people who retire between 60 and 65, which goes from 0.08 per cent under setting C to 1.6 per cent under setting B.

We obtain that under the first two scenarios, the retirement rates of all ages are affected by the proposed change and that the effects are increasing with age up to 63, when the largest impact is recorded. The smallest effect is at 65, reflecting, probably, how this age is regarded as normal retirement age.

The fact that under setting C there is a null impact on the probability of retiring between 60 and 64 with respect to the benchmark results from the specification chosen to compute the effects, that only reflects the impact of changes in SSA. However, the low incidence of the long term incentive (peak value) on the decision results in a very similar figure when the specification with the PV variable is chosen, instead. In any case, the decrease in the number of people that choose to retire at 65 so as to retire at a later age is rather small (0.20 per cent), as only the incentive changes, but not the social security wealth at that age.[34]

## 6 Conclusions

There is some agreement that generous early retirement provisions account for a large proportion of the drop in the labour force participation of elderly workers that had been observed in Spain in the nineties. This paper aims at quantifying the impact of these provisions under the Spanish Social Security System.

We have gathered evidence that, in general, the economic incentives stemming from Social Security regulations on old age pensions in Spain seem to have the expected effect on retirement. We find that the present value of the future flow of pensions has a positive impact on the probability of retiring, with larger pensions shortening the span between becoming eligible for retirement and actually claiming the retirement pension. Therefore, all measures taken to reduce the present value of such flow at early ages may have the desired effect of reducing early retirement.

Moreover, it seems that the built-in incentives in the system not to retire early have a non negligible effect on old-age retirement, so that they are effective in retaining people. The higher flow of pensions that workers receive for staying at work one additional year compensate both the loss of leisure that they experience for the additional year that they keep contributing and the wage and salary they perceive at work. The quantitative size of such effect is statistically significant so that small variations in the incentives measures have a sizeable effect on early retirement. Therefore, from a policy perspective, there is a need to reinforce such effects.

We also found that the new scheme implemented since 2002 has reduced the probability of retiring at each age, in spite of the fact that the substitution effects captured through the incentives measures seem to have reduced their incidence on retirement decisions. We also found some evidence of a more myopic behaviour of workers as regards social security incentives. The changes in the regulation that have taken place may explain such results.

Any new change in the incentive structure of pensions should take into account the longer work histories that younger people have, when becoming eligible. In fact, the counterfactual results show that a small change in the incentive structure has a small impact on the number of people retiring. It seems that to increase the number of people staying beyond 65 requires more than a tiny push. It is therefore necessary to combine economic incentives with other institutional constraints in order to effectively increase the retirement age.

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[34] In fact, those whose entire contributory life is below 35 years experience a reduction in the amount they perceive at 65 in relation to the benchmark.

There is a need to address the consequences of an ageing population on the Social Security accounts. Minor changes in the rules that define the amount to perceive at each age and in relation to the years effectively contributed may have a positive impact on the accounts, through its impact on the probability to retire at each age, but this is not enough. Prospective amendments in retirement rules should be oriented to link the possibility of retiring and the benefit rights not only to contributive efforts to, but also to life expectancy.

## APPENDIX 1
## DATA

This appendix contains the definition of the variables included in the different specifications. As it has already been mentioned in the text, the main data source is the Muestra Continua de Vidas Laborales 2006 (MCVL-2006), a sample of administrative data gathered by the Social Security Department.

The subsample used includes the available information on men who have contributed to social security at least once in their lifetime, have not collected an old age pension before 1997, and who were born between 1936 and 1946, so that in 2006 they were between 60 and 70 years old. Moreover, we restrict it to those men whose longest contributory relationship with the Social Security took place in the General Regime, the scheme that covers most workers and whose description can be found in the following appendix on legislation. We also drop those individuals who have collected an old pension after 1997, but whose eligibility to access a retirement pension, in terms of having at least fifteen contributory years, could not be proved with the available data, as a pension could not be estimated for them.[35] The final subsample is composed of 35853 individuals. The main statistics for each variable is presented in Table 6.

**Economic Incentive Variables**

To calculate the Social Security benefits to which individuals in our sample are entitled, we make use of the Social Security covered earnings histories of individual in the MCVL2006.

***SSW*$_{it}$**: Value of Social Security Wealth of individual *i* at time *t*, at 2006 prices:

$$SSW(r)_{it} = \sum_{s=t}^{s=L} [B_i(s,r)[p(s \mid t)_i / (1+\rho_i)^{s-t}]]$$

indicates Social Security Wealth at time *t* (at age *t*) if retiring at age *r*, *L* is the maximum life length, $B_i(s,r)$ is the pension benefit in period *s* (at age *s*) if retiring at *r*, *p*(*s*|*r*) is the conditional probability of an individual at time *t* to be alive at time *s* where *s*>*r*, $\rho_i$ is the individual discount rate.

To calculate the pension we make use of data on *covered earnings* and from it we have built the Regulatory Base which has been computed as the regulation establishes. The minimum base that has been used to complete job careers has been the one corresponding to contributory group 5, senior administrative ("*oficial administrativo*"), the group with the largest volume of population. On the other hand, the maximum base has been taken to be the one corresponding to group 1, Engineers and Graduates ("*Ingenieros y Licenciados*"), the group with the highest base for all the years. The maximum life length (*T*) has been taken to be 98 years; $\rho_i$, the individual discount rate is assumed to be fixed at 3 per cent, *p*(*s*|*r*), the conditional probability of an individual aged *r* to be alive at age *s*, has been taken from the National Statistics Institute (INE) demographic projections scenario 2, based upon 2001 Census data and pensions are assumed to increase 2 per cent yearly from 2006. Minimum and maximum pensions are applied and the minimum one corresponds to a worker with a dependent spouse.

In order to calculate the different incentive measures, we need to project SSW for the future. Two different situations arise, depending on the age of the individual and whether or not he has

[35] The administrative nature of the data source explains that a limited number of individuals had to be deleted from the sample as the available information for them did not seem consistent.

retired. For those that are not 66 before 2006, we need to project their pension and their SSW beyond this year. To do so, we assume that their salary and, therefore, their contributory base will be increasing at a 2 per cent rate every year. For those that have retired before 2006, we project their salaries for the years before 2006 assuming that they keep the purchasing power of their last observed salary (or the following one), so that the contributory base increases by the same amount as the December over December CPI.[36]

***SSA$_{it}$***: the Accrual Rate,

$$SSA(r)_{it} = 1/(1+\rho_i)SSW(r+1)_{it} - SSW(r)_{it}$$

and we let:

$$SSW(r+1)_{it} = \frac{SSW(r+1)_{it+1}}{(1+\Pi_t)}$$

A limitation of this index is that it does not take into account the comparison that the individual can make between pension benefits and the level of his/her income. It could be argued that the leisure preference is such that wages can fully compensate for the forgone leisure enjoyment from postponing retirement.

***PV$_{it}$***: Peak Value computed between the ages of 60 and 65 is defined as:

$$PV_i(r) = \max(SSW(r,r+1)_i, SSW(r,r+2)r_i, SSW(r,r+3)_i ..., SSW(r,66)_i)$$
$$= SSA_i, otherwise$$

where:

$$SSW(r,r+j) = SSW(r+j)/(1+\rho)^j - SSW(r)$$

We follow Coile and Gruber (2000) and restrict the peak value to be equal to the accrual rate, if the individual works beyond the highest value for his social security wealth[37]

***RR$_{it}$***: Replacement rate, $RR_i(r)$ is the ratio of the expected pension benefits $B_i(r)$ at time *t* over wages $w_i(r)$ perceived at time *t*–1 for individual *i* at age *r*, if the person retires at age *r*:

$RR_i(r) = E_r(B_i(r)/w_i(r))$ , where *E* is the expectation operator

**Other variables**

***failurejub$_{it}$***: dummy variable that takes value 1 if the person retires at time *t* and 0 otherwise. It is the dependent variable

***disab$_{it-1}$***: Dummy variable that takes value 1 at time *t* if the person was receiving any disability benefit while he was a year younger (at time *t*–1) and zero, otherwise

***univ$_i$***: dummy variable that takes value 1 if the contributory group ("*grupo de cotización*") of the longest contributory relationship with the Social Security system is the one with the highest academic qualifications (group 1: "Engineers and Graduates"), and zero otherwise

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[36] Alternatively, we could have taken the average increase in observed national accounts data for compensation of employees per employee.

[37] They also normalize the peak value by the expected stream of wages over the period between the maximum year and the current year. Hence their actual index measures the benefits of continued work relative to the social security wealth earnings in the same period. They call this measure the tax/subsidy rate. This normalization can also be made for both the accrual and the option value.

***numrel***$_i$: number of contributory labour relations that have been recorded by the Social Security before becoming entitled to an old age pension and that include those involving the perception of unemployment benefits

***Regional Government (Comunidad Autónoma) where the worker initially registered***: Group of 19 dummy variables, each one corresponding to a CA, plus one for Ceuta and one for Melilla, that records the initial worker's registration (IIccaa-)

***serv***$_i$: Dummy variable that takes value 1 if the longest job a person has held has taken place in the following CNAE sector classifications: Trade (50 to 52), Restoration (Hostelería) (55), Transport (60 to 64), other services, including education y health (65 to 67, 70 to 74, 80, 85 and 90)

$u_{it-1}$: Dummy variable that takes value 1 at time $t$ if the person was receiving unemployment benefits,[38] either as a subsidy or a contributory transfer, while he was a year younger (at time $t$–1), and zero, otherwise

$l_{it-1}$: Dummy variable that takes value 1 at time $t$ if the person was working and contributing to Social Security while he was a year younger (at time $t$–1), and value zero, otherwise

$g\_k_{it}$: Dummy variables that take value 1 if the person is at time $t$ in the $k^{th}$ period decision and zero otherwise, where $k$=[1,6]. That is, $g\_k$ takes value 1 if the value of the length of the spell from the year the person becomes entitled to a retirement pension is $k$

$age\_k_{it}$: Dummy variables that take value 1 if the person is $k$ years old at time $t$ and zero otherwise, where $k$=[60,65]

***cycle***$_t$: Spanish GDP real growth rate (for years 1997 to 2006)

***r*2002**: Dummy variable that takes value 1 if the year of the observation is greater than 2001

***otherben***$_{it-1}$: Dummy variable that takes value 1 at time $t$ if the person was receiving any Social Security benefit other than disability, old age or unemployment while he was a year younger (at time $t$–1) and zero, otherwise

***meanlength***$_i$: average number of years for the spells that the individual $i$ has had before becoming entitled to a pension

***t***: trend variable

[38] It corresponds to the people whose relationship with Social Security is coded as a TRL 751-756 in the administrative files.

## APPENDIX 2
## LEGISLATION

### The institutional framework

The labour-market based social security is mandatory for workers in Spain. Old-age public pensions are mainly provided through three different schemes: General Social Security scheme (Régimen General de la Seguridad Social, RGSS), Special Social Security Regimes (Regímenes Especiales de la Seguridad Social, RESS) and government employees scheme (Régimen de Clases Pasivas, RCP).[39] Around 72 per cent of social security contributions are obtained from the RGSS. The pension regulations for RESS, within which the self-employed are assigned, and RCP do not, in general, allow for early retirement, so that the focus of the analysis will be on the RGSS.

The main changes that have taken place in Social Security regulation in recent years that affect the period covered by the sample correspond to the reforms introduced in 1997 and 2002 in relation to the framework set in 1985.[40]

The normal retirement age in Spain, that is the age when a person becomes eligible for the full pension benefit, is 65. In fact, in some sectors retirement at sixty-five has been compulsory for some years. However, since 2002, incentives have been built in the regulation so as to promote retirement beyond the age of 65.[41] Early retirement is possible from the age of 60, under some strict conditions that are detailed below and that imply a reduction in the amount of the pension to be perceived that is defined by a reduction coefficient.

### Entitlement criteria for RGSS

A payroll tax defined for both employers and employees and levied on earnings, with a minimum contribution and a maximum pensionable earning, finances the Social Security System.

Up to 1997 only 8 contributory years were required to be entitled to a retirement pension. The change introduced in 1997 set a timetable to extend this period to fifteen years, one every year, so that in 2002, 15 years were required to be able to receive a pension at the age of 65, the ordinary retirement age. An additional requirement introduced in 1997 was that two of these contributed years had to have taken place during the last eight years.

As for early retirement before the age of 65 there are three different cases:[42]

On the one hand, those who, before January 1, 1967, contributed to the labour mutual funds system that preceded the current Social Security system are entitled to retire from the age of 60 if the total contributory years are at least 15.

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[39] The RGSS and RESS are administered and managed by the Social Security as a joint pay-as-you-go system. The RCP is administered and managed by the Central Government.

[40] In particular, up to 2002, pension regulations required total or substantial withdrawal from any form of employment requiring affiliation to the Social Security System to be able to perceive an old-age pension. In 2002, partial retirement was regulated, so that employment and old-age pensions could be simultaneously enjoyed, while the mandatory retirement age at 65 was effectively abolished. In 2006 a new agreement among government, trade unions and employers' associations was reached, but with limited impact (Ley 40/2007, de 4 de diciembre, de medidas en materia de Seguridad Social).

[41] The regulation increased the amount of the pension to be received if the worker remained employed and payment of social contributions by employers and employees with indefinite-term contacts were waived.

[42] Regulation also allows for early retirement for special professions, especially those involving dangerous or unhealthy activities or some instances of those affected by industrial restructuring regulated by special legislation. Moreover, a new regulation came into force in 2002 allowing for partial retirement that can be simultaneously enjoyed with a part-time job. Workers can partially retire starting at the age of 60 if the firm replaces the retiree with another worker (relief contract) to compensate for the retiree's reduction in work-time.

For those whose initial contribution year dates from after 1967 and only since the 2002 amendment, the earliest retirement age is 61. For them, the minimum number of contributory years amounts to 30. Moreover, in order to be able to claim the pension, they have to have spent at least six months involuntarily unemployed and registered as job seekers in the Public Employment Service Offices, immediately preceding the claim. Years spent unemployed and receiving unemployment benefits add as contributory years towards an old-age pension.[43]

Retiring at the age of 64 is also possible and is subject to different rules: from 2002 no previous period of unemployment is required, but just the minimum 15 contributory years. However, in this case, the firm needs to hire another worker for a minimum period of a year (substitution contract) to replace the retiree, if full benefits (as at the age of 65) are to be guaranteed.

The database does not provide information about contributions dating from before the seventies. On the other hand, all men born between 1936 and 1946 could potentially have been working by 1967, as the youngest would have started working at the age of 21. Therefore, the assumption in the empirical part is that all people in the sample contributed to the labour mutual funds system, so that they only require 15 years of contribution to be entitled to retire.[44] In fact, in our sample 34 per cent of those we observe retiring, do so at 60 years of age.

**The pension amount**

The actual level of the old age pension is defined by the interaction of different elements. On the one hand, the Regulatory Base (Base reguladora, BR) that defines the amount upon which to calculate the pension rights is directly related to wages perceived, but subject to lower and upper caps.[45] The minimum and maximum contributory periods to be included in its calculation and the inflation correction to obtain its present value are regulatory defined. Reduction coefficients for early retirement and for less than 35 years of contribution are also defined.[46] Minimum and maximum pensions are yearly defined and depend on marital status and number of dependents of the person receiving the benefit. Pensions are indexed by the Consumer Price Index. Up to 2002, any additional year contributed beyond 35 did not add to the amount of pension received.

A person retiring between 1985 and 1996 with at least 15 contributory years at year $t$ had a regulatory base defined as:

$$BR_t = \frac{1}{112}\left(\sum_{j=1}^{24} w_{t-j} + \sum_{j=25}^{96} w_{t-j}\frac{I_{t-25}}{I_{t-j}}\right)$$

where $w_{t-j}$ are *covered earnings* for the jth month before retiring at $t$ and $I_{t-j}$ is the price index for the $j$th month before retirement,[47] so that only eight years are taken into account to define $BR$.

Since 2002, the contributory base is defined as:

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[43] In fact, unemployed workers aged 52 and older can receive unemployment benefits that turn into subsidies until they are eligible for early or ordinary retirement.

[44] We also find that 40 per cent of people in the sample who retire do so with less than 30 registered years of contribution.

[45] Different caps have been in place for different types of workers depending on their group of contribution (grupo de cotización) associated with the type of job and education level.

[46] There is a special treatment for those that contributed to the system before 1967 (mutual funds contributors or "mutualistas").

[47] It is divided by 112 as pensions are paid in fourteen annual instalments.

$$BR_t = \frac{1}{210}\left(\sum_{j=1}^{24} w_{t-j} + \sum_{j=25}^{180} w_{t-j}\frac{I_{t-25}}{I_{t-j}}\right)$$

so that 15 years are taken into account. A transitory period was set from 1997 to 2002 so that a one year increase in the years considered in the indexed part of the weighted average was included per year, so that in 2002 the fifteen years were finally accounted for.[48]

The relation between the first monthly pension received at time $t$ ($B_t$) and the regulatory base ($BR_t$) calculated at $t$ can be expressed as $B_t = \alpha_{nt}^T \cdot BR_t$, where ${\alpha_{nt}}^T = {\alpha_{nt}}^y {\alpha_{nt}}^a$, so that ${\alpha_{nt}}^y$ depends only on contributory years ($n$), and ${\alpha_{nt}}^a$ depends on the age of retirement. If retirement age is equal or larger than 65 then, and up to 1997, ${\alpha_{nt}}^a = 1$ and ${\alpha_{nt}}^T$ is expressed as:

$$\alpha_{nt}^T = \begin{cases} 0 & if\ n < 15 \\ 0.6 + 0.02(n-15), & if\ 15 \le n < 35 \\ 1, & if\ 35 \le n \end{cases}$$

The reform introduced in 1997 modified the number of years to define the contributory base and the substitution rate (${\alpha^T}_n$) if age of retirement was equal or larger than 65, so that:

$$\alpha_{nt}^T = \begin{cases} 0, & if\ n < 15 \\ 0 \cdot 5 + 0.03(n-15), & if\ 15 \le n < 25 \\ 0 \cdot 8 + 0.02(n-25), & if\ 25 \le n < 35 \\ 1 & if\ 35 \le n \end{cases}$$

The new scheme thus implies a more progressive approach to full benefits.

For early retirement, regulation also sets a penalization system linked to age. *Mutualistas* that retire early are subject to a reduction coefficient equivalent to 8 per cent for each year in advance of 65 that he/she retires, so that $\alpha_t^a = 1 - 0.08(65 - r)$ *where* $r >= 60$. The 1997 reform reduced the reduction coefficient to 7 per cent for those with more than 40 contributory years, when claiming the pension. This coefficient should be jointly applied with the one corresponding to contributory years.

The 2002 reform changed the penalization mechanism, so as to make the age coefficient ($\alpha_t^a$) more linked to the number of contributed years, so that:

$$\alpha_{nt}^a = \begin{cases} 0 & if\ r < 61 \\ 1 - k\,(65 - r), & if\ 61 \le r < 65\ where \\ 1, & if\ r \ge 65 \end{cases} \qquad k \begin{cases} 0.08 & if\ n = 30 \\ 0.075 & if\ 31 \le n \le 34 \\ 0.07 & if\ 35 \le n \le 37 \\ 0.065 & if\ 38 \le n \le 39 \\ 0.06 & if\ n \ge 40 \end{cases}$$

where $r$ is retirement age.

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[48] As social contributions are paid 14 months a year, the effective number of years taken into account to compute the regulatory base is 6.8 up to 1997 and 12.9 since then. The 2006 agreement proposes to rise the effective contributory years to 15, without taking into account the 14 monthly payments.

**Table 6**

**Descriptive Values. Sample of Men Born Between 1936 and 1946, Having Worked in the General Regimen, with a Relation with the Social Security in 2006**

| | All Period Considered 1996-2006 | | | Before 2002 | | | After 2002 | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Median** | **Mean** | ***s.d.*** | **Median** | **Mean** | ***s.d.*** | **Median** | **Mean** | ***s.d.*** |
| $SSW_t$ (1) | 199.30 | **222.50** | *96.83* | 195.83 | **211.84** | *87.02* | 201.35 | **228.17** | *101.21* |
| $SSA_t$ (1) | 6.89 | **6.73** | *12.95* | 10.12 | **9.79** | *12.20* | 4.97 | **5.09** | *13.04* |
| $PV_t$ (1) | 12.65 | **18.84** | *26.73* | 21.68 | **26.77** | *28.03* | 8.32 | **14.63** | *25.01* |
| $RR_t$ (2) | 57.61 | **67.36** | *35.50* | 50.77 | **57.61** | *26.56* | 61.93 | **72.55** | *38.45* |
| $l_{t-1}$ (2) | | **57.49** | | | **62.67** | | | **54.74** | |
| $u_{t-1}$ (2) | | **24.28** | | | **27.54** | | | **22.55** | |
| ***numrel*** | | **10.770** | *25.866* | | **9.547** | *19.763* | | **11.420** | *28.565* |
| ***meanlenght*** (3) | | **7.237** | *7.243* | | **7.763** | *7.436* | | **6.957** | *7.122* |
| ***time since eligible*** (3) | | **2.677** | *1.565* | | **2.275** | *1.390* | | **2.892** | *1.609* |
| ***univ*** | | **0.106** | *0.307* | | **0.101** | *0.302* | | **0.108** | *0.310* |
| ***serv*** | | **0.364** | *0.481* | | **0.356** | *0.479* | | **0.367** | *0.482* |
| ***disab*** | | **0.126** | *0.332* | | **0.024** | *0.152* | | **0.181** | *0.385* |
| ***otherben*** | | **0.134** | *0.341* | | **0.030** | *0.172* | | **0.190** | *0.392* |
| ***low60*** | | **0.086** | *0.281* | | **0.101** | *0.302* | | **0.078** | *0.268* |
| ***low61*** | | **0.047** | *0.211* | | **0.034** | *0.181* | | **0.053** | *0.224* |
| ***low62*** | | **0.029** | *0.168* | | **0.015** | *0.123* | | **0.036** | *0.187* |
| ***low63*** | | **0.018** | *0.134* | | **0.008** | *0.091* | | **0.024** | *0.152* |
| ***low64*** | | **0.011** | *0.104* | | **0.005** | *0.067* | | **0.014** | *0.120* |
| ***low65*** | | **0.008** | *0.086* | | **0.003** | *0.053* | | **0.010** | *0.100* |
| ***top64*** | | **0.001** | *0.037* | | **0.001** | *0.025* | | **0.002** | *0.042* |
| ***top65*** | | **0.003** | *0.058* | | **0.001** | *0.034* | | **0.005** | *0.067* |
| ***age61*** | | **0.219** | *0.413* | | **0.236** | *0.425* | | **0.209** | *0.407* |
| ***age62*** | | **0.175** | *0.380* | | **0.158** | *0.365* | | **0.184** | *0.387* |
| ***age63*** | | **0.135** | *0.342* | | **0.110** | *0.313* | | **0.148** | *0.355* |
| ***age64*** | | **0.100** | *0.300* | | **0.068** | *0.252* | | **0.118** | *0.322* |
| ***age65*** | | **0.065** | *0.246* | | **0.027** | *0.162* | | **0.085** | *0.278* |
| ***cycle*** (4) | | **3.667** | *0.679* | | **4.262** | *0.688* | | **3.350** | *0.406* |
| ***r2002*** | | **0.653** | *0.476* | | **0.000** | *0.000* | | **1.000** | *0.000* |

(1) In thousands of euros.
(2) In percentage.
(3) In years.
(4) In percentage variation of GDP.

Moreover, it introduced a premium for late retirement, so that the pension was increased by 2 per cent per additional year if the worker credited more than 35 years of contribution:[49]

$$\alpha_n^T = 1 + 0.02(r - 65) \; if \; r > 65 \; and \; n \geq 35$$

[49] The 2006 agreement proposed raising the premium to 3 per cent for those with more than 40 contributory years. The partial retirement regulation introduced with the 2002 reform, established that no correction coefficient for age would be used for those claiming this type of pension. The reform agreed in 2006 aims at rationalizing this type of retirement, requiring six years of seniority in the firm before retiring, 30 contributory years (instead of the current 15), and changing the maximum and minimum labour day reduction to 75 per cent and 25 per cent, respectively from the current 85 per cent to 15 per cent. Full implementation will be in four years' time.

**Table 7**

## Logit Estimates of the Effects of Pension Incentives on Retirement Behaviour between 60 and 65 Years of Age. Males Born between 1936 and 1946, Having Worked in the General Regime with a Relation with the Social Security in 2006*

| | MODEL A | | MODEL B | | MODEL C | |
|---|---|---|---|---|---|---|
| | ACCRUAL | PEAK VALUE | ACCRUAL | PEAK VALUE | ACCRUAL | PEAK VALUE |
| | LR chi2(45)=38014.62 | LR chi2(49)=38187.03 | LR chi2(56)=38597.09 | LR chi2(45)=38030.83 | LR chi2(49)=38213.54 | LR chi2(56)=38607.93 |
| | Pseudo R2=0.365 | Pseudo R2=0.367 | Pseudo R2=0.371 | Pseudo R2=0.365 | Pseudo R2=0.367 | Pseudo R2=0.371 |
| | Log likelihood = –33064.09 | Log likelihood = –32977.89 | Log likelihood = –32772.86 | Log likelihood = –33055.97 | Log likelihood = –32964.63 | Log likelihood = –32767.44 |
| | 115.532 number of observations | | | | | |
| ECONOMIC INCENTIVES AND REGULATION | | | | | | |
| $SSW_t$ | 2.979 (23.08)*** | 2.969 (23.31)*** | 2.462 (11.69)*** | 2.401 (11.81)*** | 2.322 (10.78)*** | 2.289 (10.83)*** |
| $SSA_t$ | –7.993 (–7.07)*** | | –12.941 (–7.78)*** | | –10.510 (–5.69)*** | |
| $PV_t$ | | -4.284 (–8.11)*** | | -6.730 (–9.26)*** | | -5.363 (–6.92)*** |
| $RR_t$ | 0.046 (1.2) | 0.043 (1.14) | –0.083 (–1.25) | –0.144 (–2.14)* | –0.085 (–1.28) | –0.139 (–2.06)* |
| $SSW_t$ * r2002 | | | 1.109 (4.76)*** | 1.166 (5.16)*** | 1.272 (5.48)*** | 1.252 (5.53)*** |
| $SSA_t$ * r2002 | | | 8.821 (4.50)*** | | 4.018 (2.04)* | |
| $PV_t$ * r2002 | | | | 4.451 (4.94)*** | | 3.265 (3.61)*** |
| $RR_t$ * r2002 | | | 0.232 (3.04)** | 0.300 (3.89)*** | 0.151 (1.97)* | 0.252 (3.26)** |
| r2002 | | | –0.763 (–10.37)*** | –0.843 (–11.04)*** | –0.689 (–9.31)*** | –0.787 (–10.24)*** |
| low60 | | | | | 0.205 (4.45)*** | 0.224 (5.01)*** |
| low61 | | | | | –0.035 (–0.46) | –0.001 (–0.01) |
| low62 | | | | | –0.587 (–5.68)*** | –0.554 (–5.38)*** |
| low63 | | | | | –0.922 (–6.42)*** | –0.878 (–6.14)*** |
| low64 | | | | | –1.885 (–9.73)*** | –1.899 (–9.80)*** |
| top64 | | | | | –0.546 (–2.26)* | –0.383 (–1.61) |
| top65 | | | | | –1.509 (–11.52)*** | –1.415 (–11.07)*** |
| WORKING STATUS, SECTOR OF ACTIVITY AND OTHER LABOUR HISTORY RELATED VARIABLES | | | | | | |
| $l_{t-1}$ | –1.577 (–39.51)*** | –1.577 (–39.52)*** | –1.551 (–38.65)*** | –1.556 (–38.77)*** | –1.575 (–39.05)*** | –1.577 (–39.10)*** |
| $u_{t-1}$ | 0.942 (25.21)*** | 0.934 (24.98)*** | 0.965 (25.72)*** | 0.952 (25.33)*** | 0.954 (25.31)*** | 0.947 (25.09)*** |
| numrel | –0.022 (–11.82)*** | –0.022 (–11.74)*** | –0.021 (–11.11)*** | –0.021 (–11.06)*** | –0.023 (–11.74)*** | –0.023 (–11.66)*** |
| t x numrel | 0.004 (9.03)*** | 0.004 (8.97)*** | 0.004 (8.68)*** | 0.004 (8.65)*** | 0.004 (9.10)*** | 0.004 (9.04)*** |
| meanlenght | 0.002 (0.75) | 0.002 (0.73) | 0.003 (0.96) | 0.003 (1.01) | 0.005 (1.57) | 0.005 (1.58) |
| t x meanlenght | 0.003 (3.85)*** | 0.003 (3.92)*** | 0.003 (3.43)*** | 0.003 (3.40)*** | 0.002 (2.56)* | 0.002 (2.61)** |
| serv | –0.003 (–0.07) | –0.001 (–0.02) | 0.020 (0.50) | 0.022 (0.54) | 0.023 (0.58) | 0.024 (0.60) |
| t x serv | –0.020 (–1.67) | –0.022 (–1.81)* | –0.024 (–2.01)* | –0.026 (–2.13)* | –0.027 (–2.22)* | –0.028 (–2.30)* |

*(continues)*

**Table 7 (continued)**

## Logit Estimates of the Effects of Pension Incentives on Retirement Behaviour between 60 and 65 Years of Age. Males Born between 1936 and 1946, Having Worked in the General Regime with a Relation with the Social Security in 2006*

| | MODEL A | | MODEL B | | MODEL C | |
|---|---|---|---|---|---|---|
| | ACCRUAL | PEAK VALUE | ACCRUAL | PEAK VALUE | ACCRUAL | PEAK VALUE |
| | LR chi2(45)=38014.62 | LR chi2(49)=38187.03 | LR chi2(56)=38597.09 | LR chi2(45)=38030.83 | LR chi2(49)=38213.54 | LR chi2(56)=38607.93 |
| | Pseudo R2=0.365 | Pseudo R2=0.367 | Pseudo R2=0.371 | Pseudo R2=0.365 | Pseudo R2=0.367 | Pseudo R2=0.371 |
| | Log likelihood = –33064.09 | Log likelihood = –32977.89 | Log likelihood = –32772.86 | Log likelihood = –33055.97 | Log likelihood = –32964.63 | Log likelihood = –32767.44 |
| | 115.532 number of observations | | | | | |
| PERSONAL CHARACTERISTICS & OTHERS | | | | | | |
| **univ** | **–0.729** (–10.46)*** | **–0.751** (–10.82)*** | **–0.706** (–10.10)*** | **–0.716** (–10.28)*** | **–0.779** (–10.95)*** | **–0.794** (–11.18)*** |
| **t x univ** | **–0.078** (–4.02)*** | **–0.068** (–3.57)*** | **–0.086** (–4.39)*** | **–0.079** (–4.15)*** | **–0.038** (–1.89) | **–0.029** (–1.49) |
| **disab** | **–1.578** (–8.28)*** | **–1.586** (–8.34)*** | **–1.468** (–7.64)*** | **–1.485** (–7.74)*** | **–1.484** (–7.70)*** | **–1.498** (–7.78)*** |
| **otherben** | **–2.981** (–17.55)*** | **–2.970** (–17.54)*** | **–2.978** (–17.39)*** | **–2.972** (–17.41)*** | **–3.016** (–17.54)*** | **–3.015** (–17.55)*** |
| **age61** | **–0.015** (–0.06) | **–0.037** (–0.15) | **–0.069** (-0.29) | **–0.095** (-0.40) | **0.098** (0.40) | **0.069** (0.28) |
| **age62** | **–1.047** (–3.70)*** | **–1.076** (–3.80)*** | **–1.055** (–3.70)*** | **–1.087** (3.81)*** | **–0.767** (–2.48)* | **–0.791** (–2.56)* |
| **age63** | **–0.710** (–2.50)* | **–0.739** (–2.59)** | **–0.725** (–2.54)* | **–0.759** (–2.65)** | **–0.098** (–0.32) | **–0.134** (–0.44) |
| **age64** | **–0.712** (–2.46)* | **–0.759** (–2.63)** | **–0.686** (–2.36)* | **–0.739** (–2.55)* | **0.247** (0.78) | **0.213** (0.67) |
| **age65** | **2.813** (10.94)*** | **2.788** (10.84)*** | **2.865** (11.09)*** | **2.834** (10.96)*** | **3.271** (12.34)*** | **3.272** (12.33)*** |
| **cycle** | **0.241** (16.89)*** | **0.246** (17.18)*** | **0.111** (5.94)*** | **0.119** (6.42)*** | **0.125** (6.69)*** | **0.131** (7.03)*** |
| DURATION VARIABLES | | | | | | |
| **g1** | **–0.514** (–1.96) | **–0.540** (–2.06)* | **–0.591** (–2.24)* | **–0.615** (–2.33)* | **–0.331** (–1.23) | **–0.370** (–1.37) |
| **g2** | **–1.703** (–6.76)*** | **–1.733** (–6.88)*** | **–1.697** (–6.74)*** | **–1.723** (–64.85)*** | **–1.539** (–6.02)*** | **–1.572** (–6.15)*** |
| **g3** | **–0.522** (–2.06)* | **–0.557** (–2.20)* | **–0.538** (–2.11)* | **–0.567** (–2.22)* | **–0.442** (–1.64) | **–0.483** (–1.79) |
| **g4** | **–0.858** (–3.52)*** | **–0.904** (–3.72)*** | **–0.856** (–3.50)*** | **–0.891** (–3.65)*** | **–1.094** (–4.32)*** | **–1.128** (–4.45)*** |
| **g5** | **0.054** (0.22) | **0.027** (0.11) | **0.028** (0.12) | **0.016** (0.07) | **–0.494** (–1.95) | **–0.519** (–2.05)* |
| **cons** | **–2.328** (–3.82)*** | **–2.264** (–3.71)*** | **–1.422** (–2.30)* | **–1.306** (–2.12)* | **–1.731** (–2.76)** | **–1.635** (–2,46)** |

* Notes:
Dependent variable is 1 if person retires and 0 otherwise, conditioned on not having retired before. Monetary values are in thousands of euros, prices 2006. Z-values are in parenthesis.
Statistical significance: * p<0.05; ** p<0.01; *** p<0.001.
Coefficients of Autonomous Communities not resported. Prob > chi2=0.
Model A represents the basic model. Model B includes Model A and changes in 2002 regulation as control variables. Model C includes Model B and income levels as control variables.

**Table 8**

## Quantitative Effects of Pension Incentives and Other Variables on the Average hazard Rate by Age

| | ACCRUAL | | | | | | | PEAK VALUE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All ages** | **Age 60** | **Age 61** | **Age 62** | **Age 63** | **Age 64** | **Age 65** | **All ages** | **Age 60** | **Age 61** | **Age 62** | **Age 63** | **Age 64** | **Age 65** |
| *Economic Incentives and Regulation* | | | | | | | | | | | | | | |
| $SSW_t$ | 0.00604 | 0.00717 | 0.00377 | 0.00462 | 0.00515 | 0.00878 | 0.00910 | 0.00604 | 0.00716 | 0.00377 | 0.00462 | 0.00514 | 0.00875 | 0.00912 |
| | *0.0029* | *0.0043* | *0.0013* | *0.0019* | *0.0022* | *0.0064* | *0.0089* | *0.0029* | *0.0043* | *0.0013* | *0.0019* | *0.0023* | *0.0064* | *0.0089* |
| $SSA_t$ | –0.00075 | –0.00115 | –0.00048 | –0.00046 | –0.00041 | –0.00071 | –0.00147 | | | | | | | |
| | *–0.0003* | *–0.0006* | *–0.0002* | *–0.0002* | *–0.0002* | *–0.0003* | *–0.0011* | | | | | | | |
| $PV_t$ | | | | | | | | –0.00072 | –0.00145 | –0.00052 | –0.00045 | –0.00031 | –0.00038 | –0.00080 |
| | | | | | | | | *–0.0003* | *–0.0007* | *–0.0002* | *–0.0002* | *–0.0001* | *–0.0002* | *–0.0006* |
| $RR_t$ | 0.00026 | 0.00027 | 0.00014 | 0.00018 | 0.00022 | 0.00043 | 0.00055 | 0.00024 | 0.00025 | 0.00013 | 0.00017 | 0.00020 | 0.00039 | 0.00052 |
| | *0.0001* | *0.0001* | *0.0000* | *0.0001* | *0.0001* | *0.0003* | *0.0005* | *0.0001* | *0.0001* | *0.0000* | *0.0001* | *0.0001* | *0.0002* | *0.0005* |
| *Individual Characteristics* | | | | | | | | | | | | | | |
| **numrel** | –0.00078 | –0.00186 | –0.00069 | –0.00057 | –0.00036 | –0.00019 | 0.00028 | –0.00077 | –0.00184 | –0.00068 | –0.00057 | –0.00036 | –0.00019 | 0.00027 |
| | *–0.0002* | *–0.0009* | *–0.0002* | *–0.0002* | *–0.0001* | *–0.0001* | *0.0002* | *–0.0002* | *–0.0008* | *–0.0002* | *–0.0002* | *–0.0001* | *–0.0001* | *0.0002* |
| $l_{t-1}$ | –0.13012 | –0.17677 | –0.07608 | –0.09285 | –0.10215 | –0.19861 | –0.15740 | –0.13028 | –0.17694 | –0.07612 | –0.09294 | –0.10232 | –0.19897 | –0.15764 |
| | *–0.1160* | *–0.1831* | *–0.0699* | *–0.0870* | *–0.0969* | *–0.2147* | *–0.1470* | *–0.1162* | *–0.1836* | *–0.0697* | *–0.0870* | *–0.0971* | *–0.2151* | *–0.1476* |
| $u_{t-1}$ | 0.07919 | 0.10601 | 0.04691 | 0.05679 | 0.06200 | 0.11593 | 0.10557 | 0.07862 | 0.10523 | 0.04654 | 0.05634 | 0.06152 | 0.11515 | 0.10498 |
| | *0.0594* | *0.0885* | *0.0310* | *0.0392* | *0.0440* | *0.1076* | *0.1097* | *0.0589* | *0.0880* | *0.0304* | *0.0388* | *0.0438* | *0.1070* | *0.1092* |
| ***uni*** | –0.05719 | –0.07249 | –0.03245 | –0.03880 | –0.04222 | –0.07833 | –0.10884 | –0.05799 | –0.07355 | –0.03281 | –0.03922 | –0.04265 | –0.07925 | –0.11126 |
| | *–0.0281* | *–0.0390* | *–0.0126* | *–0.0164* | *–0.0187* | *–0.0516* | *–0.1128* | *–0.0285* | *–0.0398* | *–0.0127* | *–0.0166* | *–0.0190* | *–0.0526* | *–0.1173* |
| ***serv*** | –0.00182 | –0.00233 | –0.00113 | –0.00132 | –0.00142 | –0.00247 | –0.00284 | –0.00181 | –0.00232 | –0.00112 | –0.00131 | –0.00142 | –0.00246 | –0.00283 |
| | *–0.0010* | *–0.0014* | *–0.0005* | *–0.0006* | *–0.0007* | *–0.0018* | *–0.0030* | *–0.0010* | *–0.0014* | *–0.0005* | *–0.0006* | *–0.0007* | *–0.0018* | *–0.0030* |
| ***disab*** | –0.09491 | –0.11417 | –0.04653 | –0.05607 | –0.06077 | –0.12213 | –0.26254 | –0.09540 | –0.11485 | –0.04667 | –0.05618 | –0.06087 | –0.12247 | –0.26505 |
| | *–0.0379* | *–0.0526* | *–0.0166* | *–0.0212* | *–0.0240* | *–0.0666* | *–0.3103* | *–0.0379* | *–0.0532* | *–0.0165* | *–0.0213* | *–0.0242* | *–0.0673* | *–0.3141* |
| ***otherben*** | –0.14350 | –0.15770 | –0.06152 | –0.07475 | –0.08122 | –0.17335 | –0.52006 | –0.14352 | –0.15826 | –0.06153 | –0.07457 | –0.08095 | –0.17288 | –0.52009 |
| | *–0.0542* | *–0.0686* | *–0.0224* | *–0.0290* | *–0.0324* | *–0.0886* | *–0.5875* | *–0.0546* | *–0.0696* | *–0.0225* | *–0.0289* | *–0.0324* | *–0.0886* | *–0.5882* |

Notes:
Quantitative effects of continuous variables are computed as the discrete differences of the logistic function evaluated at a 10 per cent increase in the variables' values with respect to the logistic function evaluated at the observed variables' values. Results are obtained under Model A in Table A 2. Median values are in italics. The effects are estimated for the period beginning in 2002.

**Table 9**

## Quantitative Effects of Pension Incentives and Other Variables on the Average hazard Rate for Ages between 60 and 65

| | MODEL B | | | | MODEL C | | | |
|---|---|---|---|---|---|---|---|---|
| | ACCRUAL | | PEAK VALUE | | ACCRUAL | | PEAK VALUE | |
| | mean | *median* | mean | *median* | mean | *median* | mean | *median* |
| *Economic Incentives and Regulation* | | | | | | | | |
| $SSW_t$ | 0.00718 | *0.0034* | 0.00717 | *0.0034* | 0.00725 | *0.0033* | 0.00715 | *0.0033* |
| $SSA_t$ | –0.00038 | *–0.0002* | | | –0.00060 | *–0.0002* | | |
| $PV_t$ | | | –0.00038 | *–0.0001* | | | –0.00035 | *–0.0001* |
| $RR_t$ | 0.00082 | *0.0003* | 0.00086 | *0.0004* | 0.00036 | *0.0001* | 0.00061 | *0.0003* |
| ***r2002* overall change** | –0.02257 | *–0.0097* | –0.02225 | *–0.0100* | –0.01929 | *–0.0086* | –0.01953 | *–0.0087* |
| ***r2002* change** | | | | | | | | |
| ***low60*** | | | | | 0.01627 | *0.0088* | 0.01781 | *0.0097* |
| ***low61*** | | | | | –0.00268 | *–0.0014* | –0.00005 | *–0.0000* |
| ***low62*** | | | | | –0.04063 | *–0.0189* | –0.03861 | *–0.0181* |
| ***low63*** | | | | | –0.05966 | *–0.0262* | –0.05739 | *–0.0255* |
| ***low64*** | | | | | –0.10067 | *–0.0382* | –0.10122 | *–0.0385* |
| ***top64*** | | | | | –0.03790 | *–0.0178* | –0.02744 | *–0.0132* |
| ***top65*** | | | | | –0.08607 | *–0.0345* | –0.08238 | *–0.0337* |
| *Individual Characteristics* | | | | | | | | |
| ***numrel*** | –0.00067 | *–0.0001* | –0.00066 | *–0.0001* | –0.00071 | *–0.0002* | –0.00071 | *–0.0001* |
| $l_{t-1}$ | –0.12357 | *–0.1088* | –0.12392 | *–0.1088* | –0.12525 | *–0.1094* | –0.12556 | *–0.1097* |
| $u_{t-1}$ | 0.07886 | *0.0588* | 0.07767 | *0.0577* | 0.07751 | *0.0566* | 0.07698 | *0.0561* |
| ***uni*** | –0.05481 | *–0.0264* | –0.05498 | *–0.0265* | –0.05596 | *–0.0268* | –0.05638 | *–0.0271* |
| ***serv*** | –0.00035 | *–0.0002* | –0.00032 | *–0.0002* | –0.00030 | *–0.0002* | –0.00032 | *–0.0002* |
| ***disab*** | –0.08750 | *–0.0345* | –0.08822 | *–0.0347* | –0.08763 | *–0.0345* | –0.08829 | *–0.0348* |
| ***otherben*** | –0.13931 | *–0.0509* | –0.13919 | *–0.0512* | –0.13911 | *–0.0507* | –0.13920 | *–0.0509* |

Notes:
Quantitative effects of the continuous variables are computed as the discrete differences of the logistic function evaluated at a 10 per cent increase in the variables' values with respect to the logistic function evaluated at the observed variables' values. Results are obtained under Models B and C in Table A2. The effects are estimated for the period beginning in 2002.

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# ASSESSING THE SHORT-TERM IMPACT OF PENSION REFORMS ON OLDER WORKERS' PARTICIPATION RATES IN THE EU: A DIFF-IN-DIFF APPROACH

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## 1 Introduction

The performance of the European labour markets improved significantly during the second half of the 1990s (AER 2003). After having reached a peak in 1994, the unemployment rate started gradually to decline while both the employment and the participation rates kept rising. With increases of more than 8 and 7 percentage points, respectively for the employment and the participation rates, the female and the older workers were the most dynamic components. These improvements reflect long-term changes in the socio-economic behaviour such as a different attitude toward female employment and participation, improved health and working conditions which induce to retire at older ages. Yet, they took place in response to the reforms implemented during the period (e.g., ECB, 2007). The last decade witnessed important changes in European pension systems. Up to 1995, only few countries implemented pension reforms. By 2006, almost every European country had enacted reforms of the pension system. This richness of reforms across countries and time of their occurrence can be used to conduct a "policy experiment" of the effects of pension reforms on the participation rates of people aged between 50 and 64 years. Each policy intervention is considered as a discrete event that occurred at a specific time for each country. The event-study compares the value of one variable of interest after a certain reform or legislation has taken place with its value before such change has occurred. To control for other determinants not related to specific policy interventions, the findings of before-after comparison are compared with a control group made of those countries which did not implement a reform at least in one year covered by the sample period. With the event-study approach we will verify whether after pension reforms the participation rate rises.[1] Thus, we analyse the impact of pension reforms on participation rates of different age/sex groups of elderly workers by contrasting changes in participation rates in reforming vs non-refroming countries.

The paper is organised as follows. Section 2 presents the main stylised facts. Section 3 briefly reviews the main theoretical explanations of the observed trends in participation, while section 4 discusses the effects of pension reforms on the average retirement age. Section 5 gives an overview of the reforms undertaken in the EU between 1997 and 2007. Section 6 presents the empirical finding of the effects of recently introduced pension reforms on the older workers' activity rates. Section 7 discusses the policy implications and possible follow up.

## 2 Stylised facts: main developments in older workers' participation rates

Life expectancy has significantly increased in developed countries, mainly thanks to improved living standards, working conditions and health care. In the early 1980s the average life

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[1] The event-study method has been applied to study market response to changes in the law, both as a result of court decisions and legislative reforms.

expectancy stood at around 75 years to reach 80 in 2006; for few new Member States it hovered around the EU average of 26 years earlier (Table 4).

Work has become less physically demanding, population much healthier and long-lived. Even so, as documented, among others, by Palmer (1999), Samwick (2002), and Boeri *et al.* (2001), there has been a significant decline in the participation rate of elderly people, which reversed its negative trend only in recent years. The dramatic difference in the time pattern across men and women (Figure 1) often gets unnoticed. For several countries, the activity rate of men aged between 55 and 64 appears often U shaped, with decline in participation at least until the mid 1990s. For the 50-54 age group, rates appear more stable and the decline relatively more limited; there are significant exceptions to this pattern such as. the participation rates of Belgian and Italian men aged 50-54, rapidly converging to the highest rates. Despite country specific labour force histories, the broad trend of a shrinking labour supply of male aged 50+ remains. Thus, even though men live longer than before, they leave the labour market earlier.

Conversely, women, especially those aged less then 60, have a steadily rising participation, and it is not rare to find countries where female rates almost doubled in 10 years only. The change over time in the age profile of the participation rates confirms that the major modifications in the participation behaviour occurred in the case of women, at age below 59, and especially in their early 50s. Without these modifications, several countries would have had in 2007 activity rates hovering around the level of twenty years earlier. As a consequence of these differentiated patterns in the participation rates by sex, the average age at which people retire has changed only to a minor extent (Table 5).

Figure 2 displays the age profile of the exit rate from the labour market for selected countries for the mid-80s, the early 1990s and the first half of 2000s. This rate is calculated as the conditional probability of an age cohort of not staying in the labour market at age $h$.[2] Spikes can be observed at about the statutory retirement age for all countries and, for some, at the age of early retirement. There is also a clear difference in the exit rates by sex which reflects different statutory retirement ages of men and women. Finally, there are recently significant changes in the age profile of the exit rates in the recent years. The probability of leaving the labour market at ages just below 60 falls for both sexes in several countries. Even so, at the age of 60 there is a significant increase in the probability of withdrawing from the labour market. Early exit from the labour market remains high in Belgium, Germany, France, Italy and the Netherlands.

The patterns briefly described are the outcome of complex individual participation decisions which are influenced by a variety of factors, including *social factors*, such as longer schooling or change in the role of women in households; *demographic factors*, including the decline of fertility rates and modifications of the age structure; *institutional factors*, such as changes in the financial incentives to retire early, in the eligibility conditions or in the availability of alternative early retirement paths, (e.g., temporary access to disability and unemployment benefits before being granted retirement benefits, Van Ours, 2006 for the Netherlands). Early- or pre-retirement programmes were commonly used in the ‘70s and ‘80s to deal with industrial restructuring (Brugiavini, 2001), high unemployment of older workers, low employment of young workers, or as a labour cost saving strategies. Economic factors, such as the level of the unemployment rate, the average income by household, the share of part-time employment in total employment or the share of the services sector in the economy have also been invoked to explain the differences in the participation rates across countries and over time.

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[2] In symbols if $PR(h,t)$ is the participation rate at time $t$ of cohort $h$, the exit rate is defined as $1\text{-}PR(h,t)/PR(h\text{–}1,t\text{–}1)$.

## 3 What explains the main trends

Many economists have tried to solve the puzzle of higher life expectancy, less physically demanding work and lower retirement ages. Two major factors have caused declining participation rates of older workers (Diamond, 2005).

First, due to positive trend in real earnings, both the fraction of lifetime spent working dropped. As the income effect from higher real earnings prevails on the substitution effect, higher real incomes allows more hours for leisure, higher consumption and savings despite falling working time. Thus, the increase in real wages has been the main determinant of the long-term decline in the retirement age in industrialised countries (Bloom, Canning and Moore, 2007).

The increase in the lifespan has also produced a wealth effect because of the influence of compound interest and wage growth, which reduce the proportion of life devoted to work. Second, the rules establishing access to pension, public health and long-term care may have influenced the individual decision to retire. As life expectancy increases it would be optimal to postpone retirement age. However, the existence of social security programs translate into higher savings and earlier labour market exits (e.g., Bloom, Canning, Mansfield and Moore, 2006, for a life-cycle model of the labour supply with endogenous retirement age and the social security arrangement). Similarly, in a model with stochastic ageing among three age classes and accumulation of human capital with two skill levels, Ljiungqvist (2007) shows that the non-employment effect of taxation do not differ in complete and incomplete markets, with the tax and benefit system affecting non-employment of low and high skilled respectively in complete and incomplete markets.[3] Using a panel for 12 countries, Gruber and Wise (2002) demonstrate several disincentives for continued work for the elderly built in national social security schemes. Many have noticed high exit rates at the first age at which one can retire and at the statutory retirement age (e.g., Coile and Gruber, 2000, or Samwick, 1998). More generally, individuals able to set aside enough funds are those that firstly retire, especially when they are allowed to use benefits to "top-off" their retirement wealth.

Early retirement schemes can be characterised by several adverse mainly long-term effects (Conde-Ruiz and Galasso, 2004). They can influence negatively the accumulation of human capital of less-skilled workers, lower economic growth, and increase the dependency ratio and the risks of financial imbalances when population ages. Using an overlapping generation model with heterogeneous agents extended by voting, Conde-Ruiz and Galasso demonstrate why alternative policies had not been realised even though they would have had less distortive impact upon the economy. Their analysis provides a political economy explanation of the early retirement schemes.

## 4 Pension reforms and average retirement age

If expected income falls or life expectancy increases unexpectedly, a worker realises that his/her planning horizon is extended and previous plans concerning the rest of his/her life should be reassessed. Economic theory proposes three ways how to set up a new optimal plan. First, a worker could reduce consumption during pre-retirement age and accumulate savings for later stages of life. Second, a worker could reduce consumption spending during retirement age and deplete lifetime savings more slowly. Third, a worker could decide to work longer to reach the initial level of consumption. In addition, when there is only one earner in the family, the fall in his or her expected income during retirement may induce the second earner to enter into the labour market to keep

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[3] With incomplete markets fiscal policy impacts employment outcomes via the optimal allocation of individual wealth. As tax rates increase, skilled people can put aside enough funds to finance early retirement. At successively high rates, the low skilled will start to save up for early retirement.

unchanged the family consumption.[4] The final impact on the participation rate depends on how these effects influence the retirement decision.

Within a life-cycle framework, the retirement decision is a function of the lifetime streams of earning, pensions and other sources of income (Mitchell and Fields 1981). Obviously rational agents chose their optimal consumption pattern jointly with the amount of work they wish to supply during their lifetime and the time at which they wish stop working. In a standard competitive model with social security, taxes and benefits have distortionary effects on individual consumption, savings and optimal retirement age (e.g., Seshinski, 1977). Thus, compared to an economy with no benefits, social security benefits imply in equilibrium lower consumption and lower retirement age. In the *option value* model (Stock and Wise, 1990), the work/retirement decision is associated to the option of *continued work keeping the option to retire at a later stage*. If the expected value of working is worth more than the expected value of retiring, the individual continues to work. If there are no expected gains from continued work, he would retire. In this framework, changes in the pension system such as changes in the coverage rate, in the accrual of retirement wealth attributable to continued work, more than the level of retirement wealth at a given point in time, are found to influence the average retirement age (Samwick, 1998).

According to the simulations of Gruber and Wise (2002), a reform that delays benefit eligibility by three years would likely reduce the proportion of men aged between 56 to 65 out of the labour force between 23 to 36 per cent.

Mitchell and Fields (1983) apply an ordered logit model to estimate the impact on the average retirement age of changes in the expected income. Not surprisingly they find a negative impact of a rise in social security streams on the average retirement age. The impact of a 10 per cent increase in the social security benefits was estimated to reduce a retirement age by –0.07 years for all individuals without any restriction on age. In case of individuals at the age of 60 the effect is more pronounced when reducing the average retirement age by –0.19 years.

Bottazzi, Jappelli and Padula (2006) estimate – separately for males and females – the impact of the Italian pension reform on the expected retirement age, omitting the transitional 1993-97 period of the reform. While their regressions indicate that the patterns found for women are the same as for men, still the effect on women is somewhat larger. The estimated impact on the expected retirement age is about 0.7 years for both male and female private sector worker. In case of public employee and self employed the effect is even higher reaching values over 1 and 2 years respectively.

Some EU countries have switched from defined benefit to defined contribution pension systems or at least introduced one pension pillar based on this assumption. Such change may lead people to stay longer in the labour market and, therefore, is expected to increase the average retirement age. Friedberg and Webb (2005) support this hypothesis by estimating that employees with defined contribution plans usually retire one or two years later compared to employees with defined benefit plan. Furthermore, Diamond (2005) argues in favour of pension systems with low implicit tax on continued work after the age at which retirement benefits can first be claimed. Usually low implicit taxes are ensured with a defined contribution system.

Palmer (1999) proposes a notional defined contribution pay-as-you-go system. As usual in prevailing pay-as-you-go systems, working people contribute to the system providing resources for contemporary pensioners. However, differently from the DB system, the more people contribute to system the higher is their future pension. Finally, the rate of return is not affected by the developments of the financial markets, but by the overall performance of the economy. So, the

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[4] The so-called "added worker" effect implies an increase in the participation rates when the expected income of the family deteriorates (Pissarides, 2000).

system should stimulate people to postpone their exit from the labour market and, in passing, to its financial stability.

Bloom, Canning and Moore (2007) show that the optimal response to dealing with the solvency problems that arise in social security when life expectancy increases is to reduce contributions and increase benefit rates, maintaining solvency exclusively by increasing the retirement age. This response can maintain solvency because raising wages over time and compound interest on accumulated savings mean that longer working lives tend to create more than proportional wealth at retirement.

The retirement age has stabilised and recently partially reversed its declining trend. Again, several factors have to be taken into account. First, under the pressure of ageing and the medium- to long-term risks for the financial sustainability of social security systems, several member states have enacted reforms of the pension systems that have tightened the eligibility conditions for pension benefits (e.g., minimum years of contributions, retirement age) and reduced their generosity. Second, some reforms have shifted part of the financial risks from state to employers and employees. Thus, longer life expectancy and less generous pension benefits may have induced workers to work longer to accumulate precautionary savings for their old age (*i.e.*, they have made the income effect prevail over the substitution effect). The next section reviews more in depth the pension reforms enacted in the member states in the last decade.

## 5 Overview of early retirement and pension reforms undertaken in the EU over the 1997-2007 period[5]

Reaching low levels of inactivity among older workers and promoting longer working lives are key factors to alleviate the negative impact of population ageing on employment and economic growth (European Commission-EPC 2009 Aging report). The 2001 Stockholm European Council stressed the importance of reforms encouraging higher employment and participation rates, especially among women and the elderly; it emphasised that pension reforms are needed to ensure both the long-term financial sustainability and a certain degree of intergenerational fairness.

In response to pressures stemming from ageing populations and persisting low participation rates, all countries of the EU have reformed their pension systems. These reforms comprise a number of different measures (Table 6 and Table 7) that were meant to keep the sustainability of public finances mainly by transferring part of the demographic risk from the state to individuals and by giving strong incentives for working longer.

A widely accepted distinction is between parametric and systemic reforms. Parametric are those reforms which involve adjustments to the parameters of defined benefit (DB) and pay-as-you-go (PAYG) public pension systems, without changing their financing mechanisms. Systemic reforms move away from the PAYG DB- system and adopt a DC-type personalised accounts system - thus linking more strictly pension contributions to pension benefits.[6]

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5 This section briefly describes the main elements of the reform strategies adopted in the EU27 over the period 1997-2007. Information on pension reforms adopted in the EU27 in the years 2000 to 2007 is taken from the LABREF database (http://ec.europa.eu/economy_finance/db_indicators/db_indicators8638_en.htm). For reforms enacted during the Nineties in the EU15, we used the Fondazione Rodolfo De Benedetti database, available at: http://www.frdb.org. Concerning Bulgaria and Romania, for the time being LABREF only covers the years 2003 to 2007. Missing information was mainly obtained from Disney, R. (2003), "Public Pension Reforms in Europe: Policies, Prospects and Evaluation", a number of ILO and ISSA papers, as well as the Joint Reports on Social Protection and Social Inclusion, 2007 and 2008 editions, and the Synthesis report on adequate and sustainable pensions 2006, all available at: http://ec.europa.eu/employment_social/spsi/index_en.htm

6 The distinction between parametric and systemic reforms is largely used by the international academic community, notably the IMF and the OECD (see, for instance, *Pensions at glance*, OECD, June 2007). The key parameters of DB pension schemes can be

*(continues)*

The majority of pension reforms adopted in last ten years were parametric, mainly strengthening the links between contributions and benefits (notably by extending the period over which earnings are taken into account for benefits' calculation) and stricter conditions for eligibility to first pillar defined-benefit pension schemes (notably through higher retirement ages). For example, the reference contribution period and wages used for the calculation of old-age pensions were extended in Finland in 2003; the annual pension accrual rates were also modified to discourage early exits from the labour market and to financially reward long working careers; it was also decided that starting from 2009 pensions would begin to reflect changes in average life expectancy.[7] In Finland and Sweden, greater flexibility was given to older workers to decide their retirement age (abolition of the general retirement age at 65). In Austria, the 2003 pension reform raised the retirement age to 65 for men (60 for women) starting from 2017, extended the assessment period for pension calculation gradually from 15 to 40 years and gradually reduced the accrual rate.[8] Finally, the reform of the public old age pension scheme introduced in Portugal in 2000 increased to 40 years the contribution period for a full pension for the private sector.[9] Other measures included changes in the taxation of contributions and benefits, or in the pension coverage, as well as the setting-up and development of mandatory and/or voluntary second- and third-tier pension schemes.

Almost all countries increased the statutory retirement age, the majority opting for a smooth transition towards higher retirement ages (Table 8). The age of eligibility to a state pension was progressively increased from 65 to 67 in Denmark, Sweden and Germany, in the latter with a very long phasing-in period. In the UK, the earliest age to take a pension was raised from 50 to 55 in 2004 and a default retirement age was fixed at 65 in 2005, with unjustified retirement ages below 65 years being prohibited. The retirement age was also progressively increased in the Czech Republic (2003) up to 63 years for men and childless women (women get one-year bonus per child varying between 59 and 62 years), in Hungary (1997) up to 62, Slovenia (1999) and Romania (2000). In Cyprus, the retirement age for civil servants was increased from 60 to 63, the same as in the private sector (where retirement ages range between 63 and 65). In Portugal it was raised from 60 to 65. The age at which women can receive a first pillar pension was equalised with men's age in most countries.

Pension reforms involved a systemic change in the financing of the insurance system in few cases only, notably leading to the conversion of pre-existing DB first pillars into notional defined contribution (NDC) public pension schemes (e.g., PL, SE),[10] or to the introduction of statutory

grouped into: *income measures* (ceiling or other restrictions on pensionable earnings; number of past salaries included in the calculation of the pension; revalorization mechanism for past salaries); *eligibility conditions* (statutory retirement age, minimum retirement age (for early retirement), minimum vesting period, contribution rate); *benefit formula*; (accrual rate; "reduction factors" for retirement prior or after the statutory retirement age; maximum replacement rates and/or pensions; minimum replacement rates and/or pensions; indexation mechanism for pensions). The main difference between DB and DC pension schemes lies in the sharing of risks for longevity between the current generation and future ones – *i.e.*, the shift to DC structure in systematic reforms implies greater risks for individuals.

[7] Germany, Finland and France introduced part-time work before the standard retirement age. In Sweden, individuals can continue working, taking a part-time pension and accrue additional unlimited pension rights. Gradual retirement was introduced in Luxembourg for the employees agreeing to switch from full-time to part-time work.

[8] One year later, the 2004 reform redesigned the calculation of pension benefits leading to a much stronger link between contributions and benefits, including a bonus/malus system for deferred/early retirement, and introduced a uniform pension law for all professions.

[9] In 2005, it was extended to employees in the public sector. The benefit formula was again significantly changed in 2007.

[10] In Poland, pre-existing defined-benefit PAYG pension scheme was replaced in 1999 by a three pillar system including a notional defined-contribution (NDC) first pillar linking contributions to future pensions, a second pillar that capitalises individual contributions and is mandatory for the younger generations, and a voluntary third pillar based on company plans or other savings vehicles. Following the shift of the public pension pillar from defined benefit to notional defined-contribution accounts, the pension benefits depend on contributions made, but the notional interest rate is set by government and the schemes remain pay-as-you-go-financed. Similar reforms were passed also in Sweden (1999), Latvia (1996) and Italy (1993, with very long implementation schedule).

funded pension schemes (e.g., HU, EE, LV, SK). Some countries (HU, SE, PL, LV, EE, LT and SK) switched part of the public defined-benefit pension system into funded defined-contribution schemes, where the pension depends on contributions and interest earned on them.

Systemic reforms were also introduced in countries that established state-supported second and third-pillar voluntary funded pension schemes, supplementing a gradual reduction of first-pillar pension levels (Germany in 2000) or promoted third pillar pension funds based on employees' own savings (France in 2003). Several countries encouraged supplementary pension schemes either through tax incentives or adjusting contribution rates in the direction of private and occupational schemes (e.g., HU, DE, NL) so as to promote the development of privately-managed, fully-funded occupational pensions. Similarly, the automatic transfer of the end-of-service allowance to occupational pension funds was decided in Italy in 2004.

The changes introduced In several countries were rather incremental building upon previous reforms dating in some cases from the early Nineties (e.g., Italy). Reforms generally involved the establishment of stronger actuarial links between benefits and contributions – mainly through longer contribution periods required for a full pension – and increased incentives for workers to retire later, notably by means of actuarial reductions for early pensions and increases in pension rights for deferred retirement.

With few exceptions (e.g., Slovakia), the major reforms in the new Member States were legislated in the 1990s (for instance, Poland, Estonia, Latvia, Lithuania and Slovenia). In some EU10 countries, recent reforms have increased the generosity of the system, for instance by introducing new early retirement schemes where they did not exist any more (e.g., in Lithuania, where the early retirement scheme was abolished in 1995 and re-introduced in 2004 for the long-term unemployed, the Czech Republic, where a new early-retirement programme in the steel industry was introduced in 2000) or by reinforcing them (e.g., in Hungary), to help absorb the shocks of ongoing employment restructuring and economic change.

To take better account of future demographic changes, a significant number of countries introduced a demographic adjustment in their first pillar pension formula linking pensions to changes in average life expectancy. This is a common feature of all countries having introduced systemic reforms, where pensions will in future automatically adjust to changes in life expectancy, but similar adjustment mechanisms have also been built into systems which have not undergone systemic reforms (e.g., with the reforms of 2003 and 2004 in France and Germany. Similar provisions have been introduced in DK, FR, AT, FI, LV, LT and, more recently, in PT (2007).

### *5.1 Discouraging early retirement...*

Early retirement benefits, which vary by country and usually by professional group depending on the nature of work, is the main reason for early exits from the labour market. They are often used as an instrument of employment policy, to artificially lower the unemployment rate of the elderly.

Reducing the generosity of early retirement pensions was a key component of all pension reform. To discourage early exits from the labour force, Member States have abolished early retirement schemes, substantially reduced their generosity and introduced bonuses in case of postponement of retirement for those extending their working lives (Table 8).

For example, as part of the 1999 pension reform, in Poland the "pre-retirement allowance" was discontinued in 2001, while the eligibility conditions for obtaining "pre-retirement benefits"

were made more stringent in 2004.[11] A comprehensive reform of the pre-retirement pension system was approved in France in 2003.[12] In Finland (2003-2004), the qualifying age for early old age pension was raised to 62 and the individual early retirement, available to people with reduced working capacity aged 60 to 64, was phased out. The early retirement pension for older long-term unemployed will be abolished in 2009.[13] Some early retirement schemes were suspended and abrogated in Portugal in 2005[14] and the conditions for accessing early retirement tightened in Czech Republic and Spain (2006). Germany, Hungary, Slovakia (2006) and Portugal (2007) cut early retirement benefits, raised the minimum contributory period to be eligible for an old-age pension and tightened the access to schemes open to unemployed. In Latvia, the possibility to early retire was abolished in 2008. The early retirement age was gradually raised in Austria in 2003, and the possibilities for early retirement will be phased out by 2017. In Germany (2004), the minimum entry age for early retirement on account of unemployment was increased from 60 to 63. The earliest age at which a private or occupational pension can be taken was also raised in those countries where this has an impact on the effective labour market exit age (e.g., UK, IRL). In Sweden (2000), early retired people were allowed to return to work while the tax advantages for early retirement were abolished in the Netherlands.

Working beyond the official retirement age was supported in many countries for instance with higher accrual factors – e.g., CZ, EE, LU, DE, EL, HU, PT, SI – or with the introduction of supplements for deferred public old-age pension (e.g., DK). Partial retirement was introduced in Germany (2001) and the UK (2004) and gradual retirement in France (2006). In this country, a new form of fixed-term contract for job seekers aged 57 or more was introduced in 2006, while the so-called "Deladande Contribution" – a tax to be paid by companies dismissing employees aged 50 years and over – was gradually phased out to improve the employability of older workers.[15] Incentive schemes for workers who decide to remain in the labour market after the official retirement age were decided in Italy, France, Spain and the UK.

## 6 An empirical evaluation of the effect of pension reforms on the older workers' participation rates in the short-term

The OECD has conducted an extensive research on the impact of policies and institutions on employment and unemployment in the OECD countries.[16] This work showed that high implicit taxes on continued work deter older workers from remaining in the labour market, while high

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[11] Both schemes had been introduced in 1994 to accompany employment restructuring in the waning branches and outdated sectors of national economy.

[12] The 2003 reform, which was embedded in the pension package known as the "Raffarin Act", included limiting fiscal incentives for pre-retirement schemes to physically demanding jobs and restructuring firms in financial distress; eliminating progressive early retirement; increasing the cost of company early-retirement schemes, placing restrictions on state-financed early retirement. Even so, employers may still require employees who have the right to a full pension to retire between the ages of 60 and 65 if the worker is covered by an early retirement scheme put in place before the reform came into force or if an extended sector-level collective agreement, providing for compensatory measures for such retirement, was reached before 1 January 2008. A number of sectors have taken advantage of this option for maintaining retirement before the age of 65.

[13] If people become unemployed at the age of 57, they will be entitled to the income-related daily unemployment allowance until the age of 65 if they have worked for five years during the previous 15. Those born before 1950 will be entitled to a daily unemployment allowance from the age of 55 until the age of 60; thereafter, early retirement and then full retirement will be still possible.

[14] Previously, workers in Portugal could qualify for early retirement benefits either at age 55 with 30 years of contributions or at age 58 if they were unemployed.

[15] The Deladande Contribution was introduced in 1987 to compensate for the removal of the administrative authorisation of redundancy but in practice obstructed the recruitment of people aged 50 years and older and transferred possible redundancies to employees who were soon to reach 50 years of age. The contribution will be phased out completely in 2010.

[16] Bassanini, A. and R. Duval (2006), "Employment Patterns in OECD Countries: Reassessing the Role of Policies and Institutions", OECD, Economics Department, Working Paper, No. 486, OECD Publishing.

statutory retirement ages have the opposite effect.[17] The characteristics of the old age-age public pension systems (e.g., standard retirement age, accrual rates) and other forms of income support (early retirement schemes) are found as the main determinants of the differences in the 55-64 participation rates across countries and over time (Blondall and Scarpetta, 1998; Duval, 2003).

In this section we verify the impact of pension reforms on the participation rates of specific groups of older workers with a difference-in-difference approach. This approach requires the identification of a specific policy intervention against which one should compare the difference in outcomes before and after intervention for a treatment and a control group. A source of spatial and temporal policy variation in the reforms carried out is necessary to estimate this effect.

We exploit the information available from LABREF and other sources (e.g., FRDB, MISSOC, etc.) to identify a chronology of reforms.[18] Reforms are classified in three categories. First, fundamental reforms are those systemic reforms that imply a change from defined benefits to notional defined contribution first pillar pension schemes or that transfer public pension savings partly to private funded schemes. To this category belong parametric reforms that entail a change in the eligibility conditions (e.g., statutory retirement age, years of contributions). These reforms are usually gradually phased in and imply long implementation lags. Second, measures that do not modify financing or eligibility conditions are deemed as non fundamental, namely those modifying the tax regime of contributions and pension benefits, indexation rules, or introducing second and/or third pension pillar gradually and on a voluntary basis. The third group gathers all measures implying phasing-out of early retirement schemes.

Figure 3 displays the cumulated number of fundamental, non-fundamental pension and early retirement reforms for the period 1990-2006. Three things emerge. First, an increasing number of countries introduced reforms that changed the philosophy of the system (fundamental reforms). As of 2006 nearly every European country, especially of the EMU (Table 6), had reformed its pension system. Second, starting from 2000, non-fundamental reforms are more frequent than fundamental or early retirement reforms. Third, early retirement reforms rare in the 1990s became more frequent in the early 2000s.

This rich variation in policies across countries and over time can be exploited to assess their effect on the older workers' participation rates. Each measure is considered a discrete event which occurred at a specific point time for each country. The value of a variable of interest after certain legislation has taken place is compared to its value before such a change occurred. To control for factors unrelated to specific policy intervention, the before-after comparison is evaluated against the average of a control group.

In the period under consideration almost all countries undertook a pension reform. The quasi-natural experiment framework requires that pension reforms are a source of exogenous variation with respect to shocks to the participation rates. Consistently with the common belief

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[17] A 10 percentage points cut in the implicit tax and a one-year increase in the standard retirement age are estimated to raise the employment rate of older workers by 1 and 0.6 percentage points, respectively.

[18] *LABREF* provides information on reforms enacted in various years by the 27 Member States. It is an inventory of labour market reforms jointly managed by DG ECFIN and the Economic Policy Committee. It is conceived as a tool to provide comprehensive description of qualitative features of the reform process, including the design of enacted reforms, their scope and durability. To date, the database covers the years 2000-2006 for the EU27. Information for the year 2007 will be made available to the public in April 2008. The database can be freely accessed at: http://europa.eu.int/comm/economy_finance/indicators/labref_en.htm. For a description of LABREF see *European Economy Research Letter* Vol. 1, issue 3 November 2007. As regards pension reforms LABREF provides information distinguishing policy measures in the area of Disability benefits, Early retirement schemes, Contributions , Coverage, Eligibility conditions, Level and tax treatment of pension reforms. For the years 2000-2006, the chronology of pension reforms is taken from LABREF. For the previous years the information draws on different sources (e.g., EIRO, MISSOC, NATLEX).

(Lindbeck and Persson), we assume that the main motivation for governments to undertake a pension reform is to achieve financial sustainability of social security rather than to offset trends in participation rates and in the retirement age.

Our sample covers 27 countries over the period 1990-2006.[19] To define our treatment group we identify as reform year the year in which a reform is enacted. When reforms of the same type are passed in two consecutive years we treat them as a single event; the average participation rate is taken as representative of the participation rate at the time of the reform. Similarly, if there are at most two years between two years of reforms we treat them also as one event. Our control group is made out of the remaining periods. Within both groups we compute the average change in the participation rate. Finally, the average change in the participation rate of the treatment group is compared with average participation rate for the control group. If a reform is successful, the difference between the participation rates of the two groups should differ from zero.

One way to detect this is to compare the change in the participation rate 1, 2 and 3 years after a pension reform has been implemented with the change in the participation rate in all periods but those that followed a reform. The change in the participation is modelled as follows: $\Delta PR_{i,t} = \alpha I_{i,t} + v_{i,t}$; $I_{it}$ equals 1 if country $i$ enacts a reform in period $t$ and zero otherwise. A similar expression holds for a country $j$ with $j \neq i$. The average change of the participation rate in reforming years relative to change of the participation rate in years of non reform can be written as follows:

$$\frac{\sum_{t}^{T}\sum_{i}^{I}\Delta PR_{i,t}}{IT} - \frac{\sum_{s}^{S}\sum_{j}^{J}\Delta PR_{j,s}}{JS} = \alpha$$

The reform in country $i$ is successful if $\alpha$ is statistically different from zero. We evaluate the effect of pension reforms comparing the average change in the participation rate after a pension reform with the average change of the participation rate over the sample period excluding those years where a reform occurred.[20]

For each target group, the first two columns of Table 1 to Table 3 report the average change in the participation rate over reforms and non-reforms years; the statistical significance of their difference appears in column 3.[21] Table 1 suggests that compared to the non-reform years the participation rate of the 50-54 and 60-64 age groups rise significantly in the years near to the reform year. Conversely, no significant change is detected for the participation of those belonging to the 55-59 age group. While fundamental reforms do not have significant effect on the participation rates in the years just following the enactment of the reform, probably because of the gradual phasing-in (Table 2), parametric reforms entail a change in the participation rate of those with age between 55 and 59.

Figure 4 shows the time pattern of the participation rate around the reform event for the three reforms' types and the three age groups. We consider only those reforms that are followed at least by one year; hence, measures taken in 2006 are excluded from the sample. Next, in order to select the reform years we treat two consecutive periods of reform as a one reform year. The same rule

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[19] Since data on participation rates from European LFS Statistics are not available for all years for all countries the panel is unbalanced.

[20] In contrast, we do not look at the effect on the participation rate of changes in one specific element of the system (*i.e.,* contributions, eligibility conditions, retirement age, indexation formula, and the like). We leave this for future work.

[21] Since it may take some time for a pension reform to have visible effects on the participation rate, we calculated the average change in the participation rate over a period of 6 years following a pension reform.

applies for years once there are at most two years between two years of reforms. Consequently, the participation rate in the selected years is calculated as a simple average in these years.

The figure plots the average change in the participation rate compared with the year in which the reform occurred. Hence, each point represents the cumulated change up to and since the enactment of the reform. A successful reform implies a change in the slope in the years that follow. Before the pension reform, all groups have participation rates lower than or as big as the rate observed in the year when it is enacted. Then the participation rate increases, and after 3 years it is on average 5 percentage points higher than at the year of enactment.

Figure 4 shows the cumulated change of the participation rates before and after the enactment of early retirement, fundamental and non-fundamental reforms.[22] The following points are noticeable:

- the increase in the participation rate is mainly due to the female component, with increases dominated by a long-term trend,
- after early retirement reforms, the participation rate of women aged 55-59 slightly accelerates, while the profile of the men rate is more muted,
- the change in the participation rates of the oldest group barely differ by gender,
- the 50-59 male participation rate changes after early retirement reforms,
- non-fundamental reforms modifies the 55-59 participation rate,
- the profile of participation rates does not change when fundamental reforms are enacted, which is consistent with these reforms being usually gradually phased in,
- the profile of female participation rate does not change in response to any type of reform. Yet, we don't consider this an evidence of their ineffectiveness as female participation is dominated by a long-term trend unrelated to reforms of social security.

These findings are suggestive of a positive impact of early retirement reforms on the participation rate of specific groups of older workers. The different response for the male and female rates is consistent with differences in the elasticity of the labour supply to the implicit tax rates and in the length of working careers and years of contribution to social security. Thus, tightening the access to early retirement would induce women to postpone retirement.

Of course, participation rates also change in response to the business cycle. In line with the cyclical ups and downs, those out of the labour force may be induced to starts searching actively for a job when they perceive that their employment chances have improved. Similarly, unemployed people may stop searching for a job when their employment prospects weaken and leave the labour force (the so-called discouraged worker effect). Thus, controlling for the state of the economy is necessary to identify the effects of pension reforms on the participation rate. Finally, the participation behaviour is influenced by changes in the socio-economic aptitudes towards work of the elderly, not necessarily related to governments' interventions. The fact that participation rates can be influenced by other factors invites shifting to multivariate analysis.

Before proceeding with the analysis an important caveat is needed. Short-term changes in the participation following a pension reform, as the one considered in this paper, tell nothing about the lags needed for a reform to fully influence the retirement decision and the participation rate. Pension reforms, especially fundamental, are gradually phased in and their impact may become visible only after some years, when an increasing number of cohorts born over successive years start to be under the new regime. Therefore, the expected gains of pension reforms cannot always

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[22] We consider only those reforms that are followed at least by one year; hence, measures taken in 2006 are excluded from the sample. In addition, when one reform is followed within four years by another reform of the same type, we consider in the calculation only the three years preceding and following the first reform.

be perceived immediately and their short-run effect is uncertain. Moreover, due to the gradual phase in, it is unlikely that the oldest generations would change their retirement behaviour because of the reform. In contrast, those aged between 50 and 54 are more likely to revise their inter-temporal consumption/leisure allocation. In general, when a reform is announced, agents may respond with "imperfect" foresight when two dimensions of uncertainty, namely the timing and the measures adopted to reform the system, prevail (Butler, 1999). Finally, early retirement and non-fundamental reforms may have shorter implementation lags, and their effects can be more visible in the short-term. However, delay between announcement and enactment creates in general the possibility for agents to reassess how the reform will affect their incentive to retire prior to the effective implementation of the new regime (Santoro, 2006).[23] Thus, the effects of the reforms in the short-term are highly uncertain and depend on how different cohorts react to current or perspective changes in the rules of the social security system. For example, for those relatively far from the statutory retirement age, any change in their participation rate due to the reform would be induced by an announcement effect.

### *6.1 Econometric methodology*

To capture the effect of reforms we estimate a reduced form regression for the participation rate:

$$\begin{aligned} PR_{it} = {} & \alpha_i + \mu_t + \theta_1 trend_{it} + \theta_2 trend_{it} \cdot SEX_i + \\ & \beta_1 FUN_{it} + \gamma_1 NONFUN_{it} + \delta_1 ER_{it} + \\ & \beta_2 FUN_{it} \cdot SEX_i + \gamma_2 NONFUN_{it} \cdot SEX_i + \delta_2 ER_{it} \cdot SEX_i + \varepsilon_{it} \end{aligned}$$

where $PR_{it}$ is the participation rate for different age groups in country $i$ at time $t$; $\alpha_i$ and $\mu_t$ are fixed effects for countries and years respectively, $SEX_i$ is a dummy equal to 1 for women and 0 for men; $ER_{it}$, $FUN_{it}$ and $NONFUN_{it}$ are dummy variables taking the value 1 if a reform occurs in country s at time $t$ and zero otherwise. $\gamma$, $\delta$ and $\eta$ is the mean difference between countries that undertook a reform of one of the three types and those that didn't. In practice we compare the participation rate in countries enacting a pension reform in a given year with the participation rate in countries that did not enact a pension reform controlling for other (non-reforms factors) that may influence participation. The unemployment rate $u_{st}$ captures the cyclical components of unemployment while long-term changes are represented by country/gender specific trends.[24]

The reference group in the equation is men. Thus $\alpha_i$ represents the average (over time) activity rate of male in country $i$. Since a reform may imply different effects on the implicit tax rate and pension wealth of groups with different working histories, we expect a response that differs across age groups and gender. The interaction between SEX and the reforms dummies would capture this differential effect. Including interaction of this sort is also convenient when treated and control group are very similar and/or the treatment and the control group differ along other dimension of the data, in our case sex; it may also remove trends along these dimensions (Meyer, 1995). To account for lagged effect of enacted reforms we introduced the reform dummies up to 3 lags (*i.e.*, 3 years).

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[23] Santoro finds unintended announcements effect of the Italian pension reform of September 1992. Santoro, M.M. (2006), "Early Announcements of a Public Pension Reform in Italy", CBO WP-1.

[24] We tried specifications with different combinations of common and country specific trends. In light of the strong institutional characteristics of European labour markets we preferred to include country and gender/ specific trends Results are available from the authors.

The use of fixed effects allows controlling for unobserved heterogeneity possibly correlated with the policy dummies. This happens when the participation rates and the decision to undertake reforms of any type are correlated. Under these circumstances the fixed effect estimator is consistent and unbiased. In addition to a country specific unobserved component, there can be a common latent factor which influences both the participation rate and the reform dummy. This happens when exogenous trends in participation rates (e.g., increase in level of education or female participation) make a reform of the pension system more likely (for example, because there is stronger support for reforming the pension system when the participation rate is low rather than high). In this case the fixed effect estimator is inconsistent and inefficient (Coakley, Fuertes and Smith, 2004). Conversely, the two-way fixed effects provide consistent and efficient estimates. In our case, the inclusion of period dummies would absorb all the values of the coefficients of the reform dummy making them not significant. To avoid this we account for unobserved common factors with a time trend, which is equivalent to controlling for period effects when the coefficient of the trend variable is the same across countries.

The introduction of lagged of the reform dummies control for possible correlation between these and the country specific effects. Finally, to control for the presence of common shocks hitting men and women in each country we correct standard errors using a robust covariance estimator according to the formula developed by Liang and Feger (1986)[25] across groups. We estimate the equation controlling for fixed effects and for fixed and time dummies.[26]

### *6.2 Results*

Before commenting the results, a note of caution is needed for the relatively limited number of observations and reforms events. Moreover, it is worth reminding that our analysis focuses only on the short-term impact of pension reforms, while in many countries these reforms are phased in only gradually.

The results highlight a different response of the participation rate across gender, age and country groupings (Table 9). Columns 1 and 2 show, respectively for the EU27 and the EMU, the estimates of the effects of pension reforms pooling data over the age dimension. The results for the full sample show an increase in the EU27 participation rate following a fundamental reform, though the coefficients are not statistically significant. Similar results are obtained for the male rate when estimates are limited to EMU countries; conversely, the effect on women is negatively signed, though statistically insignificant. In the case of non-fundamental reforms we have similar results for the EU27, *i.e.*, positive but insignificant. In contrast, the estimates for the EMU countries suggest that non-fundamental reforms increase the overall male rate, while the effect on female participation is ambiguous. Finally, reforms tightening the access to early retirement increase female participation, more in the EMU than in the non-EMU countries. Conversely, their effect on male participation is in EMU and non-EMU countries negative or insignificant.

Columns 3 to 7 display the outcome for three age groups. For early retirement reforms, we find a consistent pattern across different age groups of women. Reforms tightening the generosity

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[25] This is implemented in Stata with the cluster command. The clustering adjusts for correlations between the error terms over subgroups. In practice there are less independent observations standard errors should go up. If the error terms are not independent in a subgroup of observations (such as for the different time periods for a specific individual in a panel or, e.g., for observations that are spatially close) clustering avoids that common group errors generate too low standard errors (Moulton, 1990).

[26] Controlling for period fixed effects would imply that the estimated coefficients would capture all the effects of our reform dummies which are slowly time varying. Preliminary evidence based on ANOVA F-test suggests that for early retirement and non fundamental reforms there is more similarity in the number of reforms across time averages than across countries averages. The opposite occurs for the number of fundamental reforms with an average which is more similar across time than countries. This implies that the former types of reforms are enacted in a specific cluster of countries uniformly over time. Conversely the latter are enacted in specific years in a large set of member states.

of the early retirement schemes tend to increase the female participation rates, with statistically significant coefficients, especially for the ages close to the statutory retirement (55-59).[27] By contrast, the participation rate of men aged 50 to 59 is negatively affected by these reforms. Only in the case of men belonging to the 60-64 age bracket of the EMU sample, participation increases after early retirement reforms. In case of reforms that change the main financing characteristics of the pension system (fundamental reforms), we found a short-term negative impact on female participation rates in particular for the 55-59 and 60-64 age groups. In the case of men, the estimates suggest a positive response, in particular for those belonging to the 55-59 bracket. Those reforms that we have dubbed as non-fundamentals appear to be effective in raising the participation rate of men both in the EMU and non-EMU, though the coefficients are significant only for the EMU sample. On the contrary, women participation seems to fall in the short-term. However, the uncertainty associated to these results is higher probably due to "non-fundamental reforms" category being a residual gathering a range of diverse measures. Thus, the implicit assumption that these different measures have the same impact on the participation rate might not be valid. Finally, the impact of the early retirement reforms on women is in absolute terms always the largest. While for men, fundamental reforms seem to have the largest effect on the participation rate for the central age bracket.

One problem with these estimates is that shocks to the participation rate might also hit the variable used to capture its cyclical component, *i.e.*, the unemployment rate, implying that the coefficients measuring its impact on participation are biased downward – as the correlation between the shock and the unemployment rate is negative – and inconsistent. To correct for this endogeneity, the equation has been re-estimated with instrumental variables using the own lagged values of the unemployment rate as instruments (Table 10 and 11). As expected, the IV estimates of the coefficients of the unemployment rate are lower than the OLS estimates. Different specifications across countries and age groups suggest that the participation rate is broadly more sensitive to the unemployment in non-EMU countries. One exception is the participation rate of the group 50-54, which has a response to the difficulty of finding a job due to the cyclical conditions as big as in the rest of the EU.

Turning to the role of reforms, the IV estimation suggests for both the EU27 and the EMU sample, a statistically significant and positive effect of fundamental reforms on the overall male and female participation rates (col. 1). When the focus is on specific age groups the effect on the male and female participation rates are respectively positive and negative. For the EU27 sample, non-fundamental reforms have usually a positive effect on participation rate, which is, however, precisely estimated only in the case of women. Conversely, for the EMU countries non-fundamental reforms increase the male participation rate but decrease that of women of age between 55 and 59. Finally, reforms of early retirement reduce the participation rate of men, especially those aged between 50 and 54, but increase sizeably that of women.

To account for persistent trends in participation rates unrelated to pension reforms, we include gender and country specific time trends in equation (1). Adding trends usually turns out in a lower impact of reforms, implying that in the specification without trend the impact of reforms is biased upward, as part of these trends get caught in the reform dummies. Moreover, the fact the standard error of the coefficients measuring the impact of reforms remained unchanged suggests that the introduction of specific trends does not introduce multicollinearity that reduces the precision of the estimates.

Thus, when we control for gender and country specific trends, we find that:

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[27] The impact is larger in the EMU sample.

- fundamental reforms increase the participation rate of older men, respectively in the EU and the EMU sample, by about 2/3 of and ½ percentage point within 2 years. For both samples, the response of the male participation rate to fundamental reforms conditioned to age is hump-shaped: low for the youngest and the oldest of the older workers age group and high for those with age at about the average retirement age; participation rates of men aged between 55 and 59 raise by about 2 pp. Conversely, female participation declines in the short-term, more in EMU than in non-EMU countries, offsetting the overall effect of fundamental reforms;
- for the EU sample, non-fundamental increase the overall female participation rate (+0.7 pp in the year of reform), especially of women aged between 50 and 54, while the male rates remain mainly unaffected. The opposite is found when the estimates are restricted to the EU subsample. In this case, the male rate increase – again the 50-54 age group being the more reactive – while the female components remain mainly unchanged with the exception of women of age between 55 and 59 whose participation rate drops by more than 2.5 pp;
- early retirement reforms have a positive effect on the female participation rate, especially for the 55-59 age group of the EMU sample. Conversely, in respectively the EU and the EMU samples, the male participation rate drops or remains mainly unchanged.

## 7 Conclusion and policy implication

This paper investigates the short-term effects of pension reforms on the participation rates of specific age groups belonging to the 50-64 age class with a diff-in-diff approach. Variation across countries and time in pension reforms enacted in the member states provides the information needed to examine the effects of these reforms.

The descriptive and preliminary econometric analysis conducted on a sample of 27 EU countries suggests a different short-term impact of pension reforms on the participation rate of men and women. Reforms tightening the access to early retirement have a short-term positive effect on the female participation rate, but reduce somewhat male participation. In our view, these findings reflect the different length of working life of men and women. A full pension is usually granted to anyone who has been working for a certain number of years. If someone does not reach the statutory number of working years, his or her pension is consequently reduced. When men enter the labour market, they tend to have more stable career path than women and to work continuously until retirement age (e.g., Hall, 1982). By the official retirement age, males have worked a sufficient numbers of years to get a full pension. As long as the pension reform reduces the expected lifetime income, it creates an incentive for those that have accumulated enough financial wealth to retire earlier. Thus, the optimal retirement age is defined as the upper threshold such that is never optimal to retire after that age as lifetime income is downward sloping (Heijdra and Romp, 2007). Following the announcement of a reform that makes less generous the pension system, men just below the retirement age may find more convenient to anticipate the exit decision, not to miss a generous pension. These findings suggest the risk of a run on pension funds well before the changes take effect. This has been indeed the case following the announcements of restrictions of early retirement in some EU Member States, according to the 2009 Commission working document "Joint Report on Social Protection and Social inclusion".

Conversely, women have more career interruptions than men, especially because of maternity leave and family reasons, and the number of years spent working at the age of retirement is smaller than men. This difference may explain why the female participation rate raises in response to early retirement reforms. Compared to men, women have to reach a reasonable pension or accumulate a sufficient amount of precautionary savings before being able to retire with (not too large) drop in consumption. The effects are stronger in the EMU than in the non-EMU countries.

The results for non-fundamental reforms are more uncertain. The positive effect of non-fundamental reforms for men is not surprising. These reforms usually adjust upwards the contribution rates, implying a lower net wage. If the substitution effect prevails, an individual prefers to work more. There is an additional motive for working more, which is related to the increasing life expectancy. Because of a longer life span an individual needs to work more in order to accumulate sufficient amount of wealth. As the real wage drops, he/she needs to work more to reach an intended level of consumption during the retirement age.

In contrast, reforms that change the way of financing pensions or the eligibility conditions (fundamental reforms), usually with long phasing-in periods, may have unintended short-run effect on the female participation rate, especially of EMU countries.

Our findings point at the importance of designing pension reforms and strategies to reform social security that reduce the risks of undesired effects on the decision to remain into the labour market. There is plenty of evidence that workers' information about pension rules and uncertainties about long transition periods may influence in the short-term the retirement decision in a way which is not consistent with the intended effects of the reform. While transitory periods may be needed to gain the political support for the reforms, long and reiterated discussions on how to reform the social security system may add uncertainty and, if allowed by the rule in force, lead to anticipate the retirement decision even in cases where reforms involve future and not current older workers. Well-informed individuals are far more responsive to pension incentives, while ill-informed individuals seem to respond systematically to their misperceptions of pension incentives (Chan and Huff Stevens, 2008).

To buttress these results, we plan to extend the empirical analysis in five directions. First, in the regression, we control for the determinants of participation unrelated to reforms with country fixed effects, period dummies or a common trend. The evidence found needs to be corroborated by enlarging the set of controls to observable variables, such as self-employed, age of entry into the labour market, per capita income, share of employee working in the public sector. Second, to get an indication of the short-term effect of pension reforms on the retirement decision our result should be validated by similar finding for probability of withdrawing from the labour market. Third, to better study labour force dynamics in response to pension reforms we need to combine the cross-country policy variation with individual information on the labour market status. To use individual data from older workers' self-reported satisfaction to investigate the effect of pension reforms on their retirement decisions. Finally, in the estimate we do not take into account that for the retirement decision what matters is not the individual income but the family income. There is evidence for the US of a differential response to policy changes of men from one earner vs two earner households (Gustman and Steinmeier, 2008). Extending the analysis to the participation rates of married men and women might provide some hindsight on the different, and sometime puzzling, response of the male and female participation rates to pension that found in our estimates.

## TABLES AND FIGURES

**Table 1**

**Average Annual Change of the Participation Rate after Early Retirement Reforms' Years and Years where No Reforms Occur**

| | No Reforms' Years | Reforms' Years | *z*-test: Same Mean Changes |
|---|---|---|---|
| Participation rate 50-54 | 0.5 | 0.9 | **1.9** |
| Participation rate 55-59 | 0.7 | 0.9 | 0.6 |
| Participation rate 60-64 | 0.3 | 0.9 | **2.4** |

Source: Authors calculations on LABREF database; the difference between the participation rates of the no-reforms and reforms years is statistically different from zero at 5 per cent of confidence when the value of the *z*-test is above 2.

**Table 2**

**Average Annual Change of the Participation Rate after Fundamental Reforms' Years and Years where No Reforms Occur**

| | No Reforms' Years | Reforms' Years | *z*-test: Same Mean Changes |
|---|---|---|---|
| Participation rate 50-54 | 0.8 | 0.5 | –1.4 |
| Participation rate 55-59 | 0.7 | 0.9 | 0.4 |
| Participation rate 60-64 | 0.3 | 0.6 | 1.1 |

Source: Authors calculations on LABREF database; the difference between the participation rates of the no-reforms and reforms years is statistically different from zero at 5 per cent of confidence when the value of the *z*-test is above 2.

**Table 3**

**Average Annual Change of the Participation Rate after Non-fundamental Reforms' Years and Years where No Reforms Occur**

| | No Reforms' Years | Reforms' Years | *z*-test: Same Mean Changes |
|---|---|---|---|
| Participation rate 50-54 | 0.6 | 0.5 | –0.4 |
| Participation rate 55-59 | 0.4 | 1.1 | 2.1 |
| Participation rate 60-64 | 0.2 | 0.5 | 1.2 |

Source: Authors calculations on LABREF database; the difference between the participation rates of the no-reforms and reforms years is statistically different from zero at 5 per cent of confidence when the value of the *z*-test is above 2.

**Table 4**

## Life Expectancy at Birth

| Year | Belgium | Bulgaria | Czech | Denmark | Germany | Estonia | Ireland | Greece | Spain |
|---|---|---|---|---|---|---|---|---|---|
| 1980 | 73.3 | 71.1 | 70.4 | 74.7 [1] | 73.1 | 70.6 [2] | 73.3 [3] | 75.3 | 75.4 |
| 1990 | 76.2 | 71.2 | 71.5 | 74.9 | 75.4 | 69.9 | 74.8 | 77.1 | 77 |
| 2006 | 79.5 | 72.7 | 76.8 | 78.4 | 79.9 | 73.1 | 79.7 | 79.5 | : |

| Year | France | Italy | Cyprus | Latvia | Lithuania | Luxembourg | Hungary | Malta | Netherlands |
|---|---|---|---|---|---|---|---|---|---|
| 1980 | : | 75.6 | : | : | 70.5 | 74.7 [4] | 69.1 | 70.4 | 76.5 [6] |
| 1990 | 77 | 77.2 | : | : | 71.5 | 75.7 | 69.4 | 77 [5] | 77.1 |
| 2006 | 81 | 81 [5] | 80.6 | 70.9 | 71.1 | 79.4 | 73.5 | 79.5 | 80 |

| Year | Austria | Poland | Portugal | Romania | Slovenia | Slovakia | Finland | Sweden | UK |
|---|---|---|---|---|---|---|---|---|---|
| 1980 | 72.7 | : | 71.5 | 69.2 | : | 70.4 | 74.5 [7] | 75.8 | : |
| 1990 | 75.8 | : | 74.1 | 69.9 | 73.9 | 71.1 | 75.1 | 77.6 | : |
| 2006 | 80.1 | 75.3 | 78.9 | 72.6 | 78.3 | 74.4 | 79.6 | 81 | : |

[1] 1986; [2] 1989; [3] 1985; [4] 1986 ; [5] 1994 ; [6] 1985, [7] 1985.
Source: Eurostat.

**Table 5**

## Average Exit Age

| Country | 1984-90 | 1991-99 | 2000-06 |
|---|---|---|---|
| Belgium | 58.5 | 59.6 | 60.2 |
| Denmark | 65.6 | 64.6 | 65.8 |
| Germany[1] | 61.5 | 60.8 | 62.7 |
| Greece | 62.7 | 63.4 | 63.2 |
| Spain | 63.2 | 62.3 | 63.3 |
| France | 59.6 | 59.3 | 59.8 |
| Ireland | 63.9 | 64.7 | 66.3 |
| Italy | 60.7 | 59.8 | 61.1 |
| Luxembourg | 62.3 | 58.9 | 60.8 |
| Netherlands | 60.3 | 60.7 | 63.2 |
| Austria [2] | | 58.3 | 61.4 |
| Portugal | 65.1 | 66.2 | 64.5 |
| Finland [2] | | 62.5 | 62.9 |
| Sweden [2] | | 65.4 | 65.7 |
| United Kingdom | | 62.3 | 64.3 |
| Cyprus | | | 67.9 |
| Czech Republic [3] | | 59.4 | 61.2 |
| Estonia [3] | | 65.8 | 67.6 |
| Hungary [4] | | 58.1 | 61.1 |
| Lithuania [5] | | 65.2 | 63.8 |
| Latvia [5] | | 61.4 | 67.1 |
| Malta | | | 60.1 |
| Poland [3] | | 59.6 | 58.7 |
| Slovakia [5] | | 57.4 | 59.1 |
| Slovenia [4] | | 61.1 | 62.7 |
| Bulgaria | | | 63.5 |
| Romania [6] | | 61.5 | 62.5 |

[1] 1985-1989; [2] 1996-1999; [3] 1998; [4] 1997-1998; [5] 1999; [6] 1998-1999.
Source: Commission services.

**Table 6**

**Number of Pension Reforms by a Type of a Reform and by a Country Group**

| | Fundamental | Non-fundamental | Early |
|---|---|---|---|
| EU27 | 56 | 87 | 37 |
| EMU | 36 | 55 | 26 |
| Non EMU | 20 | 32 | 11 |

Source: LABREF; FRDB Database.

**Table 7**

**Pension Reforms' Characteristics**

| Country | Modifying the Parameters of Existing DB Schemes | Introducing NDC Statutory Schemes | Introducing a Funded Tier in the Statutory Pension Scheme | Reforming Early Retirement | Developing Private Occupational or Personal Pension Provision | Other (e.g. Taxation, Contributions, Pension Coverage, Individualisation of Pension rights) |
|---|---|---|---|---|---|---|
| Belgium | | | | x | | x |
| Denmark | x | | | x | | x |
| Germany | x | | | x | x | x |
| Greece | | | | | | x |
| Spain | | | | x | x | x |
| France | x | | | x | x | |
| Ireland | | | | x | | |
| Italy | | x | | x | x | x |
| Luxembourg | | | | | | |
| Netherlands | | | | | | x |
| Austria | x | | | x | | x |
| Portugal | x | | | x | x | |
| Finland | x | | | x | | |
| Sweden | x | x | x | x | | |
| United Kingdom | x | | | x | | x |
| Bulgaria | x | | | | | x |
| Cyprus | x | | | | | |
| Czech Republic | x | | | x | | x |
| Estonia | | | x | | | |
| Hungary | x | | x | x | | x |
| Lithuania | x | | x | | | |
| Latvia | | x | x | x | | |
| Malta | | | | | | x |
| Poland | | x | x | x | | |
| Romania | x | | | | | x |
| Slovenia | x | | | | | |
| Slovakia | x | | x | x | | x |

Source: LABREF; FRDB Database.

**Table 8**

## Current and Proposed Retirement Policies by Country

| Country | Standard Retirement Age | | | Earliest Age to Access Old-age Pension |
|---|---|---|---|---|
| | Current | New Established by Reform and not yet Fully Implemented | Phasing-in Period | |
| BE | Men: 65<br>Women: 64 | Women: 65 | 2009 | 60 (with minimum 35 years career) |
| DK | Social Pension: 65 (67 for those who had reached the age of 60 on 1.7.1999)<br><br>Supplementary pension *(ATP)* : 67 | 1) Increase of the eligible age for pensions from 65 to 67<br><br>2) Increase of the eligible age for the voluntary early retirement scheme from 60 to 62 | 1) 2024-2027<br><br>2) 2019-2022 | Social Pension: 65<br><br>Supplementary pension *(ATP)* : Persons who reach the age of 60 after 1st July 1999 can retire between 65 and 67 |
| DE | 65 | 67, starting with those born in 1947. For all those born after 1964, the standard retirement age of 67 years shall apply. It will still be possible retire at the age of 65 years without pension reduction if minimum 45 years of compulsory contributions from employment and care and from child-raising periods up to the age of 10 of the child. | 2012 to 2029 | The age limit of 60 years* will be increased in monthly intervals as of 2006. From December 2008 the earliest possible age at which a pension can be claimed will be 63<br><br>Under certain circumstances, people will be able to retire after 2029 from the age of 63 but will then have to face a permanent cut in the pension of 0.3% per month of earlier retirement. Long-term unemployed will be obliged to take this early retirement option. The retirement age for disabled people will increase accordingly from the age of 63 to 65 years. |
| GR | *Persons insured before 1.1.1993* :<br>Men: 65<br><br>Women: 60<br><br>*Persons insured since 1.1.1993* :<br>Men: 65<br>Women: 65 | | | *Persons insured before 1.1.1993* :<br>Full pension: no age condition if 37 insurance years; from between 55 and 62 years for men (57 for women) depending on number of insurance years or working days eventually plus other conditions (e.g. mothers with a minor child, arduous and unhealthy work)<br>Reduced pension: From 65 years (men and women) if 3,500 insurance days (transitory regulation until 31.12.2008),<br>• from 53 to 60 years for men (55 years for women) depending on number of insurance years or working days plus other if relevant other conditions (e.g. arduous or unhealthy conditions, mothers with a minor or disabled child)<br><br>*Persons insured since 1.1.1993* :<br>Full pension: no age condition if 37 insurance years or 11,100 days; from 60 years for men and women if arduous or unhealthy work if 15 years of insurance or 4,500 working days; from 55 years for mothers with a minor or disabled child if 20 years of insurance or 6,000 working days<br>Reduced pension:<br>From between 55 and 60 years (men and women) if 35-15 insurance years or 10,500-4,500 days insured |

* 63 (or 60 for severely handicapped persons) after 35 years of pension insurance periods; 60 for women born before 1952 after at least 15 years of insurance, if compulsory contributions were paid for more than ten years since the age of 40; 60 for persons born before 1952 after at least 15 years of insurance if they were compulsorily insured for at least 8 in the last 10 years, are unemployed at the commencement of the pension and were unemployed for 52 weeks after completion of the age of 58.5 years or have worked part-time for elder workers for 24 calendar months.

**Table 8 (continued)**

## Current and Proposed Retirement Policies by Country

| Country | Standard Retirement Age | | | Earliest Age to Access Old-age Pension |
|---|---|---|---|---|
| | Current | New Established by Reform and not yet Fully Implemented | Phasing-in Period | |
| ES | 65 | | | 60 for those insured according to the system abolished on 1/1/1967); 61 for employees with more than 6 years of service in the company and more than 30 years of contributions.<br>The age of 65 can be reduced for certain groups whose professional activity is arduous, toxic, dangerous or unhealthy |
| FR | General scheme for employees: 60.<br>Complementary schemes for employees *(ARRCO)* and management staff *(AGIRC)* :<br>65, with possibility to obtain the pension at the age of 60 if the basic pension was accorded at a full rate | | | 56 for those that started their professional activity at the age of 14 depending on the duration of insurance and contributions<br>55 for the insured with severe disability who fulfils the minimum periods of insurance and contribution<br>55 for the complementary schemes for employees *(ARRCO)* and management staff *(AGIRC)* |
| IE | State Pension (Transition): 65 years<br>State Pension (Contributory): 66 years | | | No early pension |
| IT | Persons insured before 1.1.1996:<br>Men: 65 ; Women: 60<br>Persons with a disability of at least 80% and blind people: Men: 60; Women: 55.<br>Persons insured since 1.1.1996: Flexible retirement age between 57 and 65 years | | | As of 2008, 60 years of age with no less than 35 years of contributions in the case of employees, and 61 for the self-employed; the age limit is to rise by one year from 2010 and by an additional year from 2014, thus reaching 62 and 63 years for the employees and the self-employed, respectively. A further postponement of pension payments is envisaged with respect to the moment in which the requirements are met, there including workers under the contribution-based system. For the period 2008-2015, the possibility to receive a "seniority pension" under the requirements of previous legislation (at least 35 years of contributions and a minimum age of 57 for the employees and 58 for the self-employed) is provided only to women who choose a pension treatment calculated according to the contribution-based method.<br>Early retirement possible up to 5 years before normal retiring age for employees of companies in economic difficulties *(pre-pensionamento)*<br>Special conditions for employees with early start of working life; employees exposed to arduous work; persons benefiting from specific measures to return to the labour market because of a shut-down or reorganisation of the enterprise; and manual workers |
| LU | 65 | | | Between 57 and 60 on condition that 480 months of effective insurance or assimilated periods can be proved |
| NL | 65 | | | |
| AT | Men: 65<br>Women: 60 | Progressive increase of retirement age to 65 for women<br>Elimination of early retirement by 2017 | Between 2024 and 2033 | 62 for both men and women<br>60 years for heavy workers provided that they have worked heavily at least 10 years during the preceding 20 years, and have a total of 45 insurance years<br>Gradual increase of these age limits between 2004 and 2014 (gradual abolition of these types of early pension) plus life coefficient for persons having completed the age of 50 on 1/1/2005 and younger persons<br>Two more types of early pension for those having an extremely long insurance career or particularly hard working conditions |

**Table 8 (continued)**

## Current and Proposed Retirement Policies by Country

| Country | Standard Retirement Age | | | Earliest Age to Access Old-age Pension |
|---|---|---|---|---|
| | Current | New Established by Reform and not yet Fully Implemented | Phasing-in Period | |
| PT | 65 | | | Unemployed: 62 if they were aged 57 at the beginning of their unemployment and have completed the qualifying period; 57 for those who have contributed 22 calendar years and are aged 52 or more when unemployed (with reduced pension); 55 in case of heavy or unhealthy work |
| FI | National pension: 65<br>Statutory earnings-related pension: between 63 to 68<br>Lower individual retirement ages in the public sector | | | 62<br>Statutory earnings-related pension: permanent reduction in the early old-age pension by 0.6% for each month that the pension is taken early<br>National pension: is similarly permanent reduction by 0.4% |
| SE | Flexible retirement age from 61 to 67 | | | No early pension |
| UK | State Pension:<br>Men: 65; Women: 60 | Women: 65 | 2010 to 2020 | No early State Pension |
| BG | *First Pillar:* Men: 63 plus 100 points; Women: 59 plus 93 points<br>If a person has insufficient points the right to a pension shall be acquired after 15 years of insurance and 65 years of age for men and women<br>*Second Pillar:* 5 years before completion of pensionable age provided the amount saved in pensioner's individual account is sufficient to provide a benefit equal to the minimum pension | The age and number of points for women are increased each calendar year by 6 months and 1 point until they reach 60 years and 94 points | 2009 | 1) 47-52 for women and 52-57 for men plus minimum insurance period in the frame of the general statutory scheme with universal coverage. This regime is in force until 2009<br>2) Teachers pension fund<br>3) Supplementary compulsory pension insurance under the second pillar for early retirement of persons working under hard labour conditions |
| CY | 65 for men and women;<br>63 for miners | | | 63 for men and women, provided that the insured person satisfies the relevant contribution conditions and was entitled to invalidity pension immediately before reaching the age of 63<br>58 for miners with at least 5 years of employment in a mine (1 month early for every period of f5 months of mining work) |
| CZ | Men: 61 years and 8 months.<br>Women: no children 60 years, 1 child 59 years, 2 children 58 years, 3 or 4 children 57 years, 5 or more children 56 years | The retirement age shall be increased by 2 months for men and 4 months for women each year until it reaches 63 years for men and women without children and 59 – 62 years for women with children | | The pension is reduced by 0.9% for every 90 day period before normal retirement age. This reduction is permanent and continues after the recipient reaches normal retirement age |

**Table 8 (continued)**

## Current and Proposed Retirement Policies by Country

| Country | Standard Retirement Age | | | Earliest Age to Access Old-age Pension |
|---|---|---|---|---|
| | Current | New Established by Reform and not yet Fully Implemented | Phasing-in Period | |
| EE | Men: 63<br>Women: 60 | Women: 63 | 2016 | Early Retirement Pension: *a* vailable up to 3 years before legal retirement age<br>Old-age Pension Under Favourable Conditions: a) 5 years before standard pension age (after at least 15 years of contributions) for: raising a child with a disability for at least 8 years; raising 5 or more children for at least 8 years; those involved in the clean-up of the Chernobyl nuclear power station; those who have been unlawfully imprisoned or in exile for at least 5 years; b) 3 years before standard pension age for raising 4 children for at least 8 years; c) 1 year earlier for raising 3 children for at least for 8 years; c) 5 or 10 years before the legal retirement age (and 15 to 25 years of contribution) for workers in occupations that are considered hard or hazardous<br>Superannuated Pension: Early retirement available for certain professional groups (e.g. pilots, mariners) whose professional abilities have declined before the normal retirement age, provided they have 15-25 years of pensionable service depending on the profession<br>2nd pillar: No early pension before retirement age |
| HU | 1st and 2nd pillar: 62 | | | *1st pillar* : Early Retirement Pension to those involved in jobs allowing exemption by age (i.e. work involving increased physical load or hazardous to health): 2 years before normal retirement age for those who have worked in such activities for at least 10 years (men) or 8 years (women); pensionable age is further reduced by 1 year for every additional period of 5 years (men) or 4 years (women).<br>Advanced Pension: from the age of 60 for men and 5 years before the retirement age for women with long service period |
| LT | Men: 62.5<br>Women: 60 | | | 5 years maximum before retirement age, provided that beneficiaries have an insurance period of 30 years and have been are registered as unemployed for at least 12 months |
| LV | Men: 62<br>Women: 61 years by 1 July 2007 | Women: gradually increasing by 6 months every year until it reaches 62 | | 2 years before the standard retirement age men and women with an insurance period of not less than 30 years (preretirement pension - until 1st July, 2008) |
| MT | For persons born before 1/1/1952: Men: 61; Women: 60 (women given the option to retire at 61)<br>For persons born between 1952 and 1955: 62<br>For persons born between 1956 and 1958: 63<br>For persons born between 1959 and 1961: 64<br>For persons born on or after 1/1/1962: 65 | | | *For persons born before 1st January 1952: No early pension.*<br>*For persons born between 1952 to 1961:* 61 if 35 years of paid/credited weekly social security contributions<br>*For persons born on or after 1st January 1962:* 61 if 40 years of paid/credited weekly social security contributions<br>In all cases, those opting for early pension cannot be employed until 65 of age |

**Table 8 (continued)**

## Current and Proposed Retirement Policies by Country

| Country | Standard Retirement Age | | | Earliest Age to Access Old-age Pension |
|---|---|---|---|---|
| | Current | New Established by Reform and not yet Fully Implemented | Phasing-in Period | |
| PL | Men: 65<br>Women: 60 | | | 55 for women with a 30-year qualifying period;<br>5 years early pension for a) totally incapacitated persons if they fulfil the qualifying period requirements; b) persons working in unhealthy conditions or performing a specific type of work (e.g. journalist, rail workers)<br>10 years early pension for miners, persons working with lead, cadmium or asbestos, steel workers, pilots, etc.<br>15 years early pension for wind instrument musicians<br>Persons born since 1.1.1949: No provisions |
| RO | Men: 63 in 1st quarter of 2007<br>Women: 58 in 1st quarter of 2007 | Men: 65<br>Woman: 60 | 2014 | 1) Old-Age Pension with Reduced Standard Retirement Age: assortment of standard retirement age reductions for a) persons who contributed under special or difficult working conditions, b) persons who had a handicap prior to obtaining the insured person status, c) persons persecuted for political reasons, d) women with multiple births, e) other categories, defined by legislation.<br>2) Early Retirement Pension: maximum 5 years before standard retirement age to insured persons exceeding the full contribution period by minimum 10 years<br>3) Partial Early Retirement Pension: maximum 5 years before standard retirement age to insured persons exceeding the full contribution period by maximum 10 years |
| SI | Men: 63 in 2009<br>Women: 61 in 2008<br>(following gradual increase) | | | No special early pension.<br>Possibility of exceptions (no malus) in the case of retirement at the age of 58 provided that a person has completed 40 (men) or 38 (women) years of service |
| SK | Old-Age Pension: 62 | This level of retirement age will be reached in 2014 for all population groups | 2014 | *1 st Pillar:* No age limit. Early pension possible if minimum duration of membership (10 years) and minimum amount of benefit reached.<br>*2nd Pillar:* No age limit. Early pension is possible if the early pension of the 1st pillar is received and minimum amount of benefit reached |

Source: MISSOC Comparative Tables on Social Protection in the 27 Member States of the European Union, in the European Economic Area and in Switzerland, Situation as of 1 January 2007, available at: http://ec.europa.eu/employment_social/spsi/missoc_tables_en.htm#table2007; LABREF 2000-2007.

**Table 9**

## Estimated Change in the Participation Rate of Older Workers Following a Reform (Fixed Effect)

| Variable | (I) | (I EMU) | II | (II EMU) | III | (III EMU) | (IV) | (IV EMU) |
|---|---|---|---|---|---|---|---|---|
| *duf* | 0.1 | 0.1 | –0.4 | –0.0 | 1.0 | 1.3 | 0.2 | –0.4 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.4 | 0.4 |
| | | | ** | | *** | *** | | |
| *L.duf* | 0.3 | 0.2 | –0.2 | 0.4 | 0.7 | 0.9 | 0.7 | –0.1 |
| | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.5 | 0.6 |
| | | | | | *** | *** | | |
| *L2.duf* | 0.3 | 0.5 | –0.0 | 0.7 | –0.1 | 0.4 | 0.9 | 0.7 |
| | 0.3 | 0.2 | 0.2 | 0.3 | 0.5 | 0.5 | 0.6 | 0.6 |
| | | ** | | *** | | | *** | |
| *L3.duf* | 0.2 | 0.2 | –0.3 | 0.2 | –0.2 | –0.1 | 0.9 | 0.6 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.5 |
| | | | | | | | ** | |
| *dunf* | 0.1 | 0.4 | –0.0 | 0.4 | 0.4 | 0.5 | 0.1 | 0.2 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 0.3 |
| | | ** | | ** | | | | |
| *L.dunf* | 0.1 | 0.3 | 0.1 | 0.4 | 0.5 | 0.7 | –0.1 | –0.2 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 0.3 |
| | | *** | | ** | | *** | | |
| *L2.dunf* | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | –0.1 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.4 | 0.3 |
| *L3.dunf* | 0.1 | –0.0 | –0.3 | –0.2 | 0.3 | –0.0 | 0.4 | 0.1 |
| | 0.2 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 0.3 |
| | | | ** | | | | | |
| *duer* | –0.4 | 0.2 | –0.5 | –0.0 | –0.0 | –0.2 | –0.7 | 0.9 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 0.3 |
| | ** | | ** | | | | ** | *** |
| *L.duer* | –0.3 | 0.1 | –0.4 | –0.2 | –0.5 | –0.7 | 0.1 | 1.2 |
| | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.3 | 0.4 |
| | | | *** | | *** | *** | | *** |
| *L2.duer* | –0.2 | 0.0 | –0.6 | –0.4 | –0.3 | –0.7 | 0.3 | 1.2 |
| | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.3 | 0.4 |
| | | | ** | | | *** | | *** |
| *L3.duer* | –0.3 | –0.2 | –0.6 | –0.3 | –0.5 | –0.9 | 0.2 | 0.9 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.3 | 0.4 |
| | | | ** | | | *** | | ** |
| *duf_Women* | 0.1 | –0.2 | 0.6 | 0.5 | –1.2 | –1.7 | –0.9 | –0.0 |
| | 0.3 | 0.4 | 0.3 | 0.4 | 0.7 | 0.8 | 0.5 | 0.6 |
| | | | *** | | | ** | *** | |
| *L.duf_Women* | 0.1 | –0.4 | 0.1 | –0.3 | –0.5 | –1.8 | –1.4 | –0.7 |
| | 0.4 | 0.4 | 0.4 | 0.5 | 0.8 | 0.9 | 0.6 | 0.7 |
| | | | | | | ** | ** | |
| *L2.duf_Women* | 0.4 | –0.1 | –0.1 | –0.4 | 0.3 | –0.5 | –1.1 | –0.6 |
| | 0.4 | 0.4 | 0.4 | 0.4 | 0.9 | 0.9 | 0.7 | 0.8 |
| *L3.duf_Women* | 0.4 | –0.1 | 0.1 | –0.3 | 0.1 | –0.2 | –1.2 | –0.5 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.7 | 0.7 | 0.6 | 0.6 |
| | | | | | | | ** | |
| *dunf_Women* | 0.1 | –0.3 | 0.3 | –0.3 | –0.4 | –0.6 | –0.6 | 0.0 |
| | 0.3 | 0.2 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 0.4 |
| *L.dunf_Women* | 0.1 | –0.5 | 0.4 | –0.2 | –0.8 | –1.6 | –0.8 | –0.6 |
| | 0.3 | 0.3 | 0.3 | 0.3 | 0.7 | 0.6 | 0.6 | 0.5 |
| | | *** | | | | ** | | |
| *L2.dunf_Women* | 0.2 | –0.4 | 0.5 | –0.1 | –0.3 | –1.1 | –0.6 | –0.2 |
| | 0.4 | 0.3 | 0.4 | 0.4 | 0.8 | 0.6 | 0.6 | 0.5 |
| | | | | | | *** | | |
| *L3.dunf_Women* | 1.0 | 0.6 | 0.9 | 0.1 | 0.4 | 0.2 | –0.1 | –0.0 |
| | 0.3 | 0.2 | 0.4 | 0.3 | 0.7 | 0.6 | 0.5 | 0.4 |
| | *** | *** | ** | | | | | |
| *duer_Women* | 1.0 | 0.9 | 0.5 | –0.4 | 1.3 | 2.1 | 1.6 | 0.4 |
| | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.8 | 0.5 | 0.4 |
| | *** | *** | | | ** | *** | *** | |
| *L.duer_Women* | 0.2 | 0.5 | 0.2 | –0.4 | 0.7 | 1.5 | 0.8 | 0.5 |
| | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | 0.8 | 0.5 | 0.5 |
| | | | | | | *** | *** | |
| *L2.duer_Women* | 1.4 | 1.6 | 1.2 | 0.2 | 2.6 | 3.2 | 1.4 | 1.2 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 0.9 | 0.5 | 0.6 |
| | *** | *** | *** | | *** | *** | *** | *** |
| *L3.duer_Women* | 1.3 | 1.5 | 0.8 | –0.6 | 3.1 | 2.7 | 1.0 | 0.5 |
| | 0.4 | 0.4 | 0.4 | 0.4 | 0.7 | 1.0 | 0.5 | 0.7 |
| | *** | *** | ** | | *** | *** | *** | |
| *u* | –0.4 | –0.2 | –0.2 | 0.0 | –0.5 | –0.3 | –0.4 | –0.3 |
| | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 |
| | *** | *** | *** | | *** | *** | *** | *** |
| *_cons* | 50.4 | 43.5 | 68.3 | 59.0 | 50.7 | 44.1 | 27.0 | 21.7 |
| | 0.7 | 0.8 | 0.6 | 0.7 | 1.4 | 1.8 | 1.0 | 0.9 |
| | *** | *** | *** | *** | *** | *** | *** | *** |
| Number of observat. | 9379 | 5929 | 3756 | 2376 | 2504 | 1584 | 3119 | 1969 |
| Number of groups | 810 | 480 | 324 | 192 | 216 | 128 | 270 | 160 |

Note: Preferred specification takes into account both gender and country trends.
(I) and (I EMU) represent results for all age groups in case of all countries and EMU respectively.
(II) and (II EMU) represent results for age group 50-54 in case of all countries and EMU respectively.
(III) and (III EMU) represent results for age group 55-59 in case of all countries and EMU respectively.
(IV) and (IV EMU) represent results for age group 60-64 in case of all countries and EMU respectively.

**Table 10**

## Estimated Change in the Participation Rate of Older Workers Following a Reform (Unemployment Instrumented by Unemployment *t*–1)

| Variable | (I) | (I EMU) | (II) | (II EMU) | (III) | (III EMU) | (IV) | (IV EMU) |
|---|---|---|---|---|---|---|---|---|
| *duf* | 0.3 | 0.1 | 0.1 | 0.1 | 1.1 | 1.1 | 0.1 | –0.5 |
| | 0.2 | 0.3 | 0.2 | 0.3 | 0.4 | 0.5 | 0.4 | 0.4 |
| | | | | | ** | ** | | |
| *L.duf* | 0.3 | 0.1 | 0.1 | 0.3 | 0.8 | 0.9 | 0.3 | –0.5 |
| | 0.2 | 0.3 | 0.2 | 0.3 | 0.5 | 0.6 | 0.4 | 0.4 |
| | | | | | * | | | |
| *L2.duf* | 0.4 | 0.5 | 0.3 | 0.6 | –0.0 | 0.5 | 0.7 | 0.4 |
| | 0.2 | 0.3 | 0.2 | 0.3 | 0.5 | 0.6 | 0.4 | 0.4 |
| | | * | | ** | | | * | |
| *L3.duf* | 0.1 | 0.2 | –0.1 | 0.2 | –0.2 | –0.0 | 0.6 | 0.5 |
| | 0.2 | 0.3 | 0.2 | 0.3 | 0.4 | 0.5 | 0.4 | 0.4 |
| | | | | | | | * | |
| *dunf* | 0.2 | 0.4 | –0.0 | 0.5 | 0.1 | 0.5 | 0.2 | 0.3 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.3 | 0.3 |
| | | * | | ** | | | | |
| *L.dunf* | 0.1 | 0.3 | 0.0 | 0.5 | 0.1 | 0.7 | –0.1 | –0.2 |
| | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.3 | 0.4 |
| | | | | * | | | | |
| *L2.dunf* | 0.3 | 0.1 | 0.2 | 0.3 | –0.2 | 0.3 | 0.4 | –0.2 |
| | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.3 | 0.4 |
| *L3.dunf* | 0.0 | –0.0 | –0.4 | –0.1 | –0.2 | 0.0 | 0.4 | 0.2 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.3 | 0.3 |
| | | | * | | | | | |
| *duer* | –0.4 | 0.2 | –0.5 | –0.0 | –0.0 | 0.1 | –0.8 | 0.8 |
| | 0.2 | 0.2 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4 |
| | * | | * | | | | ** | ** |
| *L.duer* | –0.4 | –0.0 | –0.4 | –0.2 | –0.5 | –0.4 | –0.2 | 0.9 |
| | 0.2 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4 |
| | | | * | | | | | ** |
| *L2.duer* | –0.3 | –0.0 | –0.6 | –0.4 | –0.3 | –0.5 | 0.2 | 1.2 |
| | 0.2 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4 |
| | | | ** | | | | | *** |
| *L3.duer* | –0.3 | –0.2 | –0.4 | –0.2 | –0.4 | –0.7 | 0.0 | 0.7 |
| | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.6 | 0.4 | 0.4 |
| | | | | | | | | * |
| *duf_Women* | –0.3 | –0.1 | 0.0 | 0.3 | –1.0 | –1.7 | –0.4 | 0.4 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 0.8 | 0.5 | 0.5 |
| | | | | | | ** | | |
| *L.duf_Women* | –0.3 | –0.4 | –0.0 | 0.1 | –0.3 | –1.6 | –0.4 | 0.3 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 0.8 | 0.5 | 0.6 |
| | | | | | | ** | | |
| *L2.duf_Women* | –0.2 | –0.3 | –0.3 | –0.3 | 0.2 | –0.9 | –0.6 | 0.0 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 0.8 | 0.5 | 0.6 |
| *L3.duf_Women* | –0.0 | –0.2 | –0.0 | –0.2 | –0.0 | –0.5 | –0.7 | –0.3 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 0.8 | 0.5 | 0.5 |
| *dunf_Women* | 0.1 | –0.1 | 0.3 | –0.4 | 0.2 | –0.8 | –0.6 | –0.0 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 | 0.6 | 0.4 | 0.4 |
| *L.dunf_Women* | 0.1 | –0.2 | 0.6 | –0.2 | –0.2 | –1.7 | –0.4 | –0.3 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 | 0.7 | 0.4 | 0.5 |
| | | | ** | | | ** | | |
| *L2.dunf_Women* | 0.3 | –0.1 | 0.6 | –0.2 | 0.6 | –1.1 | –0.3 | –0.0 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.6 | 0.7 | 0.5 | 0.5 |
| | | | ** | | | | | |
| *L3.dunf_Women* | 0.7 | 0.3 | 1.0 | 0.0 | 0.9 | –0.0 | 0.2 | 0.2 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.6 | 0.7 | 0.5 | 0.5 |
| | ** | | *** | | * | | | |
| *duer_Women* | 0.6 | 0.2 | 0.4 | –0.3 | 1.1 | 1.5 | 1.5 | 0.4 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.7 | 0.8 | 0.5 | 0.6 |
| | ** | | | | * | * | *** | |
| *L.duer_Women* | 0.3 | 0.3 | 0.3 | –0.1 | 0.7 | 1.7 | 1.0 | 0.8 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.7 | 0.8 | 0.5 | 0.6 |
| | | | | | | ** | * | |
| *L2.duer_Women* | 0.7 | 0.5 | 0.7 | 0.1 | 1.7 | 2.7 | 1.2 | 0.9 |
| | 0.3 | 0.4 | 0.4 | 0.5 | 0.7 | 0.8 | 0.6 | 0.6 |
| | ** | | * | | ** | *** | ** | |
| *L3.duer_Women* | 0.4 | 0.1 | 0.1 | –0.6 | 1.6 | 2.3 | 1.0 | 0.6 |
| | 0.4 | 0.4 | 0.4 | 0.5 | 0.7 | 0.8 | 0.6 | 0.6 |
| | | | | | ** | *** | | |
| *u* | –0.3 | 0.0 | –0.2 | 0.0 | –0.5 | –0.4 | –0.4 | –0.2 |
| | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| | *** | | *** | | *** | *** | *** | *** |
| *_cons* | 47.8 | 41.0 | 67.6 | 59.1 | 48.1 | 44.9 | 25.8 | 20.8 |
| | 0.5 | 0.5 | 0.4 | 0.6 | 0.9 | 1.1 | 0.7 | 0.7 |
| | *** | *** | *** | *** | *** | *** | *** | *** |
| Number of observat. | 8992 | 5782 | 3600 | 2316 | 2400 | 1544 | 2992 | 1922 |
| Number of groups | 810 | 480 | 324 | 192 | 216 | 128 | 270 | 160 |

Note: Preferred specification takes into account both gender and country trends.
(I) and (I EMU) represent results for all age groups in case of all countries and EMU respectively.
(II) and (II EMU) represent results for age group 50-54 in case of all countries and EMU respectively.
(III) and (III EMU) represent results for age group 55-59 in case of all countries and EMU respectively.
(IV) and (IV EMU) represent results for age group 60-64 in case of all countries and EMU respectively.

**Table 11**

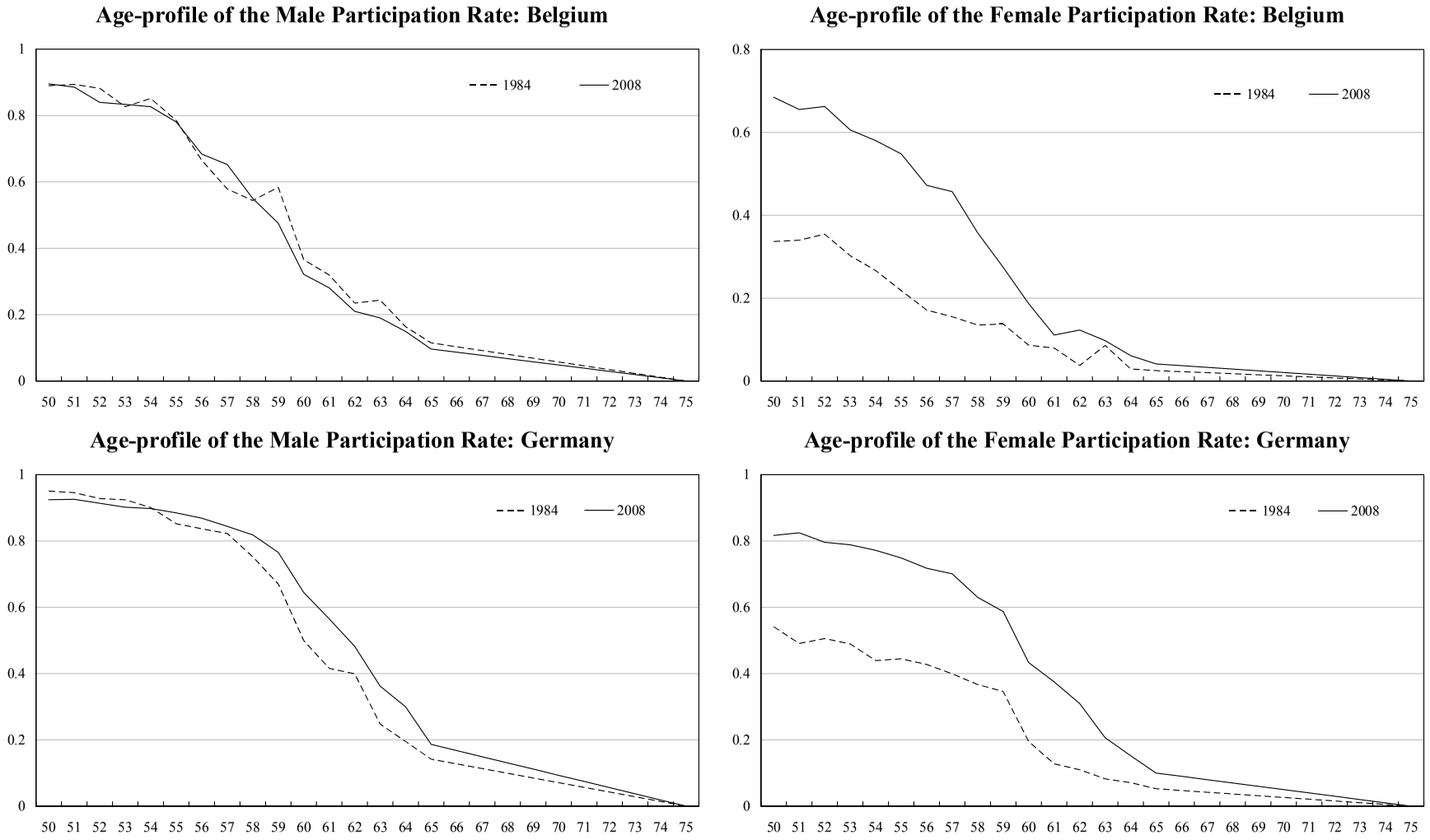
## Estimated Change in the Participation Rate of Older Workers Following a Reform (Unemployment Instrumented by Unemployment (*t*–1 and *t*–2)

| Variable | (I) | (I EMU) | (II) | (II EMU) | (III) | (III EMU) | (IV) | (IV EMU) |
|---|---|---|---|---|---|---|---|---|
| *duf* | 0.4 | 0.2 | 0.0 | –0.0 | 1.2 | 1.1 | 0.2 | –0.2 |
| | 0.2 | 0.2 | 0.2 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4 |
| | | | | | *** | ** | | |
| *L.duf* | 0.6 | 0.3 | 0.5 | 0.4 | 1.0 | 0.9 | 0.4 | –0.4 |
| | 0.2 | 0.3 | 0.2 | 0.3 | 0.5 | 0.6 | 0.4 | 0.4 |
| | *** | | * | | ** | | | |
| *L2.duf* | 0.4 | 0.4 | 0.2 | 0.3 | –0.0 | 0.5 | 0.8 | 0.6 |
| | 0.2 | 0.3 | 0.2 | 0.3 | 0.5 | 0.6 | 0.4 | 0.4 |
| | * | * | | | | | ** | |
| *L3.duf* | 0.2 | 0.2 | 0.0 | –0.0 | –0.3 | –0.0 | 0.7 | 0.6 |
| | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.4 | 0.4 |
| | | | | | | | ** | * |
| *dunf* | 0.2 | 0.4 | 0.1 | 0.4 | 0.2 | 0.5 | 0.3 | 0.4 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.4 | 0.3 | 0.3 |
| | | * | | | | | | |
| *L.dunf* | 0.2 | 0.3 | 0.1 | 0.4 | 0.3 | 0.7 | 0.1 | –0.1 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.3 | 0.3 |
| | | | | * | | | | |
| *L2.dunf* | 0.3 | 0.1 | 0.2 | 0.2 | –0.2 | 0.3 | 0.5 | –0.1 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.3 | 0.3 |
| *L3.dunf* | 0.1 | –0.1 | –0.3 | –0.2 | –0.2 | 0.1 | 0.4 | 0.1 |
| | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.3 | 0.3 |
| *duer* | –0.4 | 0.1 | –0.6 | –0.3 | 0.0 | 0.1 | –0.7 | 0.8 |
| | 0.2 | 0.2 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4 |
| | * | | ** | | | | * | ** |
| *L.duer* | –0.4 | –0.2 | –0.7 | –0.6 | –0.5 | –0.4 | –0.2 | 0.9 |
| | 0.2 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4 |
| | ** | | *** | * | | | | ** |
| *L2.duer* | –0.3 | –0.3 | –0.7 | –0.6 | –0.3 | –0.4 | –0.1 | 0.9 |
| | 0.2 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4 |
| | | | ** | * | | | | ** |
| *L3.duer* | –0.3 | –0.3 | –0.5 | –0.2 | –0.4 | –0.6 | –0.0 | 0.7 |
| | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.6 | 0.4 | 0.4 |
| | | | * | | | | | * |
| *duf_Women* | –0.1 | 0.1 | 0.1 | 0.6 | –1.4 | –1.8 | –0.5 | 0.1 |
| | 0.3 | 0.3 | 0.4 | 0.4 | 0.6 | 0.7 | 0.5 | 0.5 |
| | | | | | ** | ** | | |
| *L.duf_Women* | –0.1 | –0.2 | –0.3 | –0.0 | –0.5 | –1.8 | –0.6 | 0.1 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 0.8 | 0.5 | 0.5 |
| | | | | | | ** | | |
| *L2.duf_Women* | 0.5 | 0.6 | 0.2 | 0.5 | 0.7 | –0.1 | –0.2 | 0.3 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 0.8 | 0.5 | 0.6 |
| | * | * | | | | | | |
| *L3.duf_Women* | 0.4 | 0.2 | 0.0 | 0.1 | 0.3 | –0.4 | –0.8 | –0.3 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.6 | 0.7 | 0.5 | 0.5 |
| *dunf_Women* | –0.2 | –0.1 | 0.3 | –0.2 | 0.1 | –0.8 | –0.6 | –0.2 |
| | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.6 | 0.4 | 0.4 |
| *L.dunf_Women* | –0.2 | –0.3 | 0.6 | –0.1 | –0.2 | –1.6 | –0.5 | –0.4 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.6 | 0.7 | 0.4 | 0.5 |
| | | | ** | | | ** | | |
| *L2.dunf_Women* | 0.2 | –0.0 | 0.8 | 0.0 | 0.8 | –0.9 | –0.2 | 0.0 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.6 | 0.7 | 0.4 | 0.5 |
| | | | ** | | | | | |
| *L3.dunf_Women* | 0.8 | 0.3 | 1.0 | 0.2 | 1.1 | –0.1 | 0.3 | 0.3 |
| | 0.3 | 0.3 | 0.3 | 0.4 | 0.6 | 0.6 | 0.4 | 0.4 |
| | *** | | *** | | * | | | |
| *duer_Women* | 1.1 | 0.6 | 0.5 | 0.1 | 1.5 | 1.9 | 1.5 | 0.6 |
| | 0.3 | 0.3 | 0.4 | 0.4 | 0.6 | 0.7 | 0.5 | 0.5 |
| | *** | * | | | ** | *** | *** | |
| *L.duer_Women* | 0.8 | 0.7 | 0.5 | 0.4 | 1.0 | 2.1 | 1.1 | 0.9 |
| | 0.3 | 0.4 | 0.4 | 0.4 | 0.7 | 0.8 | 0.5 | 0.5 |
| | ** | ** | | | | *** | ** | |
| *L2.duer_Women* | 1.8 | 1.1 | 1.0 | 0.7 | 2.5 | 3.6 | 1.7 | 1.6 |
| | 0.3 | 0.4 | 0.4 | 0.5 | 0.7 | 0.8 | 0.6 | 0.6 |
| | *** | *** | *** | | *** | *** | *** | *** |
| *L3.duer_Women* | 1.3 | 0.2 | 0.2 | –0.5 | 1.7 | 2.4 | 1.0 | 0.6 |
| | 0.4 | 0.4 | 0.4 | 0.5 | 0.7 | 0.8 | 0.6 | 0.6 |
| | *** | | | | ** | *** | * | |
| *u* | –0.3 | 0.0 | –0.2 | 0.0 | –0.4 | –0.5 | –0.3 | –0.2 |
| | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| | *** | | *** | | *** | *** | *** | *** |
| *_cons* | 48.7 | 40.2 | 67.6 | 60.0 | 47.2 | 45.7 | 24.9 | 20.4 |
| | 0.4 | 0.6 | 0.5 | 0.6 | 0.9 | 1.1 | 0.7 | 0.7 |
| | *** | *** | *** | *** | *** | *** | *** | *** |
| Number of observat. | 8603 | 5633 | 3444 | 2256 | 2296 | 1504 | 2863 | 1873 |
| Number of groups | 810 | 480 | 324 | 192 | 216 | 128 | 270 | 160 |

Note: Preferred specification takes into account both gender and country trends.
(I) and (I EMU) represent results for all age groups in case of all countries and EMU respectively.
(II) and (II EMU) represent results for age group 50-54 in case of all countries and EMU respectively.
(III) and (III EMU) represent results for age group 55-59 in case of all countries and EMU respectively.
(IV) and (IV EMU) represent results for age group 60-64 in case of all countries and EMU respectively.

**Figure 1**

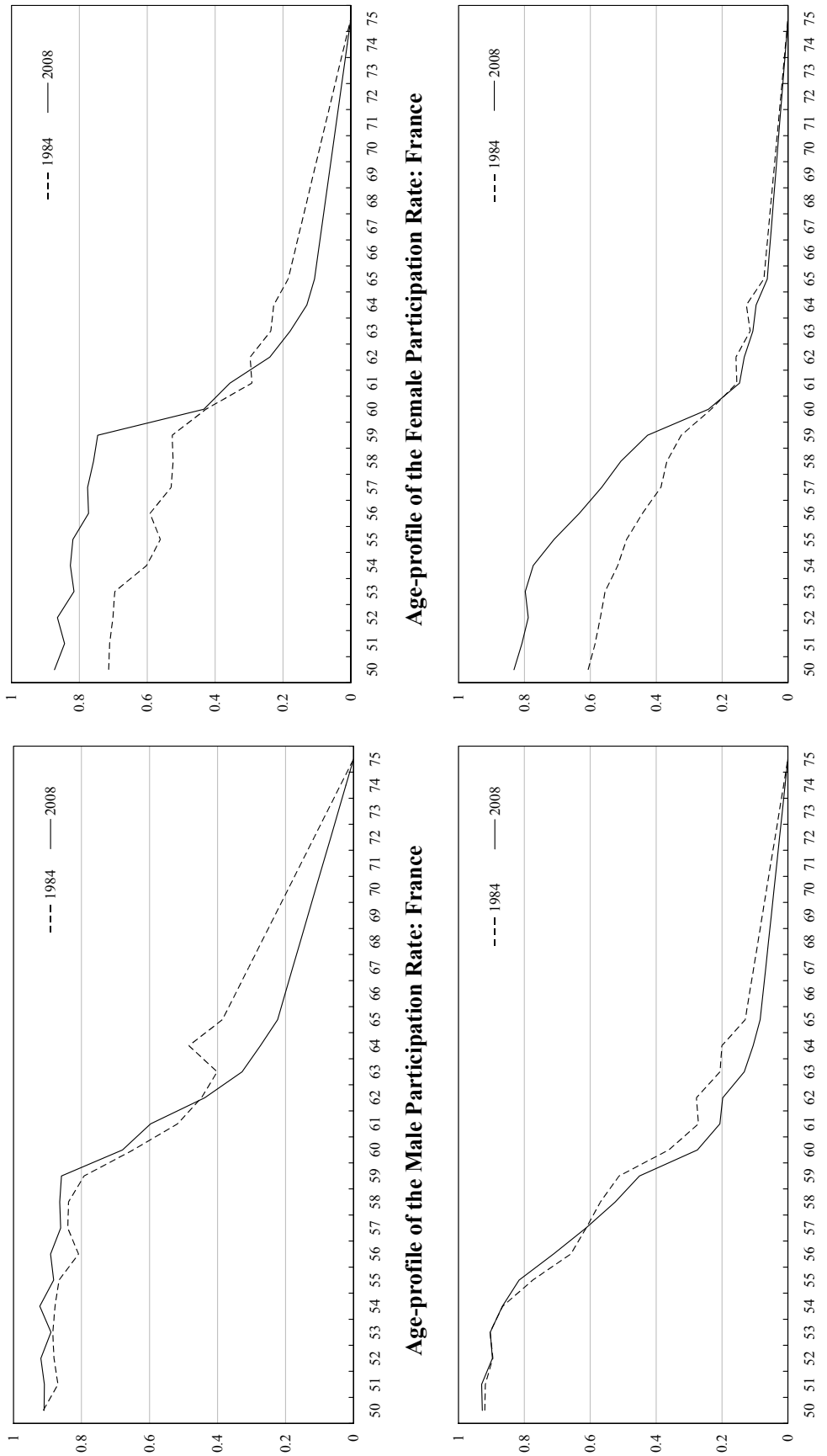
**Male and Female Age Profiles for Selected Countries**




Source: LFS.

**Figure 1 (continued)**

**Male and Female Age Profiles for Selected Countries**

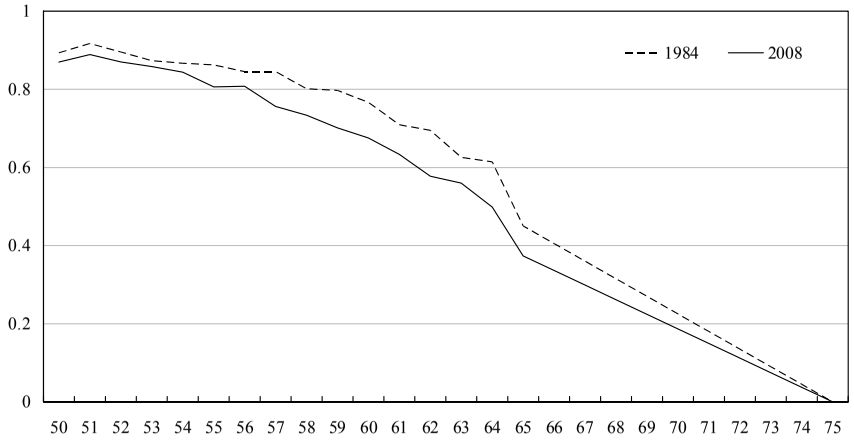



Source: LFS.

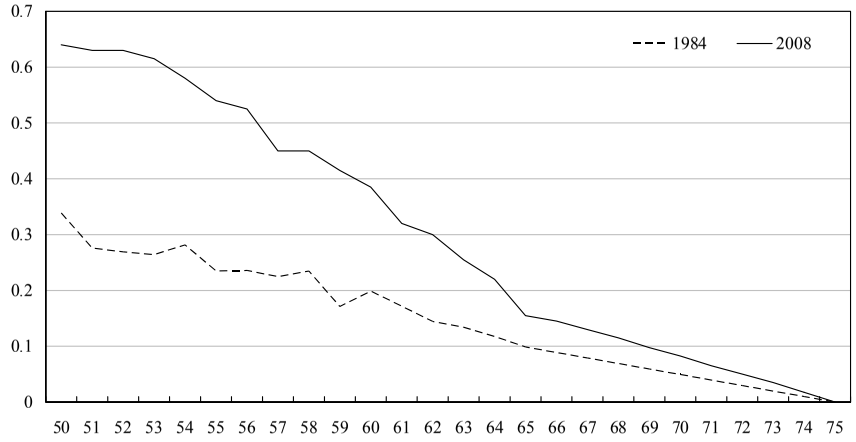
**Figure 1 (continued)**

**Male and Female Age Profiles for Selected Countries**

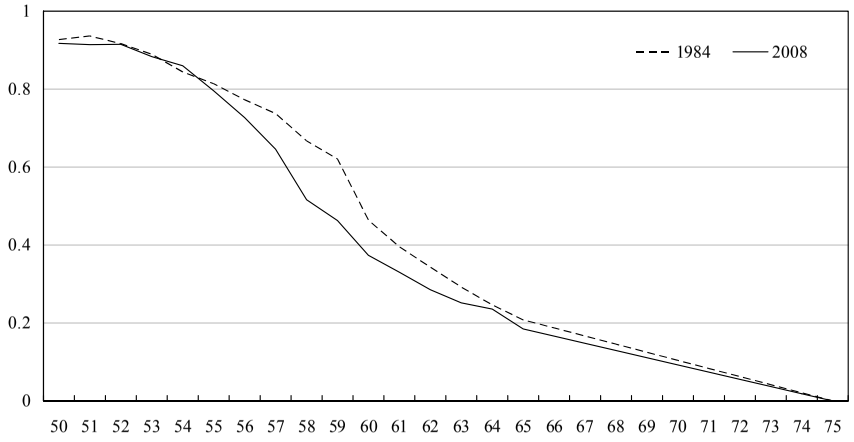
**Age-profile of the Male Participation Rate: Ireland**



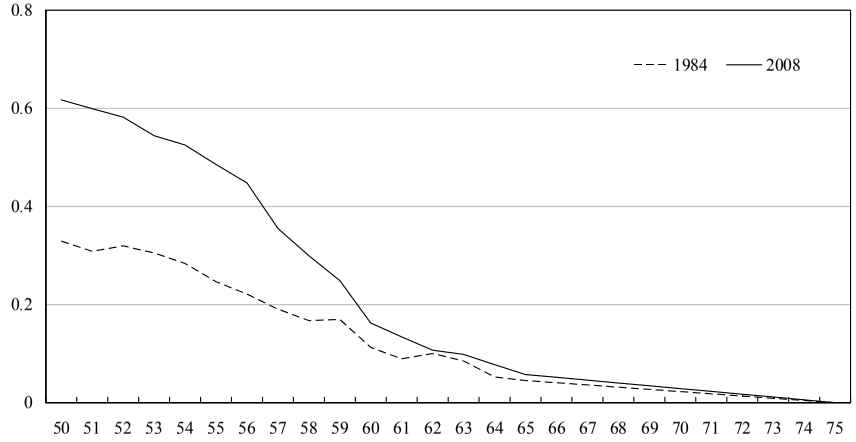

**Age-profile of the Female Participation Rate: Ireland**




**Age-profile of the Male Participation Rate: Italy**



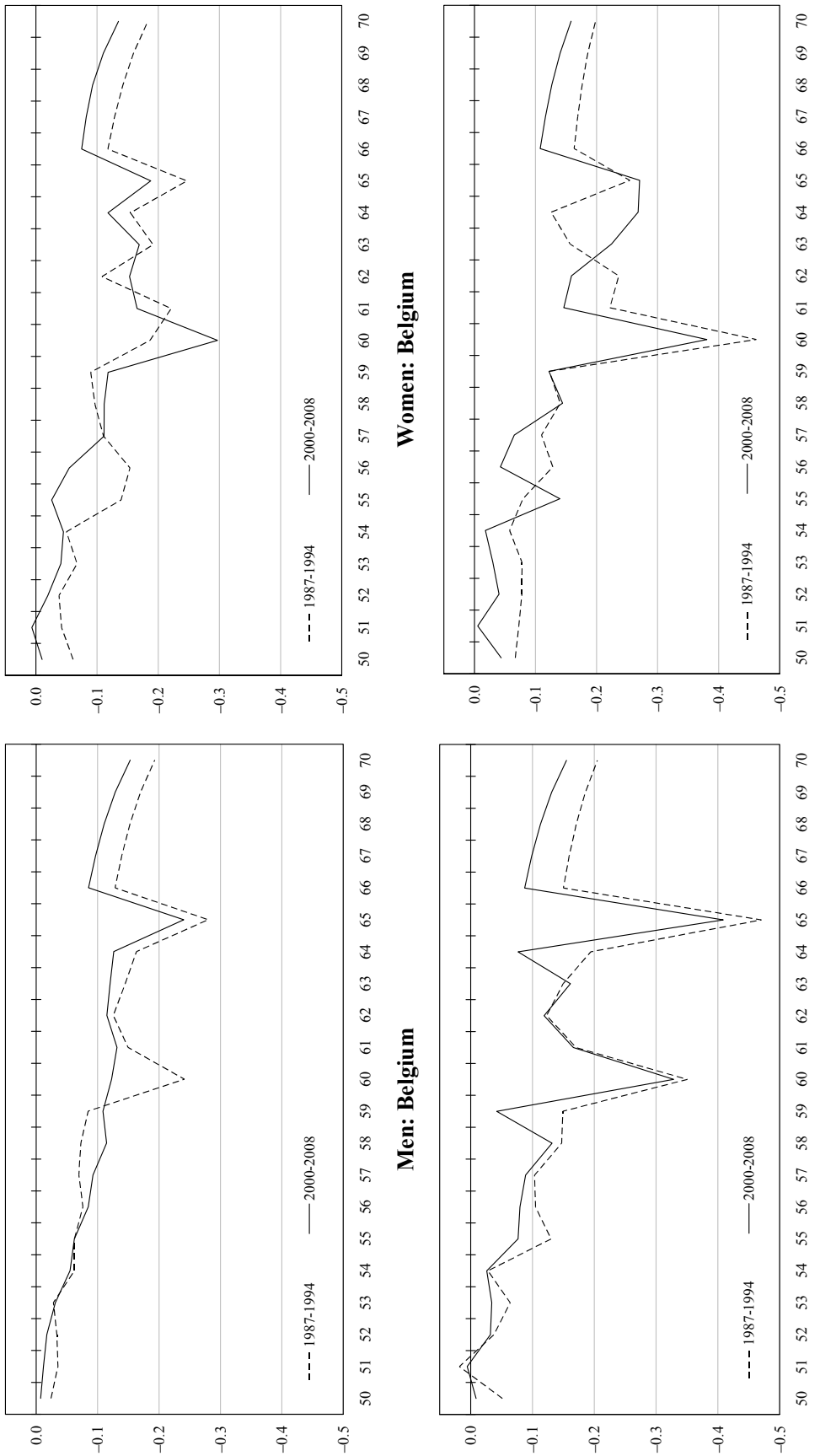

**Age-profile of the Female Participation Rate: Italy**




Source: LFS.

**Figure 2**

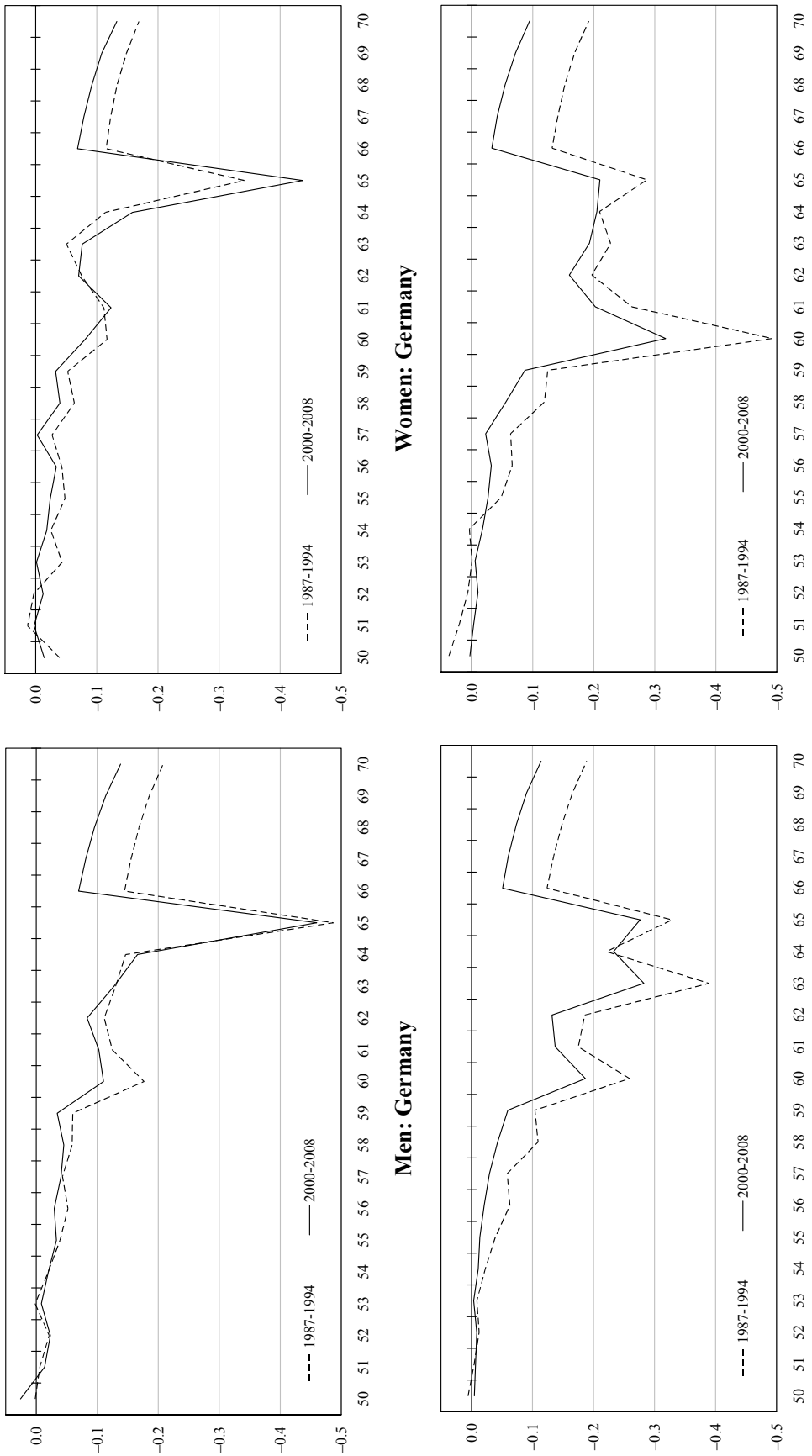
**Probabilities of Exiting in Selected Countries**




Source: LFS.

**Figure 2 (continued)**

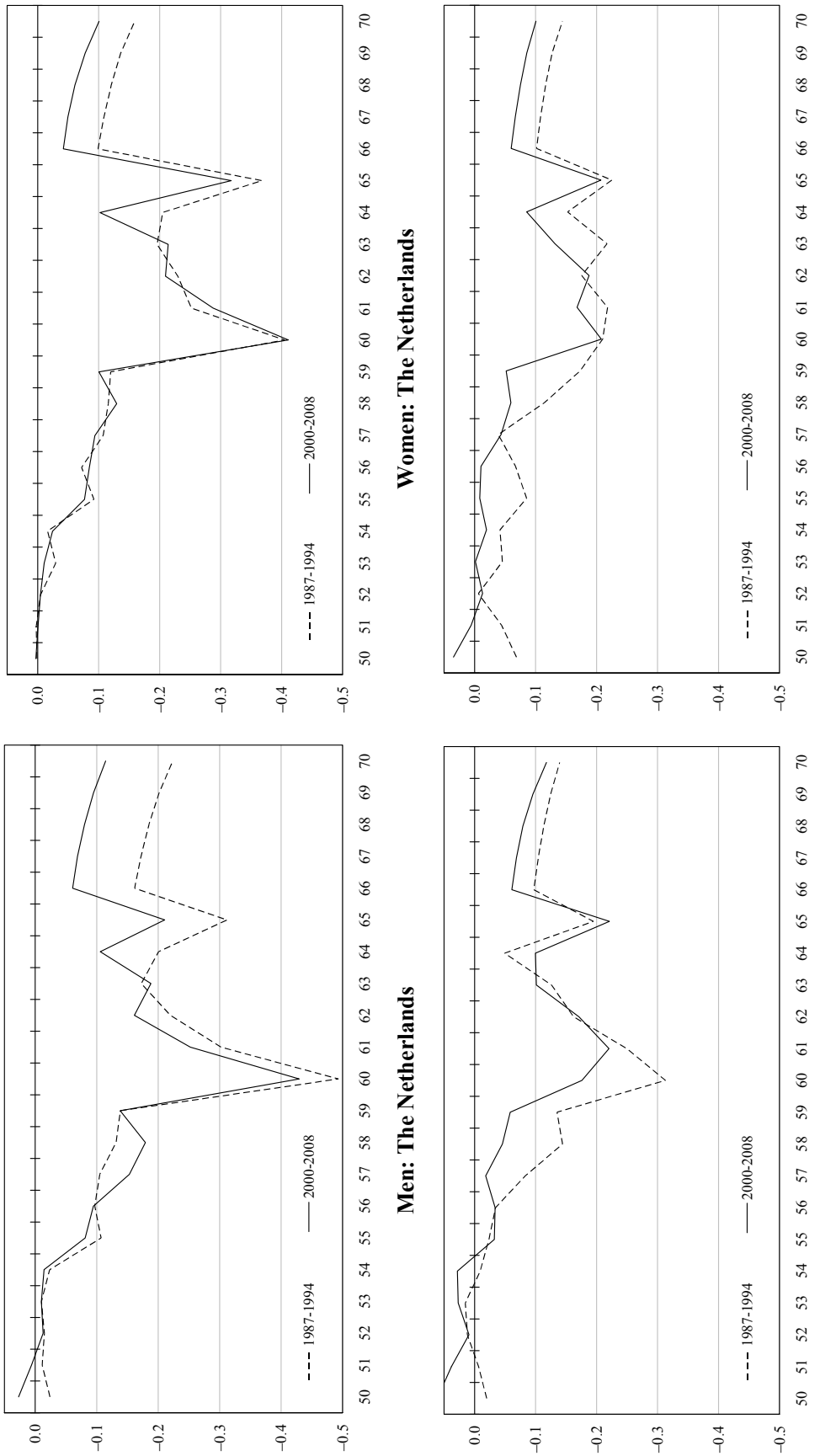
**Probabilities of Exiting in Selected Countries**




Source: LFS.

**Figure 2 (continued)**

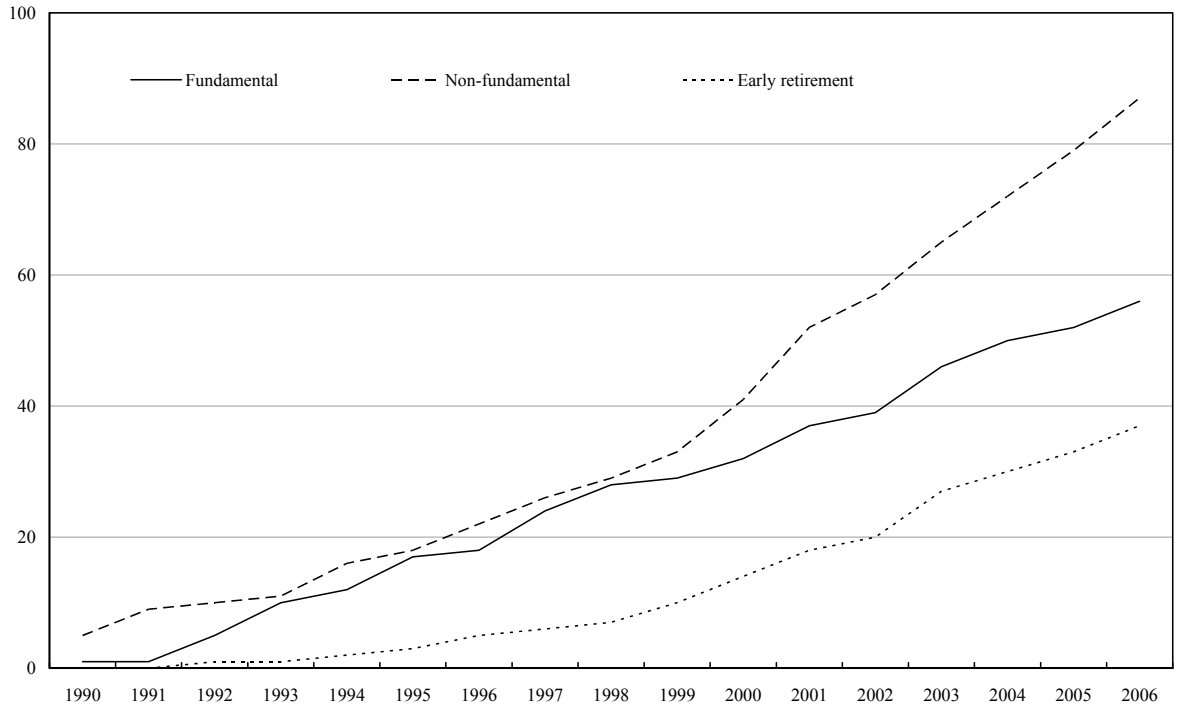
**Probabilities of Exiting in Selected Countries**




Source: LFS.

**Figure 3**

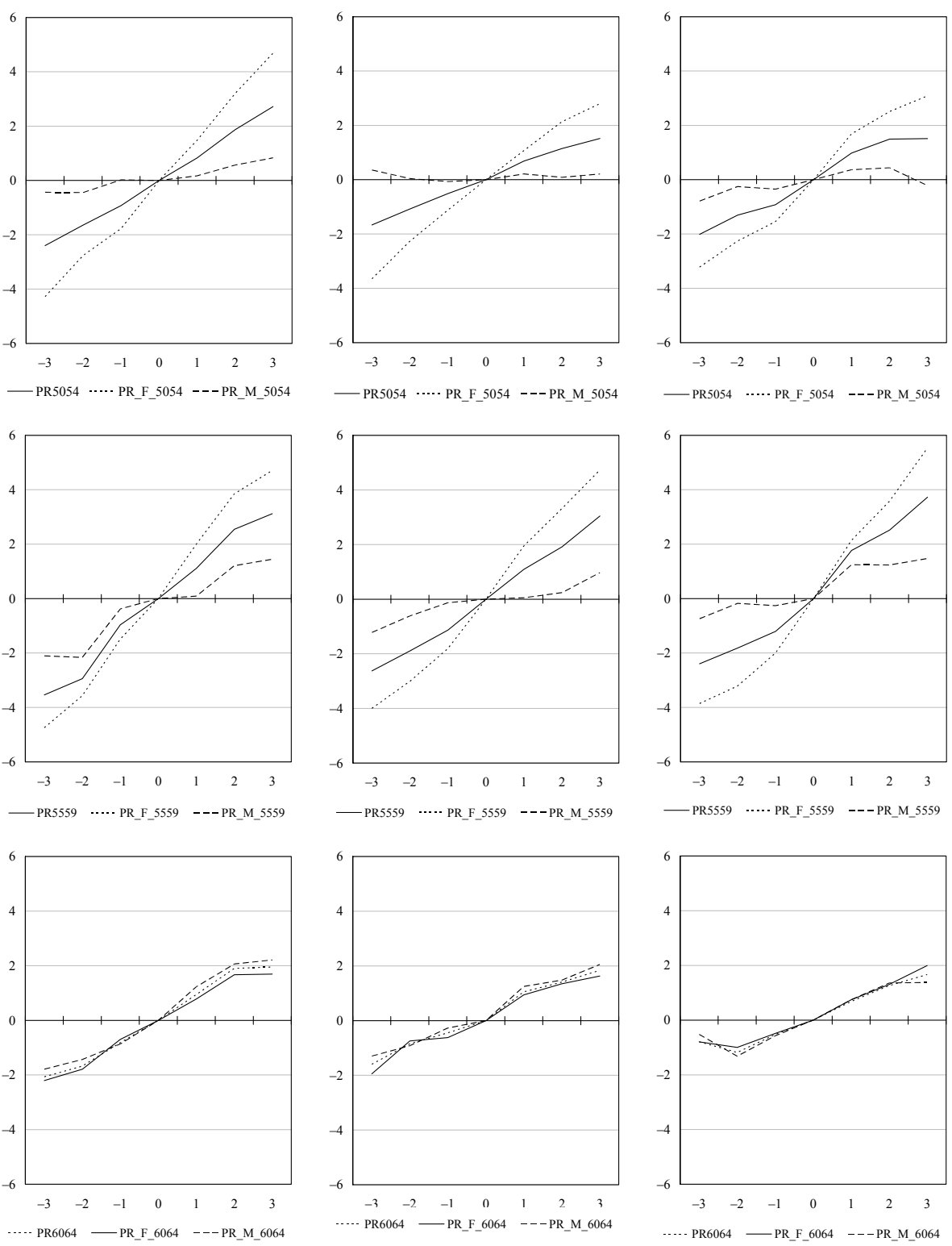
**Count of Member States Doing Pension Reforms**




Source: Commission services, based on FRDB Social reforms data base and LABREF.

**Figure 4**

**Participation Rate Before and After Reforms of Early Retirement: EMU Countries**




Source: Commission Services.

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# VALUATION OF THE HUNGARIAN PENSION SYSTEM

*Erzsébet Kovács*[*]

This paper takes a look at certain results of the modelling side of the Hungarian pension reform. Preparations are underway to implement actuarial modelling of pension liabilities for the government. The objective is to understand how the state might face challenges of the present pay-as-you-go pension system. Flat-rate pension, point system and notional defined contribution (NDC) as possible suggestions are reviewed in order to stop increase of public debt in the course of this century. Based on the investigations done in the last two years the sharpest problems for Hungary are the low activity ratios and the short working period.

## 1 Introduction

The Hungarian pension system underwent a structural reform in 1997, at present according to the World Bank terminology it has three pillars:

- Pillar I is the mandatory public pension system,[1] which is financed from the contributions paid by the employer and the employee;
- Pillar II is mandatory consisting of mutual private pension funds; and
- Pillar III covers voluntary mutual benefit funds.

Pillar I is a publicly managed, pay-as-you-go financed, defined-benefit, social security pension scheme. It provides earnings-related old-age, disability and survivors benefits. Pillar II of the compulsory pension system is operated by fully-funded, defined contribution, private pension funds. The funds accumulate and invest contributions paid by their members onto their individual accounts. At retirement the accumulated sum increased by investment yield is converted into a life annuity,[2] which can be provided by either the fund itself or a life insurance company.

Persons entering the labour market for the first time are automatically enrolled into the two-pillar system. Those who had already acquired pension rights before 1998 could voluntarily opt for the new system at the time of its inception.

Pension and Old-age Round Table (POART) was set up in 2007 to analyse the future changes of the Hungarian pension system. Based on the projection results of POART's report several important questions will be analysed. Besides the transformation of the pension system, and quantitative presentation of future contributions and benefits, impacts on labour supply in planned to be examined.

## 2 Why don't we comply with the rules of the pension system

Qualifying conditions for a person to become eligible for the old-age pension in Hungary are as follows:

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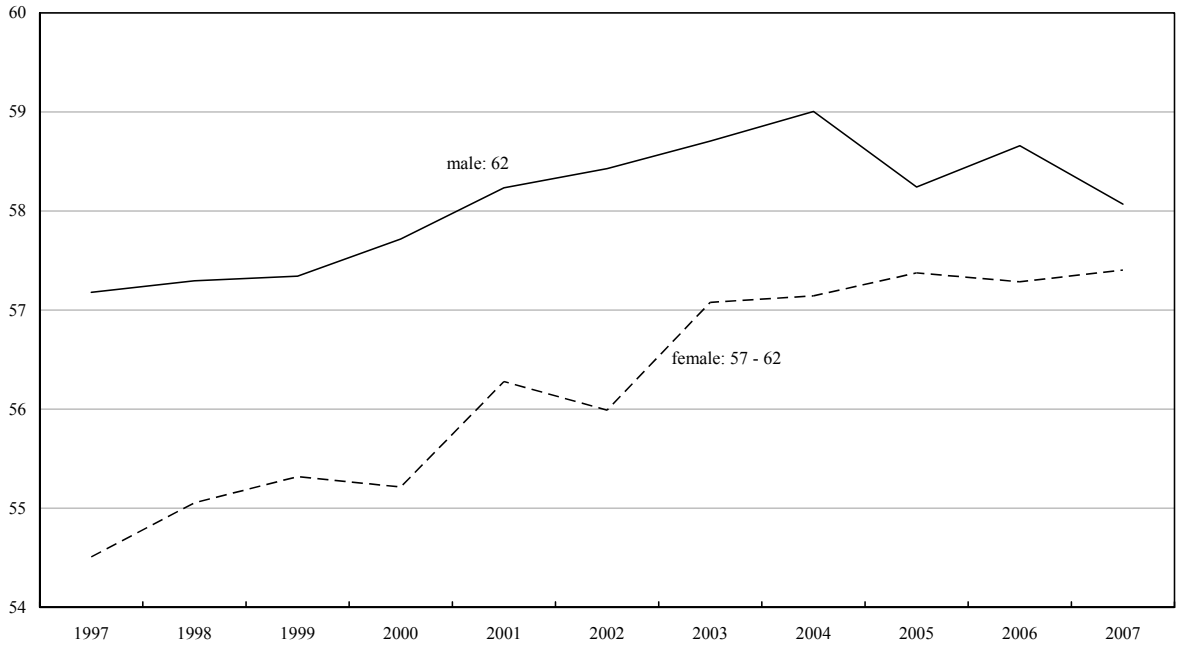
The author is member of the Hungarian Pension and Old Age Round Table. The views expressed here are mine.

[1] Our present social security system was introduced after the Second World War. The original version of the public pension was introduced in 1928.

[2] Pillar I is intended to give ¾ and Pillar II is planned to cover ¼ of the old age pension.

**Figure 1**

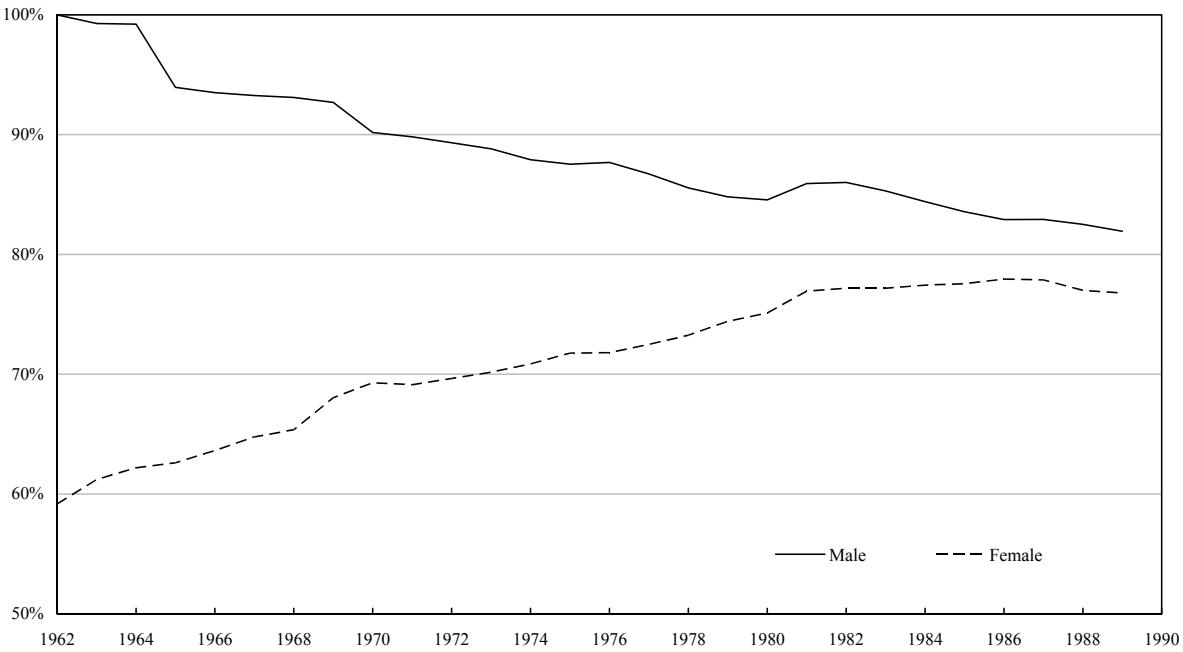
**Effective and Legal Retirement Ages**




Source: Author's calculations based on Pension Statistics.

**Figure 2**

**Ratio of Employed People before 1990**




Source: Deloitte Report based on data of the Hungarian Central Statistical Office.

- Reaching statutory retirement age 62 years for both males and females in 2009; and/or
- Completing the required number of years of service, 40 years for total pension amount;
- Completing at least 37 years of service until the age 60 to get reduced pension amount.

In spite of the clear rules the effective retirement ages of both genders are significantly lower than the official retirement age. Figure 1 presents the age of newly retired old-age pensioners according to the calendar years. The discrepancy of numbers between legal and effective retirement ages is mainly the consequence of the political and economic transition after 1989.

The best-known rule of our socialist system ended in 1989 was the full employment, which was associated with the so called in-door unemployment in the early 1960s. Figure 2 presents these artificially high rates of employment.

As a result of these high ratios the average service period was higher than 40 years for men, and 36 years for women. Based on the long contribution period, the pay-as-you-go scheme worked smoothly until the late 1980s.

After the political transition, the labour market shrank as a consequence of the privatisation of the Hungarian economy. Several companies were closed down or reorganised, and the agricultural cooperatives fell into individuals. The low demand for unskilled blue-collar workers caused serious difficulties. From 1990 to 1997 the unemployment rate increased suddenly. Early retirement and disability pension were the sidetracks for them because of their missing skills and low flexibility/mobility.

To sum up the changes, by the late 1990s participation rate of active population decreased by 20 per cent. The current level of employment is lower than it has been earlier.[3] Role of the informal sector is not analysed here because of the unpaid pension contribution. The maximum density of women's employment (83 per cent) was measured in 2005 for those who were born in 1974. The parallel maximum numbers of men's employment (71 per cent) was measured in 2005 for those who were born in 1974 and 1975. For more details see Figure 3 and Figure 4.

In order to exit from the labour market around the age of 50, persons applied for disability pension. This process was supported by policymakers to avoid the further increase of the unemployment rate. As a result of this process total number of disability pensioners reaches 22 per cent of pensioners in 2009. Number of disability pensioners below retirement age limit is around 10 per cent of the active population. These numbers are extremely high compared to he EU ratios, and are not underpinned by the health conditions of Hungarian people.

## 3 What does the future hold for us?

Theoretical arguments for strict retirement rules are reinforced by concerns about the implicit debt of the pension system.

The implicit debt is defined as a difference between present value of benefits disbursed to pensioners and active members (*i.e.* future pensioners) and contributions paid by active members. It shows obligations of the state pension system at a given point of time towards the current members[4] (those who have already entered the system).

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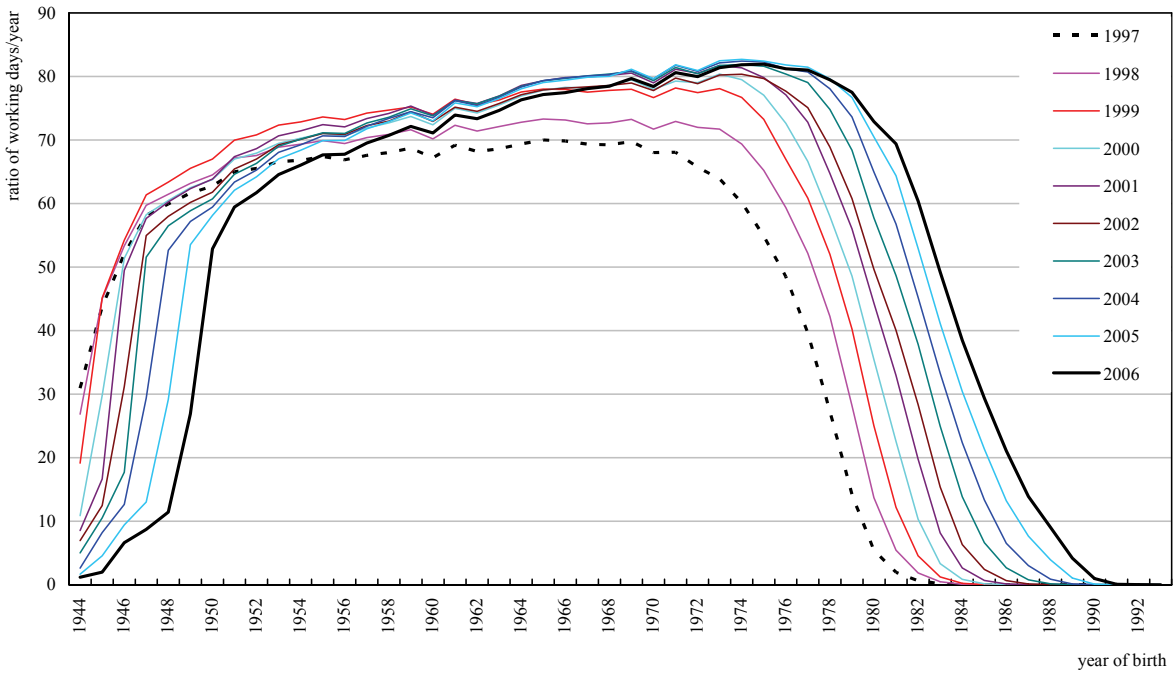
[3] According to the OECD Statistics change of the total labour force in 2004 compared to 1994 was –1.2 per cent for Hungary. The OECD average for this period equals to +9.6 per cent. Source: OECD in Figures, 2005.

[4] Benefits from the second pillar will be paid from 2013.

**Figure 3**

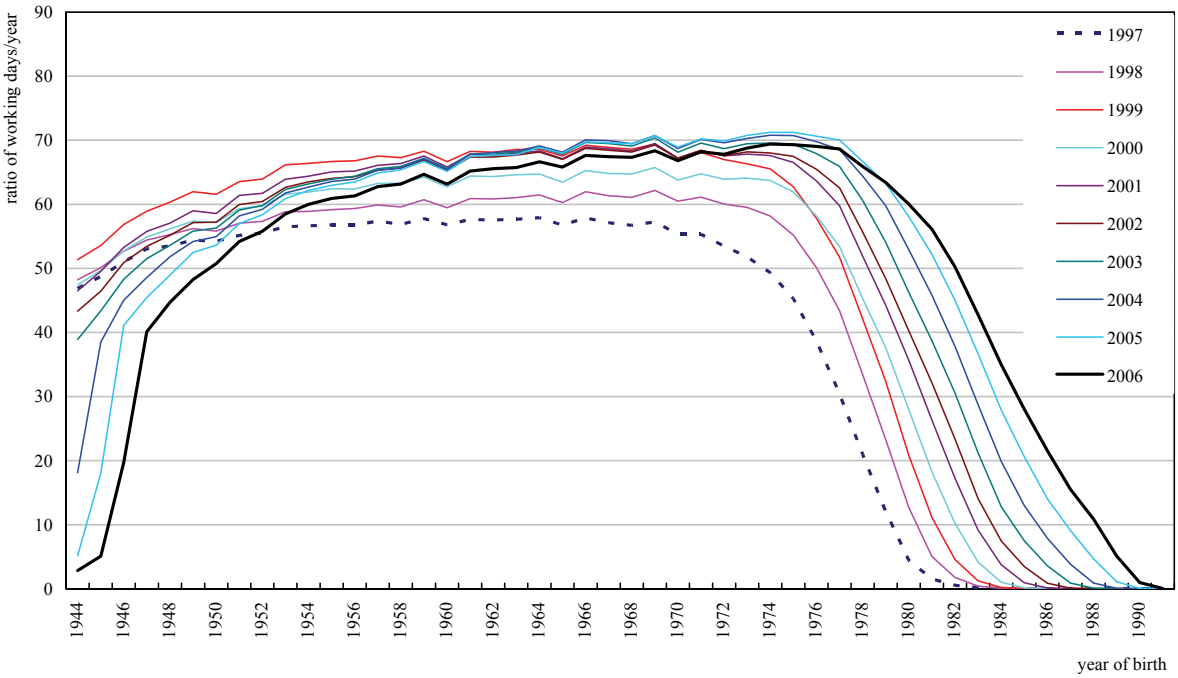
**Density of Women's Employment in the Female Population**




Source: Author's calculation based on Pension Statistics.

**Figure 4**

**Density of Men's Employment in the Male Population**




Source: Author's calculation based on Pension Statistics.

The implicit debt is measured in percent of GDP. Projected amounts of implicit debt per active members in the given calendar years were discounted to 2007 values in order to be comparable and expressed in currency units of the same year. 5 per cent discount rate was applied per annum, which corresponds to the risk free rate.

The government's possible decisions on changing the pension parameters (such as contribution rate, age limit and indexation) are expected to reduce the implicit debt in the next 15-20 years. The best scenario can be seen in Figure 5. The estimated minimum (2.45 per cent) will be reached in 2026.

This wave in Figure 5 is a consequence of the special shape of the Hungarian demographic tree[5] (see in Figure 6). The baby boom generation will retire around 2016, but the second boom, children of this generation are expected to be active on the labour market until 2040. The Hungarian pension system is strongly influenced by the special shape of the demographic tree.

Aging itself is not the most serious burden for the Hungarian pension system as it is for other highly developed countries. Life expectancy is expected to increase by 2 months per year.

The old version is projected by lower (1.3) fertility ratio, the young version is assumed with higher (1.8) fertility ratio. Both fertility values are below the reproduction level, so we do not calculate with a stationary population. Based on this projection, there are political intentions to increase the pension age to 65 year gradually in the next decade.

## 4 Increasing the contribution period

Our focus is on a small open economy in which the pay-as-you-go pension system is characterized by:

- the size of the labour market ($L$), and wages per worker ($w$),
- the number of retired persons ($P$),
- the average pension ($p$), and
- the contribution rate ($r$).

The balanced budget for this system can easily be calculated by multiplying the above quantities for a given year ($t$):

$$L(t)\, r(t)\, w(t) = P(t)\, p(t)$$

While these factors (wage, pension and contribution rate) can be influenced by the government relatively easily, the labour force adapts to the changes rather slowly.

One obvious way of increasing the contribution seems to be raising the legal retirement age. However there are objections to this strategy: as significant number of people chose the early retirement, the actual mean retirement age is lower by several years than the legal retirement age (As it was seen in Figure 1).

PORT is analysing chances of paying contribution according to age and sex. Dividing the active population into six categories, we can calculate the pension contribution density for a given year.

Employment statuses are mentioned[6] as follows:

- Person A works during the whole year,

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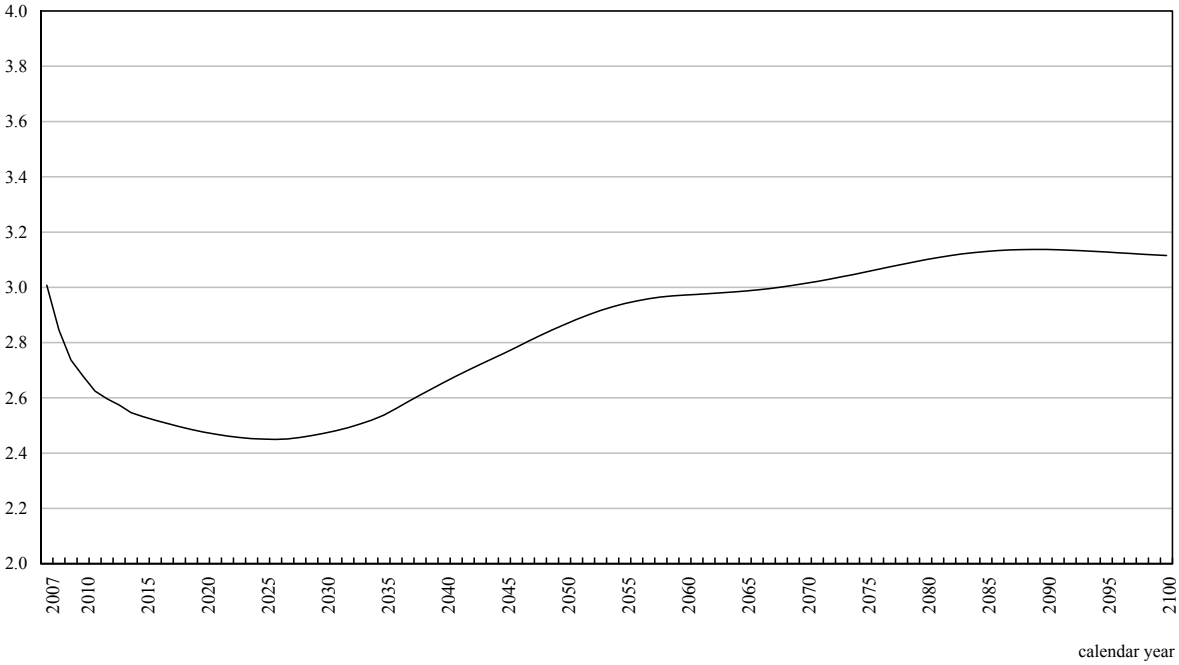
5 Data are for 2001. Projections were made by Laszlo Hablicsek in 2007.

6 M. Augusztinovics introduced these names for the statuses in her paper.

**Figure 5**

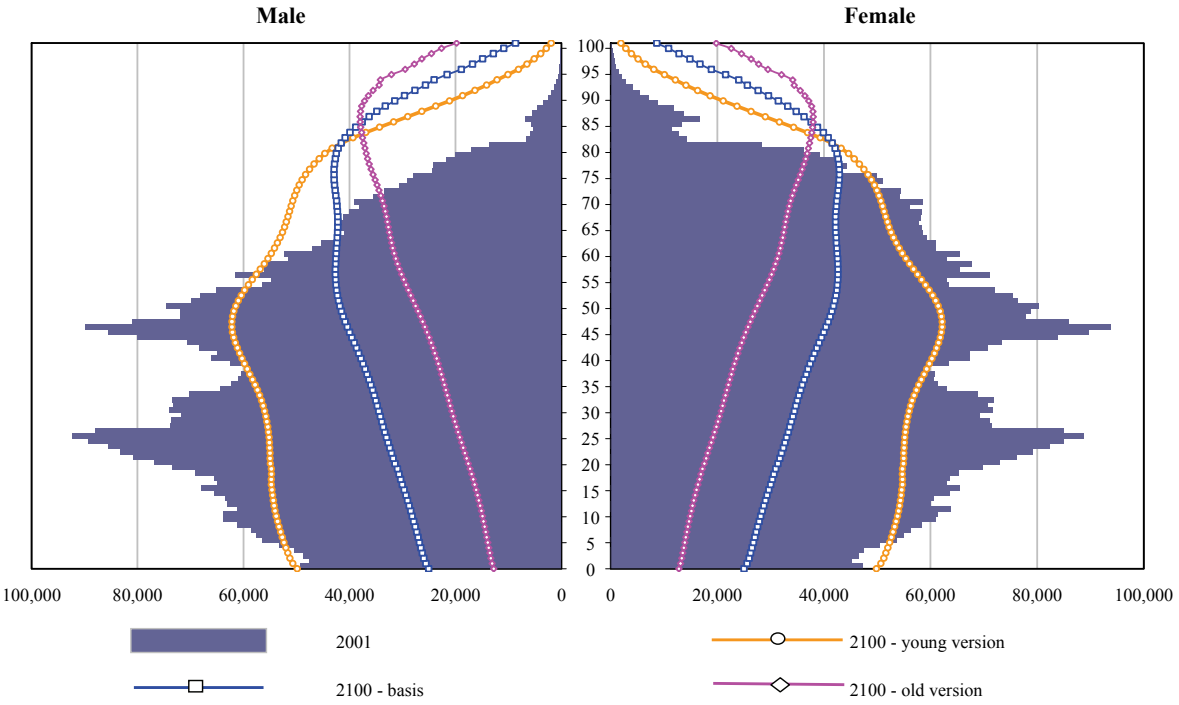
**Implicit debt of the Hungarian State Pension System**
*(percent of GDP)*




Source: Deloitte projection (2008).

**Figure 6**

**Hungarian Demographic Tree**




Source: Hablicsek's demographic projection (2007).

**Table 1**

**Transition Matrix, Male 30-43**

| | A | B1 | B2 | B3 | B4 | G | Disabled | Old-age | Dead |
|---|---|---|---|---|---|---|---|---|---|
| **A** | 86.8% | 8.6% | 1.4% | 0.9% | 0.6% | 1.3% | 0.2% | 0.2% | 0.1% |
| **B1** | 44.5% | 31.3% | 8.7% | 6.1% | 4.6% | 4.2% | 0.3% | 0.2% | 0.2% |
| **B2** | 27.2% | 20.2% | 14.2% | 11.5% | 10.8% | 15.6% | 0.4% | 0.0% | 0.2% |
| **B3** | 19.1% | 14.1% | 13.3% | 13.7% | 14.3% | 24.8% | 0.4% | 0.0% | 0.3% |
| **B4** | 9.8% | 9.1% | 9.9% | 12.0% | 21.0% | 37.3% | 0.5% | 0.1% | 0.4% |
| **G** | 2.4% | 3.4% | 4.3% | 5.2% | 8.6% | 74.9% | 0.4% | 0.4% | 0.5% |
| **Disabled** | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 95.5% | 0.0% | 4.5% |
| **Old-age** | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 99.6% | 0.4% |
| **Total** | **55.0%** | **10.5%** | **4.0%** | **3.6%** | **4.3%** | **19.1%** | **2.8%** | **0.4%** | **0.3%** |
| **Density** | 100.0% | 87.5% | 62.5% | 37.5% | 12.5% | 0.0% | | | |

Source: Author's calculations based on Pension Statistics.

- Person B1 works at least ¾ year,
- Person B2 works at least ½ year,
- Person B3 works only ¼- ½ part of the year,
- Person B4 works less than ¼ part of the year,
- Person G does not work in the given year at all.

Looking at the transition matrix of men (aged 30-43, the most active members of the society) from 2004 to 2005 a straightforward conclusion is that further reduction of participation density should be prevented. Table 1 covers 960 thousand people 77 per cent of whom contributed to the PAYG system. 55 per cent of them were full workers, 22.4 per cent contributed in a certain part of the year, 19 per cent did not pay contribution in 2005. Based on the special early retirement conditions for certain professions 0.4 per cent of this young cohort retired.

Weighing the total ratios by the contribution densities,[7] the overall contribution density (OCD) equals to 68.6 per cent. A bit less than 1/3 of the year remains uncovered by pension contribution. Analysing different age groups the ODC ratios remain lower. The females' overall contribution ratios are a bit higher than the appropriate males' results.

Further research is needed to analyse the following possibilities:

a) How can we increase overall contribution density within a given service period for different age groups and for both genders?
b) What kinds of incentives are encouraging people to extend service period without increasing legal retirement age?
c) How can we effectively increase statutory retirement age with or without increasing employment rates.

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[7] Overall contribution density: 55*1+10.5*0.875+4*0.625+3.6*0.375+4.3*0.125=68.6.

## 5 Conclusions

Finding practical solutions and implementing them should be the first step on the path towards the pension reform in Hungary. We now live in a society where significantly more emphasis is being placed on personal provision for retirement. People are encouraged to save individually in Pillar II by taxation. On the other hand state provision is not out of favour. The aim of social insurance is twofold: to alleviate poverty in old age, and provide a big pooling of risk not only for old age pensioners, who contributed to the pension system during their working period, but for disabled persons and survivors as well.

Attitude of people to pension system and savings for retirement period should be changed before introducing new pension reform. Neither the NDC nor the point system can solve our problems originated in short contribution period and early retirement.

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# COMMENTS ON SESSION 1
# PENSION REFORM AND THE LABOUR MARKET

*Johannes Clemens*[*]

As agreed previously, I will focus my comments on the papers by Najat El-Mekkaoui De Freitas and Joaquim Oliveira Martins: "Consumption Structure, Welfare Goods and Retirement Income: Linking the Ageing Puzzles", and by Paul Rodway: "Public Pensions and the Labour Market in New Zealand". I found both papers very stimulating and well founded.

## 1 Discussion of "Consumption Structure, Welfare Goods and Retirement Income: Linking the Ageing Puzzles" by Najat El-Mekkaoui De Freitas and Joaquim Oliveira Martins[1]

The paper by El-Mekkaoui De Freitas and Oliveira Martins is very ambitious, as it deals with no less than four pension puzzles. These are correlations economists would not usually expect because of their belief in the lifecycle theory:

i) People are not perfect consumption smoothers. Instead, they tend to consume less in old age;

ii) People are net savers even in old age. In a lifecycle world they should rather dissave;

iii) Countries with more pension fund assets have lower private household saving rates. If PAYG contributions are regarded as substitutes for private savings, the opposite result could be expected;

iv) Rising longevity seems to be correlated with lower savings, although a longer life needs more private provision for retirement.

Puzzles (i) and (ii) can be illustrated by hump-shaped consumption age profiles. Consumption smoothing in reality obviously does not mean perfect equalisation of consumption potentials in all phases of our lives. It rather means consumption planning, and thereby taking into account all income sources as well as consumption necessities in old age. If rational consumers save in old age, this should be driven by bequest motives. Another explanation might be special purpose savings or consumption smoothing within the retirement period. The fear of needing (not fully subsidised) long-term care at the end of one's life might drive the observed savings.

The OLG model is very insightful. However, the longevity puzzle does not really seem to be solved. Perfect consumption smoothing might lead to higher consumption during the working years if the expected income in old age rises. But if it rises only in sum because of a longer retirement phase, it is very hard to follow the author's argumentation. The saving-longevity puzzle remains striking. Maybe people not only take into account their increased longevity but also the necessity to work longer (hopefully in good health). Perhaps they have to adapt their bequest plans because they live longer and dissave more than envisaged during retirement.

It remains difficult to explain the saving-capitalisation puzzle. There were very numerous attempts to find empirical evidence for the Feldstein thesis of a wealth substitution effect when introducing a PAYG pension scheme. Even Feldstein himself mentioned the countervailing retirement effect. According to this effect, people retire earlier purely because of the existence of a pension scheme. As a result, however, they have to save more and consume less. The

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[*] Deutsche Bundesbank.

[1] The discussion refers to the original version of the paper which has been revised in the aftermath.

Barro-Feldstein controversy is well known. But all the empirical cross-section, time-series and cross-country studies have not yet brought absolute clarity to the saving-capitalisation debate.

Finally, there is some good news in the findings; due to the hump-shaped consumption age profile, demographic ageing would be consistent with lower per capita growth rates, which is nevertheless to be expected because of the shrinking working force. If the elderly do not want/need to consume as much as younger people, less production is needed to keep the welfare status constant. Indeed, it might be misleading to place too much emphasis on the expected decrease in the per capita growth rates.

## 2 Discussion of "Public Pensions and the Labour Market in New Zealand" by Paul Rodway

The paper by Paul Rodway deals with the interaction of the New Zealand statutory pension scheme, called NZ Superannuation (NZS), and the labour market participation of the elderly. It is well known that the demographic change will put public finances under pressure. The post-war baby boom will (temporarily) cause strong increases in the number of pensioners. The more or less linear rise in further life expectancy will continuously worsen the ratio of tax payers to pensioners. And finally, the tax base will erode due to insufficient birth rates to stabilise the population.

According to the brief but enlightening characterisation of the pension system, the NZS offers a flat pension at the age of 65 to every New Zealander, notwithstanding whether he/she is in paid employment. In contrast to Bismarckian pension schemes in central Europe, the NZS includes a substantial element of explicit income redistribution. On the one hand, this makes the system successful in fighting old age poverty. 66 per cent of the net average wage for a couple implies a 100 per cent or more replacement rate for a household receiving less than two-thirds of the average gross wage. On the other, due to the absence of any equivalence between contributions and benefits, the taxes levied to finance the NZS cause distortions and lead to inefficiencies.

Paul Rodway is right to emphasise that there is no implicit tax to be taken into account by a pensioner considering whether to participate in the labour force. He/she receives the pension at the age of 65 regardless of whether he/she remains in employment. However, it should be mentioned that the explicit tax on the optional additional labour income is partly used to finance the pension scheme without giving rise to any additional pension claim. This disincentive to labour supply is the result of income redistribution within the NZS. The tax burden is the same for every cohort, but only those aged 65 or more can avoid it by leaving the labour force.

The figures on labour force participation are very instructive. They give us a hint of the importance of the retirement or, more precisely, the eligibility age. Obviously, the rise from 60 to 65 by 2001 caused a significant increase in the participation rates of those aged 55 to 64. In Germany, there was a comparable development from 1997 onwards. Here, actuarial deductions were introduced in stages in the event of early retirement (especially after unemployment or old age part-time work). Since 2005, there has generally been no opportunity to retire early (*i.e.*, before reaching the age of 65) without these deductions. The result (together with major labour market reforms) is a relatively strong increase in the labour force participation rate of the elderly in Germany (see Figure 2).

Unsurprisingly, the willingness to work after 65 diminishes. Theoretically, the positive income effect in the form of the NZS pension must lead to a lower labour supply if the demand for leisure is characterised by a positive income elasticity. This matches with the finding of a sudden cut in full-time work at 65 and – for men – a steady increase in part-time work with advancing age.

The deeper analysis of special factors that influence retirement behaviour is very interesting. According to the findings presented by Paul Rodway, the probability for remaining in work rises if a person does not have a non-working spouse. This might be interpreted as good news because secular trends moving from families to single households indicate some fiscal relief. Regarding the findings on health status, which is stated here to be rather irrelevant to decisions on whether to work, I would be cautious. Disabled persons are, by definition, no longer able to work. If they are included in the sample, one should expect some influence from health status. Persons who are not disabled but less healthy probably do not have a choice on whether to leave the labour force – unless they can count on the support of a spouse. And finally, the general trend moving from physically demanding jobs (in the production sector) to mentally demanding jobs (in the service sector) might make it easier to stay in work even with a worsened health status.

What could be done to ensure fiscal sustainability in the next 30 years and beyond? Weakening the indexation means lower replacement rates. This might be politically difficult to sell. Fortunately, however, New Zealand has a highly redistributive pension scheme. Therefore, smaller pensions would be less of a problem to low income groups than, for example, in the German pension scheme, with its high degree of equivalence of contributions and benefits. On the other hand, pension cuts would be less effective from a fiscal perspective, because there are no "big" pensioners, who would lose more than those at the lower end of the income distribution.

The first choice, therefore, would seem to be an increase in the eligibility age, preferably automatically indexed to rising life expectancy. For example, it should be possible to argue that there is an obvious necessity to stabilise the ratio of time spent in retirement to the time spent in work. Longer working time – as Paul Rodway points out very clearly – is the key to dampening the fall in potential output growth and, consequently, to strengthening the economic basis of government finances and, not least, the social security system.

Some doubts arise regarding the idea of diverting the NZS pensions to a capital funded private scheme (KiwiSaver account) while staying in work. Letting the KiwiSaver account run above the age of 65 and allowing people to put money aside on a voluntarily basis would be a good idea. However, if subsidies are involved in these private savings accounts, it should be kept in mind that extra expenditures are not consistent with fiscal sustainability. This is a general caveat of government sponsored private savings accounts because it contradicts the goal of fairer intergenerational burden-sharing.

# COMMENTS ON SESSION 1
# PENSION REFORM AND THE LABOUR MARKET

*Tomasz Jędrzejowicz*[*]

I would like to thank Daniele Franco and Banca d'Italia for the opportunity to participate and discuss two inspiring papers of this session. The first one, by R. Vegas *et al.*, is an empirical study, dealing with retirement decisions in Spain, conducted using detailed data on labour and pension histories. The second one, by A. Ahuja and R. Paserman, is an overview paper, focused on pension policies in European Union countries from a macro perspective, which draws on policy exchange and coordination between EU Member States in the area of pensions and social protection conducted in the context of the Open Method of Coordination. The two papers are therefore quite different, but both deal with the key issue of determinants of retirement decisions, in particular in case of early retirement.

Pension wealth is generally found in studies to be one of the key drivers of retirement decisions. This result is confirmed by the Vegas *et al.* paper, where social security wealth turns out to play a greater role in the retirement decision than variables representing the increase in pension an individual could obtain by working longer, which also turn out to be significant. A higher replacement rate in principle also encourages early retirement, but in practice OECD studies show it to be less relevant and Vegas *et al.* obtain a similar result, with the replacement rate turning out to be insignificant. Other public income support programmes available prior to pensionable age, such as disability, unemployment and special early retirement schemes, also play a role, as do the levels of health, education and income.

An issue related to retirement decisions, which recently has been receiving some attention in the literature is that of involuntary retirement. The issue is potentially relevant for both papers. In case of the paper by Vegas *et al.*, involuntary retirement may not be captured directly, because of the nature of the dataset used. The issue is to some extent addressed indirectly, as the authors use a GDP growth variable to proxy the macroeconomic environment, but the results obtained are counterintuitive. Perhaps it would be useful to explore different variables representing the overall labour market environment, such as the level of unemployment or the number of jobs lost in a given period.

Another potentially important issue in the context of retirement decisions is the minimum pension guarantee which would generally promote early retirement among low-income workers. The significance of this effect is likely to increase with reforms lowering average replacement rates, less intra- and inter-generational redistribution and more common temporary employment. The level of minimum pension is susceptible to political pressures and therefore subject to frequent ad hoc adjustments, which lead to uncertainty about its future level.

For the case of Spain, Vegas *et al.* find that the minimum pension guarantee increases the probability of retirement at 60, but the effect appears to be relatively small and is reversed for workers aged 61 to 65. Though not directly comparable, these results seem to be qualitatively different from those of Jiménez-Martín and Sánchez (2006), according to whom the minimum pension guarantee in Spain increases retirement at age of first entitlement and early retirement in general by almost 50 per cent. The importance of the minimum pension guarantee in the Spanish pension system is also referred to in Boldrin *et al.* (2008), as well as OECD reports.

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[*] Narodowy Bank Polski.

The paper by Ahuja and Paserman states that indeed, most EU Member States perceive minimum income benefits as benefits as providing negative incentives towards longer working lives, a conclusion generally consistent with empirical literature. However, while looking through the publications produced in the framework of the Open Method of Coordination, I have found an earlier one devoted specifically to the issue of minimum income provisions for older people (SPC, 2006), which gives a rather different message, stating that there is "no real evidence to prove or disprove labour market or savings behaviour impacts of minimum income benefits for older people".

Another important and much debated issue raised by the Commission authors is that of a move to funded pension schemes. The paper points out that such a move was usually motivated by the desire to pre-fund the future pension burden, as well as obtain higher returns on contributions in the private pension pillar. While the second argument has been questioned in the literature, the first one is fully viable, especially as it also entails other advantages of a political nature. Firstly, a move to an individual defined contribution pension scheme implies making the implicit future cost of ageing of the populations explicit, thus supporting the recognition and acceptance of the need for pre-funding of the pension burden. Secondly, once a defined contribution system with individual pension accounts is set up, a reversal of the reform would entail very significant political costs. These would most likely be higher than in case when the government were to abort pre-funding conducted at the government level, via debt reduction or building government reserve funds.

But as the authors rightly point out, the move to funding also entails some risks which may need to be addressed. Firstly, one needs to note the shifting of the pension risk from provider to the beneficiary. This may be viewed as an opportunity to get participants more involved in pension planning, but in order to make this happen, costs will have to be incurred in reach them.

In addition, the current financial market turmoil has shown that pension accounts may be at risk due to financial market volatility. While swings in asset prices are normal, although "normal" depends on the magnitude of these swings, it is important to ensure that funds of persons close to retirement are invested in low-risk assets.

Speaking of the current downturn, the Commission authors point to a number of challenges arising in connection with the financial turmoil and global economic downturn. These include first of all rising unemployment, resulting in delayed establishment of younger workers on the labour market and, consequently, lower accumulation of contributions in defined contribution pension schemes, both funded and notional. Older workers will also suffer by becoming more susceptible to layoffs, with increased take-up of early retirement being the likely consequence. Some Member States are also delaying pension reforms or the activation of automatic mechanism which in the current climate would otherwise lead to lower pension benefits. Funded pension schemes are facing increasing challenges with the recent fall in asset value and increased risk of pension adequacy problems. In addition, one general challenge, which is already evident, is related to the massive increase in deficit and debt levels in connection with the current downturn. This will have significant implications for the size of fiscal adjustment required to cope with the ageing challenges.

Finally I would like to conclude by devoting some attention to Poland, which may serve as an example for many issues raised in the paper by Commission authors. Before the pension reform in 1999, Poland had a fairly generous defined benefit pension system, with a relatively flat pension levels, thanks to which the elderly were a group less prone to poverty than the remainder of the population. The system also featured very generous profession-specific early retirement provisions, which in many cases were not justified by medical considerations. In addition, during the early years of economic transformation, the social insurance system had been used to cushion the social cost of restructuring and layoffs, in particular through the use of early retirement, disability benefits

and special pre-retirement benefits. All in all, this provided for a very costly system with strong disincentives to long careers and low participation rates. In 1999 a comprehensive pension reform was introducing a notional defined contribution pillar, as well as a mandatory funded pillar and elimination of the vast majority of early retirement provisions (finally completed in 2008). As a result, according to EPC Ageing Working Group projections, Poland is in a very good position to cope with the ageing pressures. Nevertheless, a number of problems and risks remain. Women's retirement age remains at a low level of 60 years, resulting in low future pensions from defined contributions pension schemes. The shift of responsibility and risk of pension provision to beneficiaries may also be problematic in the longer run, as they are not well equipped to deal with this risk. This is evidenced by the rush of workers to register as self-employed, which means paying lower social contributions, but ultimately will result in lower benefit levels. The minimum pension will also gain significance as under the new system many low-income workers, especially those with sizeable breaks in their careers, will likely not accumulate sufficient funds in their individual pension accounts and will therefore draw on the minimum pension. Given the risk of discretionary adjustments of the minimum pension as a results of political pressures, this may undermine the idea of the reform.

# COMMENTS ON SESSION 1
# PENSION REFORM AND THE LABOUR MARKET

*Walpurga Köhler-Töglhofer*[*]

## 1 Introduction

OECD countries, in particular the European countries within the OECD, will face major demographic challenges in the not-too-distant future: Age-related public expenditures will increase dramatically due to (a) the strong inflow into retirement when the large baby-boom cohorts reach pension age, (b) the steadily growing life expectancy, and (c) the well-documented decline in the age at which people exit from the labour force. Together with the observed trend towards delayed entry into the labour market, this implies a sharp decline in the length of working life and in its duration relative to the retirement period. Together with declining and now comparatively low fertility rates,[1] this leads to a shrinking active labour population (in absolute terms as well as relative to the number of retirees) which cannot be fully compensated by migration.

The process of population ageing per se is the result of a great progress in human history – the so-called demographic transition. "Before the start of the demographic transition life was short, births were many, growth was slow and the population was young. During the transition, first mortality and then fertility declined, causing population growth rates first to accelerate and then to slow again, moving toward low fertility, long life and old population" (Lee, 2003). People not only live longer these days, they also stay in relatively good health until later in their lives. However, the combination of declining fertility rates, longer life expectancies, low effective retirement ages and the large inflows into retirement of the large baby-boom cohorts transforms the benefits of demographic transition for individuals into a challenge both for the sustainability of public finances and for labour market policy. In many countries, the numbers of workers retiring each year will increase sharply and will eventually exceed the number of new labour market entrants. Without changes in the participation patterns and in productivity, this will result in declining GDP-per-capita growth and thus in lower living standards.

According to the most recent report of the Ageing Working Group of the European Commission's Economic Policy Committee, the reduction in the population aged 15-64 and the increase in persons aged 65+ will cause the old-age dependency ratio in the EU to almost double from 28 to 53 per cent over the next 50 years; at the same time, the total dependency ratio will increase on average by 30 percentage points to nearly 80 per cent.[2] According to the OECD (2006), the ratio of older inactive persons per worker in the OECD area will almost double from around 38 per cent at the beginning of this decade to just over 70 per cent in 2050, if work and retirement patterns remain unchanged.[3]

Given these prospects, raising labour force participation will be one of the most critical measures, since changes in the ratio of retirees will be driven both by changes in the size of older relative to younger groups and by the proportion of older people who participate in the labour market. Thus, increasing participation and employment rates of older workers or – more generally – extending working life is essential for ensuring sustainable public pay-as-you-go pension systems

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[*] Österreichische Nationalbank.

The views expressed in this comment are those of the author and not necessarily those of the OeNB.

[1] Fertility rates have decreased over the last decades and remain substantially below the demographic reproduction rate of 2.1. See Stiglbauer (2006).

[2] See European Commission (2009).

[3] In Europe, this ratio could rise to almost one older inactive person for every worker over the same period. See OECD, 2006, p. 9.

and for safeguarding high living standards. Moreover, this would also be a logical step in the light of increasing life expectancy. As part of the Lisbon Agenda, the European Union aims at increasing the employment rate of older workers to 50 per cent by 2010 ("Stockholm target"). A complementary target is raising the average exit age into retirement by five years ("Barcelona target").[4]

Over the last decade, Europe in fact already witnessed a significant rise in the overall participation and employment rates, with women and older workers being the most dynamic components.[5] However, labour force statistics show that there are significant cross-country differences in the labour force participation of older workers that range from about 30 per cent to more than 70 per cent. Hungary, for example, to which one paper of this session was devoted, exhibits a comparatively low participation rate of about 35 per cent and rather problematic prospects with respect to the development of the old age dependency ratio (an increase of 34 percentage points compared to 28 percentage points for the EU-27) and the total dependency ratio (an increase of 35 percentage points to 80 per cent).

A higher labour force participation of older workers would mean a better mobilisation of the labour supply of older people; this would yield a triple dividend (OECD, 2006). Firstly, it would boost labour force growth and help offset the negative impact of population ageing on economic growth; secondly, it would improve public finances (comparatively fewer expenditures but more contributions) and finally it would help employers by smoothing the pace at which they have to replace retiring workers with new entrants.

## 2 Decline in the labour force participation of older workers was mirrored by a steady reduction of average retirement age

Labour force withdrawal of older workers was one of the most dramatic demographic trends in the post-war period. In the early 1960s, the participation rate of people aged 60+ was above 70 per cent in most European countries, in some it was around 80 per cent. By the mid-1990s, this rate had fallen to below 20 per cent in many countries, such as BE, IT, NL, FR or AT; in addition, cross-national differences in participation had widened. The downward trend in the labour force participation of older workers lasted until the mid-1990s, when it was eventually reversed in many countries. Despite this trend reversal, the labour force participation of males aged 55+ is still lower now than it was just a few decades ago. Female labour participation has been on the rise in general, as has been the participation of the group aged 55+; however, their respective participation levels are still much lower than those of men.

The trend of falling labour participation of older workers was mirrored by a decrease in the average effective retirement age of workers. In the 1960s and early 1970s, men retired from the labour market when they reached the age of 65. Since then, the average age of retirement has declined dramatically. The average age of female retirement, while historically lower than that of men, has followed a similar pattern from the 1960s.

Gruber and Wise (2002) point out that, to understand these trends, we have to consider the social security systems and their evolution over time, among other things. Pension policies are an important determinant of labour force participation. The extent to which social security systems

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[4] Over and above these goals, it is reasonable to think of ways to shorten education periods and years of study, since otherwise rising numbers of labour markets entrants with tertiary education (which are another explicit goal of economic policy) will tend to shorten working lives further.

[5] Between 2000 and 2008, the employment rates of female and older workers increased by about 5.5 and 9 percentage points respectively.

affect the pattern of labour force participation depends on the generosity of the system, such as replacement and coverage ratios. These two ratios were on the rise in European countries until the mid-1990s.

However, economic incentives built into the social security system were not the only reason why more and more people retired early. Above all, this development was caused by deliberate policy measures to reduce labour supply. Especially at the end of the 1970s and in the mid-1980s, governments, firms and trade unions often created "incentive schemes" for older workers to leave the labour market. Economic policymakers took action to "relieve" the labour market in times of low demand (recessions) or high supply (immigration) or in the face of structural unemployment problems caused by declining sectors – also in Austria. Various "soft landing" plans were implemented to reduce the labour supply (early retirement schemes, specific long-term unemployment benefits for older workers in declining sectors or a generous handling of invalidity pensions); these measures were characterised by less stringent eligibility rules. which were later even extended to all employees. Such bridging pensions were introduced also in FI, IT, DE and NL.[6] Most of these soft landing plans have become permanent institutions which have come to shape people's attitude towards retirement and thus to influence individual retirement decisions.

When investigating, inter alia, the reasons for cross-country differences in the labour force participation of older workers, Börsch-Supan *et al.* (2008) find, not surprisingly, that early retirement regulations in particular are an important determinant of labour force participation decisions in older age. In addition, they find that over and above the general institutional or other differences specific to a country, it is the generosity of the pension systems itself that matters a great deal in making individuals retire or keep on working.

Apart from the retirement rules and the monetary incentives built into the social security systems, also other aspects determine the labour force participation of older people, such as the trend of increasing real earnings, the existence of non-pension alternatives for old age (availability of different sources of income in old age), health-related factors, within-household decision-making (retirement decisions of couples) and care responsibilities, labour demand factors and social norms and traditions.[7]

## 3 Reversing the falling labour participation trend – an important target of pension reforms…

Labour force participation as well as employment rates of older workers have been raised significantly in several European countries in recent years. Pension reforms introduced since the 1990s primarily aimed at improving the sustainability of the public pay-as-you-go pension systems; they did so inter alia with the help of measures that intended to increase the labour force participation of older workers and to delay their exit from the labour market. The paper by Arpaia, Dybczak and Pierini, which was presented in this session, focuses on whether pension reforms enacted in the EU-27 over the past two decades have been successful in raising the labour force participation of those aged 50+ in the short term. It points to a difference in the short-term impact of pension reforms on the participation rate of men and women. The policy conclusion that can be

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[6] The political intention behind these measures was to replace ageing high-wage workers by young low-wage workers or to encourage older workers to retire in order to give their jobs to younger, possibly unemployed, workers. However, this hypothesis could not be verified empirically for the past decades. Still, in the face of the strong rise in unemployment of young male workers in the wake of the global economic crisis, this argument has again become politically attractive.

[7] The importance of the latter should not be underestimated, in particular in those countries where people tend to retire at the first opportunity offered, even if their pensions are low and would be higher if they delayed retirement. Longer retirement becomes an acceptable, even a highly desired part of a typical worker's life.

drawn from their study is that at least reforms of early-retirement options seem to have had a significant positive impact on the labour force participation of older women.[8] However, we have to bear in mind that this reform category, as defined in the study, includes very heterogeneous reform measures. Thus, from a policy perspective it would be of greater interest to check for the labour supply impact of specific measures or elements. The authors do not find any clear-cut short-term impact from fundamental or non-fundamental reforms. However, people make plans and do not change them quickly when a system changes – and this is particularly true for older people. Therefore, asking about the short-term impact of different pension reforms may just not be the most relevant question. With respect to reforms aimed at enhancing the long-term sustainability of the pension systems, the medium- to long-term effects on participation are probably more important. Above all fundamental reforms – but also early-retirement reforms – may have long phasing-in periods. For instance, Austrian's early-retirement schemes will be phased out slowly until 2017. Moreover, the breakdown of reforms into "early retirement", "fundamental" and "non-fundamental" reforms does not allow any statement or inference about the time horizon, *i.e.* whether the political intentions were geared primarily towards the long term or also to the short term. Finally, as labour supply and labour force participation of older workers are not independent from the cycle, adequately controlling for the economic conditions is indispensable.

## 4 … but efforts to increase labour force participation have to be transformed into successful structural reforms

If the labour supply of older workers could be more fully mobilised, this would reduce economic dependency ratios and would improve public finances as well as increase potential growth (both in the short and long term). However, in order to transform pension reform-related efforts to increase labour force participation into successful structural reforms, they will have to be complemented with measures improving the employability of older workers in the future; the latter is far from assured. Increasing the employment rates of older workers has to be part of a more comprehensive strategy to cope with population ageing. This requires a broader reform perspective: Attention needs to be given to strengthening the skills and improving the training of individuals to reduce the gap between marginal productivity and total compensation of older people; to combating discrimination against older workers and people with disabilities; and to fostering changes in employer behaviour that inhibits employment of older workers (and people with family and care responsibilities). Moreover, the very low hiring rates of older workers have to be increased.

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[8] As mentioned by the authors, the increase in female labour force participation following pension reforms might be related to the fact that women tend to have shorter working lives due to career interruptions (maternity leaves and other family reasons).

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**Session 2**

# PENSION REFORM AND CAPITAL MARKETS

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# PENSION REFORM AND CAPITAL MARKETS

# PRIVATIZING PENSIONS: MORE THAN AN INTERESTING THOUGHT?

*Nick Draper*[*] *and Ed Westerhout*[*]

*Privatization of public pension schemes, partial or complete, is on the political agenda in many countries. In the Netherlands, the discussion focuses on second-pillar pension schemes. Although these schemes are funded, they feature intergenerational risk sharing. This paper documents the consumption, labour supply and welfare effects of a privatization of these second-pillar schemes. It adopts a stochastic model of life-cycle planning that includes endogenous saving, investment and labour supply behaviour. The analysis offers a decomposition of the welfare effect of privatization in order to assess the effects of intergenerational risk sharing and of labour market distortions.*

## 1 Introduction

A large literature has developed that assesses the welfare aspects of pension schemes. An important result is that defined-benefit (DB) pension schemes feature different types of intergenerational risk sharing that the market for whatever reason cannot provide. By this argument, DB pension schemes add to social welfare. Another result is that pension schemes generally aggravate already existing distortions on labour and capital markets, an aspect that decreases welfare. Some studies find that the risk sharing effects dominate (Nishiyama and Smetters, 2007; Fehr and Habermann, 2008), while others conclude that the distortions are dominant (Krueger and Kubler, 2006; Fuster *et al.*, 2007).

Almost without exception, the literature focuses on the case of PAYG-financed pension schemes. For the Netherlands, the case of funded schemes is more interesting. Moreover, the case of funded schemes differs from the PAYG case for two reasons. First, to the extent that the introduction of a funded scheme substitutes pension saving for private saving, the effect on aggregate saving may be minor. The case of the introduction of an unfunded scheme is known to be entirely different. Second, a funded scheme generally features a tight link between benefits and contributions. In contrast, in a PAYG scheme such a link either is weak or does not exist.[1]

This paper explores the effects of the privatization of a funded pension scheme. It therefore constructs an OLG model in which the rate of return on equity is stochastic and labour supply is endogenous. Unlike Teulings and de Vries (2006) and Bovenberg *et al*. (2007), households decide on the size and the portfolio composition of their private saving accounts. The idea that households do not save otherwise than through a pension fund is not only unrealistic, but would also in our case be misleading as households would be constrained from adjusting their private savings in order to compensate for a reduction of pension savings.

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[1] Lindbeck and Persson (2003) stress the usefulness of distinguishing carefully the concept of actuarial fairness from the financing concept (funded, unfunded).

Our model has a relation with a few models in the literature that combine capital income risk with aggregate labour income risk (Bodie *et al.*, 1985, Viceira, 2001, Cocco *et al.*, 2005 and Gomes *et al.*, 2008). Although our paper takes labour productivity and thus gross labour income as non-stochastic, labour income net of pension contributions is stochastic, as the rate of pension contributions in our model reflects shocks in the rate of return on equity. The paper that comes closest to our paper is that of Bodie *et al.* (1992) which includes labour income shocks that are perfectly correlated with stock price shocks.

Unlike Bodie *et al.* (1992) and Gomes *et al.* (2008), we adopt a specification in which labour supply is not driven by a wealth effect. Our motivation is that empirically, wealth effects are usually found to be small when compared with substitution effects (Lumsdaine and Mitchell, 1999). The implication is that labour supply is unresponsive to changes in financial wealth. Hence, labour flexibility cannot play a role in absorbing capital market shocks and the impact that the two above-mentioned studies find of labour flexibility on portfolio composition does not arise in our model.

Our approach is to analyze a hypothetical DB scheme. This allows us to give clear-cut answers on the question what is the role of typical elements of DB schemes, like the insurance against capital market uncertainty or lifetime uncertainty. The disadvantage is that real-world schemes are different, because of factors neglected in the simulation approach. See Samwick and Skinner (2004) and Poterba *et al.* (2007) for a comparison of the actual performance of DB and DC schemes.

Our analysis highlights four elements. The probably most well-known effect of DB schemes is intergenerational risk sharing. While the market does not allow trade with the unborn, DB schemes can. This type of risk sharing will be lost when the scheme is abandoned (Gordon and Varian, 1988; Bovenberg *et al.*, 2007; Gollier, 2008).

The second element is labour market distortions due to contingent transfers. If transfers among generations relate to labour income, they act as a wedge on labour supply. Hence, intergenerational risk sharing can result in effectively taxing or subsidizing labour supply. Both factors decrease social welfare and it is this welfare loss that will vanish when a DB scheme is abandoned.[2]

The third element also relates to labour market distortions, but now due to the fact that the contribution rate and the pension accumulation rate are uniform across generations. This element is common to DB plans (Bodie *et al.*, 1985) and is even legally prescribed in the Netherlands.[3] As the terminal value of a pension contribution is lower, the older the household, pension contributions are larger than the rights accumulated for young workers, whereas beyond a certain age (typically, about 45 years old) the opposite holds true. The uniformity of the pension contribution rate thus works as an incentive for young workers to take up leisure, whereas beyond a certain age, households are induced to increase their labour supply. The distortion of the labour supply decision of both groups of workers creates an additional welfare loss.

The fourth element is annuity markets. Pension schemes automatically convert the wealth upon retirement into an annuity, thereby insuring participants against lifetime uncertainty. This insurance could be achieved on the market as well, provided that annuity markets are perfect. In reality, annuity markets show large imperfections (Poterba, 2001). Our analysis takes this to the extreme and simply assumes (in the benchmark at least) that annuity markets do not exist.

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[2] Taxes are levied also for other (non-pension) reasons, which increases the role of labour market distortions. Future work will take this into account.

[3] Aarssen and Kuipers (2007) and Bonenkamp (2007) calculated the transfers between different age cohorts for the Netherlands that are due to the uniformity of the contribution rate and the build-up rate and found them to be quite large.

This paper will focus on the steady-state implications of the privatization of pension schemes. We will present four types of simulations: 1) privatization of the funded DB scheme (benchmark simulation); 2) the same as 1), but now assuming that perfect annuity markets exist; 3) a simulation that explores the role of labour supply endogeneity and 4) a simulation that explores the role of the uniform contribution rate. Together, these simulations indicate the overall contribution of the funded DB pension scheme to welfare and the contributions of various elements, among which insurance against lifetime uncertainty, uniform pricing and labour supply endogeneity.

Our analysis is not exhaustive. DB schemes offer additional advantages that our analysis does not capture. The obligatory nature of pensions prevents myopic households from saving too little. Moreover, pension funds may be better investors than individual households, able to achieve higher rates of return on average, less volatile rates of return or both. In addition, pension funds will be less subject to capital market constraints (*e.g.* borrowing constraints and short-selling constraints) than individual households.[4] These and other elements do not reduce the value of our results, but help to put them more in perspective.

The structure of our paper is as follows. The next section sets up our model. Then, we describe various aspects of the life-cycle behaviour of households in the baseline. Subsequently, we report the effects of the four simulations described above. We focus on the effects on consumption, labour supply and welfare. We end with some concluding remarks.

## 2 An OLG model with pensions

The model describes a small open economy for which factor prices are given. It consists of overlapping generations of households and a pension fund.

Households have a finite life with uncertain length. They enter the economy at the age of 20 and may work up to the age of 65. From that age onwards, they receive a pension until they die. The time of death is uncertain, but occurs at the age of 100 or before with certainty. We work with periods of five years, so we define the working phase of the life-cycle to consist of 9 periods, the retirement phase to consist of 7 periods and the life-cycle to consist of 16 periods. Households maximize a utility function by choosing their savings and their investment in risky assets at different ages in their lives. In the working phase of their life-cycle, they also choose optimally their consumption of leisure.

The pension fund in the model receives contributions from working generations and pays pensions to retired generations. Households are obliged to participate in this pension fund. This corresponds to the Dutch situation in which workers are obliged to participate in a pension scheme if they decide to sign a labour contract. The pension scheme is of the DB type: pension benefits relate to the individual's labour history, but are unrelated to both capital market rates of return and to the length of life. Shocks to pension wealth are absorbed by the contributions that the pension fund levies upon working cohorts.

This section develops the model that we use for our analysis. It starts by specifying the nature of the stochastic variables in the model. Subsequently, it specifies the model for households and that for the pension fund.

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[4] See also Bovenberg *et al.* (2007) for an overview.

### 2.1 Stochastic assumptions

We focus on one major form of macroeconomic risks: equity return risk. The gross rate of return on equity follows a lognormal white noise process. The second asset in the economy is a bond, the return of which is riskless. The excess return on the risky asset is defined as:[5]

$$\tilde{e}_s(t) = \tilde{R}_s(t) - \tilde{R}_b \tag{1}$$

In equation (1), index $b$ points to bonds and $s$ to equity. The expected value of the excess return on equity is denoted as $\mu_s$, whereas its variance is denoted as $\sigma_s^2$.

Our model distinguishes the case with and without a perfect life insurance market. In the former case, households receive an annuity return on their private savings that reflects their mortality risk (Yaari, 1965). As mortality rates are allowed to differ by age, the annuity return will be age-dependent. We abstract from macroeconomic longevity risk, so population growth at the level of generations is non-stochastic.

More precisely, in the simulations in which annuity markets are assumed to exist, the wealth of those who die at time $t$ with age $i$, is transferred to the people of the same cohort who survive. This makes the effective rate of return on the two assets equal to $R_m(t,i) = \tilde{R}_m(t)/\zeta(t,i) \quad m = b,s$, where $\zeta(t,i)$ reflects the survival rate of cohort *i* in period *t*. Similarly, $e_s(t,i) = \tilde{e}_s(t)/\zeta(t,i)$. Hence, it is $R_b$ and $R_s$ (and $e_s$) that drive private savings if annuity markets are assumed perfect, rather than their equivalents $\tilde{R}_b$, $\tilde{R}_s$ (and $\tilde{e}_s$).

The literature offers a simple approach to price assets in complete markets in case of partial equilibrium modelling. Partial equilibrium models of small open economies assume exogenous given capital market developments. Equity income is the only source of uncertainty. Given these assumptions there is a unique stochastic discount factor which can be used to calculate the value of all assets and their derivatives. This unique stochastic discount factor reads as follows (see Cochrane, 2005, page 73):

$$\tilde{m}(t) = \frac{1}{\tilde{R}_b} - \frac{1}{\tilde{R}_b}\frac{\mu_s}{\sigma_s^2}\left(\tilde{e}_s(t) - \mu_s\right) \tag{2}$$

given the stochastic assumption made. This discount factor implies that non-stochastic income flows are discounted by the bond rate, because the last term disappears after taking expectations. However, stochastic income flows are discounted with a correction which depends on the covariance with the excess return.

Two examples may illustrate the working of the stochastic discount factor. Assume a bond price $p_b$ that gives a pay out $d_b(+1)$ and a rest value $p_b(+1)$ in next year. According to asset valuation theory, it holds that:

$$p_b(t) = E\tilde{m}(t+1)\left(d_b(t+1) + p_b(t+1)\right) \tag{3}$$

This implies for the rate of return $\tilde{R}_b(t+1) = \left(d_b(t+1) + p_b(t+1)\right)/p_b(t)$

$$1 = E\tilde{m}(t+1)\tilde{R}_b(t+1) \tag{4}$$

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[5] In this document we use suffixes as indicators for variables that refer to specific time periods or ages. For individual variables we use only the age suffix $j$, for intergenerational variables we use both the age suffix $j$ and the time suffix $t$, for aggregated (macro) variables we use only time suffix $t$. At the individual level time and age are related on a one-to-one basis, so using the age indicator $j$ is sufficient.

The same argument leads to:

$$1 = E\tilde{m}(t+1)\tilde{R}_s(t+1) \tag{5}$$

for the rate of return on shares. Subtract both equations to obtain for the excess return on shares:

$$0 = E\tilde{m}(t+1)\tilde{e}_s(t+1) \tag{6}$$

Equation (4) and (6) are easy to verify after substitution of the expression for the stochastic discount factor (equation (2)), taking expectations and using the definitions of the expected value and variance of the excess return on shares. All derivative assets can be valued using this stochastic discount factor, too. For instance, our model is characterized by stochastic net wages, due to stochastic pension premiums. This implies that human wealth, the discounted value of net wages, can be considered as a derivative asset of bonds and shares. The pay-out of human wealth (net wages) has to be valued with the stochastic discount factor $\tilde{m}$. In the household model we will use $m(t,i) = \zeta(t,i)\tilde{m}(t)$.

### *2.2 The household decision problem*

An individual of age $j$ maximizes his expected intertemporal utility, $U$, which is defined over his remaining lifetime:

$$U(j) = E_j \sum_{i=j}^{j_e} u(i) d_s(i) \text{ with} \tag{7}$$

$$d_s(i) = \prod_{l=j}^{i-1} \delta(l)^{-1}$$

Here, $j_e$ (= 100 years) denotes the maximum attainable age.[6] The discount factor is defined as $\delta(l) = \tilde{\delta} / \zeta(l)$ with $\tilde{\delta}$ the time preference factor and $\zeta(j)$ the conditional (upon being alive at the start of year $j$) probability of living through the next period. $E_j$ is the expectations operator, used to account for the uncertainty of utility derived from consumption.[7]

The felicity function, $u$, has as arguments the consumption of commodities, $c$, and the consumption of leisure, $v$:

$$u(i) = \frac{1}{1-\gamma}\left(\alpha_c c(i) + \alpha_v \frac{v(i)^{1-\beta}}{1-\beta}\right)^{1-\gamma} \text{ with} \tag{8}$$

$$\alpha_c, \alpha_v > 0,\ \beta > 1,\ \gamma > 0$$

$1/\gamma$ denotes the elasticity of intertemporal substitution and $1/\beta$ the price elasticity of leisure demand. We assume $\beta > 1$, ensuring that commodity consumption is always positive. $\alpha_c$ and $\alpha_v$ are utility weights of respectively the consumption of commodities and leisure.

The asset accumulation equation describes the development of household financial wealth, $w_f^h(i)$, through time:

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[6] The consumption of children is attributed to their parents.

[7] Note, we use as convention $\prod_{l=j}^{j-1} \delta(l)^{-1} = 1$.

$$w_f^h(i+1) = R_b(i+1)\left(w_f^h(i) + y(i) - c(i)\right) + e_s(i+1)w_s^h(i) \tag{9}$$

Equation (9) signals that households receive non-capital income $y(i)$, consume $c(i)$ and invest their savings in bonds and equity. Riskless bonds earn a yearly gross return $R_b$ and equity earns an annual gross return $R_s$ (with an excess return $e_s$). As explained in the previous section, the effective rates of return on the two assets depend on the household's mortality rate in case annuity markets are present. Hence, the effective rates of return are age-dependent. $w_s^h(i)$ denotes the household's investment in risky equity. Regarding the timing of transactions, we assume that all variables (transactions, demographic changes, stocks) are measured at the start of a period.

Non-capital income equals labour income $y_w(i)$ in the working ages, $i < j_r$, where $j_r$ (= 65 years) denotes the maximum age in the working phase. Labour income depends on the working time, the wage rate $p_l(i)$ and the pension premium rate $\tau_p$:

$$y(i) = y_w(i) = (1-\tau_p(i))\left(1-v(i)\right)p_l(i) \qquad \text{for } i < j_r \tag{10}$$

Working time is expressed as $1-v(i)$, indicating that we have normalized the time endowment to unity. Non-capital income equals pension income $y_p(i)$ in the retirement period ($i \geq j_r$). The pension level (replacement rate) at the start of the retirement period depends on the work effort over the past in an average-wage defined benefit (DB) system:

$$y_p(i+1) = y_p(i) + a\left(1-v(i)\right)p_l(i) \qquad \text{for } i < j_r - 1 \quad \text{and } y_p(5) = 0 \tag{11}$$

with $a$ the accrual rate. Pension income is constant over time:

$$y(i) = y_p(i) = y_p(i-1) \qquad \text{for } i \geq j_r \tag{12}$$

The household's problem is to maximize expected intertemporal utility (7), subject to the asset accumulation equation (9), his initial amount of financial wealth, $w_f^h(i)$, and a Kuhn-Tucker condition that ensures that leisure does not exceed the time endowment of the household.

### *2.3 Household behaviour*

In our model, households decide on their savings, on their investment in equity and on their leisure demand. We start to describe leisure demand. The equation that expresses leisure demand is as follows:

$$v(i) = \left(\frac{\alpha_c}{\alpha_v}\tilde{p}_v(i)\right)^{-\frac{1}{\beta}} \tag{13}$$

where the shadow price of leisure, $\tilde{p}_v$, is defined as the maximum of the actual price of leisure, $p_v$, and the ratio $\alpha_v / \alpha_c$. This ensures that leisure time does not exceed the time endowment of the household. In case the time constraint is binding, $\tilde{p}_v = \alpha_v / \alpha_c$; alternatively, $\tilde{p}_v$ equals $p_v$.

$$\tilde{p}_v(i) = \max\left\{\frac{\alpha_v}{\alpha_c}, p_v(i)\right\} \tag{14}$$

Two aspects of leisure demand deserve discussion. First, due to our felicity function, leisure demand does not depend on the household's financial or total wealth position. This accords with empirical evidence (Lumsdaine and Mitchell, 1999). Second, a Kuhn-Tucker condition ensures that

leisure demand does not exceed unity. This holds true for retired workers, who will be assumed below to have zero labour productivity. It also applies to non-retired workers whose productivity falls below a certain level.[8] Our model thus captures the labour supply decision both at the intensive and the extensive margin.

The price of leisure consists of three components:

$$p_v(i) = (1-\tau_p(i))p_l(i) + p_r(i) \tag{15}$$

The first is the age-specific wage rate and the second the pension contributions which are proportional to the wage rate. The third component measures the discounted value of future pension income that can be attributed to the marginal hour of work, $p_r(i)$:

$$p_r(i) = ap_l(i)\sum_{h=j_r}^{j_e}\left(\prod_{l=i}^{h-1}R_b(l+1)^{-1}\right) \tag{16}$$

This component is also proportional to the wage rate.

Our specification of the felicity function implies that the consumption of commodities has a minimum that is strictly positive:[9]

$$c(i) > c_l(i) \equiv -\frac{\alpha_v}{\alpha_c}\frac{v(i)^{1-\beta}}{1-\beta} > 0 \tag{17}$$

Equation (17) demonstrates that this minimum amount of consumption is age-dependent and decreasing in leisure time. Because it relates to leisure time, we call this labour-induced consumption and denote it as $c_l$. This minimum amount of consumption plays an important role in our consumption equation, which reads as follows:

$$c(i) = c_l(i) + \left(\frac{1}{\alpha_c p_f(i)}\right)^{\frac{\gamma-1}{\gamma}}\left[w^h(i) - w_l^h(i)\right] \tag{18}$$

Here, $w^h$ denotes total household wealth, which we will define below. $w_l^h$, the wealth that relates to current and future labour-induced consumption, is described by the following equation:[10]

$$w_l^h(i) = E_i\sum_{h=i}^{j_e}\left(\prod_{l=i}^{h-1}m(l+1)^{-1}\right)c_l(h) \tag{19}$$

The second term at the RHS of equation (18) reflects the basic feature of the standard life-cycle model, consumption being proportional with total household wealth. The first and third term however indicate that the life-cycle pattern of commodities consumption deviates from the pattern of this standard model, due to the interaction with leisure demand. In particular, the first and third term taken together establish that the household consumes more (fewer) commodities than prescribed by the standard model in years in which his labour supply is relatively high (low). Our

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8 Actually, as long as labour productivity is below $\alpha_v / \alpha_c$, our model predicts zero labour supply. This indicates that retirement occurs in our model not only when labour productivity becomes sufficiently low, but also when the preference for leisure becomes sufficiently high.

9 Except if $v$ would be zero, a case that we will not consider.

10 Note, households have expectations conditional on the state of the economy. These expectations depend on the state of the economy only and are time-invariant. We use the method of parameterized expectations (see Heer and Maussner (2005), chapter 3), *i.e.* we project $\sum_{h=i+1}^{j_e}\left(\prod_{l=i}^{h-1}m(l+1)^{-1}\right)c_l(h)$ on the state of the economy at time $i$ using regression methods.

felicity specification thus brings about a positive correlation between consumption and labour supply and, given that labour supply is increasing with the wage rate, between consumption and current labour income. Hence, consumption and current income are more strongly correlated than in the standard life-cycle model, which may help to solve part of the excess sensitivity of consumption that is found in empirical research (Flavin, 1981).

Total wealth is defined as the sum of explicit assets (here, financial wealth) and implicit assets (here, human wealth, denoted $w_h^h$, and pension rights, denoted $w_p^h$):

$$w^h(i) = w_f^h(i) + w_h^h(i) + w_p^h(i) \tag{20}$$

Human wealth is defined as the discounted expected value of future after-tax labour income:[11]

$$w_h^h(i) = E_i \sum_{h=i}^{j_r} \left( \prod_{l=i}^{h-1} m(l+1) \right) (1-v(h)) p_v(h) \tag{21}$$

Pension wealth is the accumulation of pension rights minus the pension benefits that have already been paid out, where $\delta_{j \geq j_r}$ equals one for the retirement years and is zero otherwise.

$$w_p^h(j+1) = R_b(j+1)\left[ w_p^h(j) + (1-v(j)) p_r(j) - \delta_{j>j_r} y_p(j) \right] \tag{22}$$

The price index of total wealth:

$$p_f(i) = \left[ \sum_{h=i}^{j_e-1} \alpha_c^{\frac{1-\gamma}{\gamma}} \prod_{l=i}^{h-1} \left( \frac{R_b(l+1)\phi(l+1)}{\delta(l+1)} \right)^{\frac{1}{\gamma}} \frac{1}{R_b(l+1)\phi(l+1)} \right]^{\frac{\gamma}{\gamma-1}} \tag{23}$$

is a composite of the constant utility weight $\alpha_c$. As in the standard life-cycle model, the weighting factors refer to two effects. A rate of return higher than the rate of time preference increases savings on account of the substitution effect. The second element of the weighting factor describes the income effect of returns on investments. A high rate of return also adds to consumption possibilities, the income effect. If the intertemporal elasticity of substitution is below unity ($1/\gamma < 1$), the income effect dominates the substitution effect.

Different from the standard life-cycle model is the rate of return $R_b\phi$. This variable measures the certainty-equivalent rate of return. It differs from the risk-free rate of interest because the rates of return on equity and human wealth are stochastic and different from the risk-free rate of interest. The certainty-equivalent rate of return is age-specific. Indeed, pensioners do not own human capital and are therefore not subject to stochastic fluctuations in the rate of return on human wealth. In addition, workers of different age have different amounts of human capital and are therefore differentially affected by shocks in the rate of return on human wealth. The equation for the certainty-equivalent rate of return can be derived as follows:

$$\phi(l+1) = \left[ E_i \left( 1 + a_n(l) e_n(l+1) + a_s(l) e_s(l+1) \right)^{1-\gamma} \right]^{\frac{1}{1-\gamma}} \tag{24}$$

Here, $e_n$ and $e_s$ are the excess rates of return on human capital and equity respectively. $a_n$ and $a_s$ measure the share of human wealth and equity in total household wealth respectively.

The third dimension of the household's decision problem is the allocation of wealth over bonds and equity. An age-dependent fraction of total wealth net of consumption, $a_s(i)$, is invested

[11] See footnote 11.

in the risky asset (where both total wealth and consumption are corrected for labour-induced consumption):

$$w_s^h(i) = a_s(i)R_b(i+1)\left[\left(w^h(i) - w_l^h(i)\right) - \left(c(i) - c_l(i)\right)\right] \tag{25}$$

The investment share in the risky asset, $a_s$ is implicitly defined by the following two equations:

$$0 = E_i\left(1 + a_n(i)e_n(i+1) + a_s(i)e_s(i+1)\right)^{-\gamma} e_l(i+1) \text{ and } l \in \{n, s\} \tag{26}$$

with $a_n$ the implicit portfolio share of human wealth and:[12]

$$e_n(i+1) = \frac{w_h^h(i+1) - w_l^h(i+1) + R_b(i+1)y_b(i)}{w_h^h(i) - w_l^h(i)} - R_b(i+1) \tag{27}$$

in which $y_b$ is net broad labour income, *i.e.* labour income net of pension contributions but including pension rights and excluding labour-induced consumption: $y_b \equiv (1-v)p_v - c_l$.

The RHS of equation (26) can be approximated by a second-order Taylor expansion around zero. This leads to the following expression for the fraction of total household wealth that is invested in equity:

$$a_s(i) = \frac{\mu_s - \gamma a_n(i)\sigma_{ns}(i)}{\gamma\left[\sigma_s^2 - \mu_s^2\right]} \tag{28}$$

in which $\mu_s / (\gamma\left[\sigma_s^2 - \mu_s^2\right])$ is the tangency portfolio and $(a_n(i)\sigma_{ns}(i)) / \left[\sigma_s^2 - \mu_s^2\right]$ is the income hedge portfolio. $\sigma_{ns}(i)$ denotes the covariance between the excess return on equity and that on human capital. This covariance term is age-specific. It is positive for all working generations. The implicit portfolio share of human wealth can be approximated in the same way

$$a_n(i) = \frac{\mu_n - \gamma a_s(i)\sigma_{ns}(i)}{\gamma\left[\sigma_n^2 - \mu_n^2\right]} \tag{29}$$

The value function is defined as

$$V(i) = \frac{1}{1-\gamma} p_f(i)^{\gamma-1}\left[w^h(i) - w_l^h(i)\right]^{1-\gamma} \tag{30}$$

### *2.4 The behaviour of retirees*

Retirees have zero labour productivity so that $p_v = \alpha_v / \alpha_c$ and $v = 1$. Pre-commitment consumption equals $c_l = (\alpha_v / \alpha_c) / (\beta - 1)$ and the equation for consumption adjusts correspondingly. Importantly, $e_n = 0$ for retirees, since they are not subject to labour income shocks. Hence, the investment share for pensioners does not contain a hedging component and is independent of age:

$$a_s(i) = \frac{\mu_s}{\gamma\left[\sigma_s^2 - \mu_s^2\right]} \tag{31}$$

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[12] The error terms $e_n$ are calculated assuming perfect foresight. A future research step will be replacing this assumption with the rational expectation assumption.

which is comparable with Viceira (2001). This implies that $\phi(i)$ is age-independent for retired people.

### 2.5 *The behaviour of workers*

The leisure of workers is given by equation (13) and their consumption by equation (18). The investment in equity as a fraction of their total wealth is given in equation (28). A feature of the life-cycle model we employ is that human wealth as a fraction of total household wealth drops to zero at the age of 65. It can be derived that $a_n$ displays a similar pattern. Labour income net of pension premiums is positively correlated with equity return shocks. Consequently, $a_s$ increases over the life-cycle. As the hedging role of human capital diminishes over the life-cycle, households decide to invest an increasing fraction of their total wealth in equity. Although equation (28) is similar to that of Viceira (2001), the hedging demand for equity does not increase with age in that paper. The reason is that all workers in Viceira (2001) face the same probability to become retired, so that human wealth is actually independent of age. We consider our approach more realistic.

### 2.6 *Pension sector*

Pension funds start each period with a given amount of financial wealth $w_f^p$. They receive premium income $\tau_p y_{wg}$ from workers ( $j < j_r$ ) and pay benefits $y_p$ to retirees. The remainder is invested in bonds or equity. Assets have a return which is received at the start of next period. Assets evolve according to:[13]

$$w_f^p(t+1) = \tilde{R}_b(t+1)\left[ w_f^p(t) + \tau_p(t) y_{wg}(t) - y_p(t) \right] + \tilde{e}_s(t+1) w_s^p(t) \tag{32}$$

in which the macro variables are obtained by aggregation over the age cohorts (for instance $y_p(t) = \sum_j n(t,j) y_p(t,j)$ ). In this equation $\tau_p$ is the pension premium rate and $y_{wg}$ is gross wage income, *i.e.* income before premiums are paid ( $y_{wg}(t) = \sum_j n(t,j)(1 - v(j) p_l(j))$ . $w_s^p$ denotes the amount that the pension scheme has invested in equity.

The pension benefits for ( $j \geq j_r$ ) are given in pure DB: shocks are absorbed in the premium rate, while the built up remains time-independent. The representative pension fund uses a simple premium rule. It fixes the premium at a rate that gradually reduces deviations of financial wealth from the pension rights

$$\tau_p(t): \; E_t \Delta w_f^p(t+1) = \Delta w_p^h(t+1) - \mu\left( w_f^p(t) - w_p^h(t) \right) \tag{33}$$

The partial adjustment specification in equation (33) implies a gradual adjustment of financial wealth of the pension fund to its liabilities or, alternatively, a gradual convergence of the coverage ratio towards the level of unity. Hence, a deviation of the coverage ratio from one will generally not be eliminated in one period. This is essential, as it means that the pension scheme organizes risk sharing between non-overlapping generations of households, something that the private market is unable to organize. Unlike households, we do not let the pension fund optimize over the portfolio allocation of its financial wealth. We rather fix this portfolio allocation to the level that coincides with the portfolio allocation (for the case without pension funds) of the average household.

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[13] See footnote 5 for notational conventions.

### *2.7 Alternative model settings*

The benchmark version of our model abstracts from annuity markets, so private savings cannot be insured against longevity risk. An alternative model version assumes that annuity markets exist, so that there is full insurance against longevity risk at actuarially fair prices. As mortality rates are age-dependent, effective rates of return are also age-dependent in this case. Another model version assumes exogenous labour supply. In this model version, labour supply is not an instrument of the household optimization problem. A third alternative version assumes fair pension pricing. In this model version, the equation for the uniform pension contribution rate does not apply. Instead, each cohort faces a cohort-specific pension contribution rate, equal to the present value of the marginal pension right.

As the modifications that arise when implementing one of these alternative versions are pretty straightforward, we omit a detailed description with model equations.

## 3 Calibration and the numerical solution of the base run

The intertemporal substitution elasticity takes a value of 0.5 ($\gamma = 2$). The rate of time preference, $\tilde{\delta} - 1$, takes a value of 1.25 percent. The net risk-free rate, $\tilde{R}_b - 1$, equals 2 percent. The mean and the standard deviation of the excess rate of return on equity, $\mu_s$ and $\sigma_s$, are chosen to equal 1 and 10 percent respectively.[14]

Total available time a year is scaled to one and the annual gross wage rate to 2. The price elasticity of leisure equals $-1/3$ ($\beta = 3$). The parameters $\alpha_v$ and $\alpha_c$ are chosen such that annual leisure time and annual working time during working ages equal 0.5. This is achieved by taking values for $\alpha_v$ and $\alpha_c$ of 0.25 and 1 respectively.

The pattern of mortality rates is such that cohorts up to the age of 75 have a size of 10 and older cohorts have size equal to that of their predecessor minus 2, so that the last cohort in the model, aged 95-99, has size 2. In the simulations with a pension fund we assume an adjustment parameter $\mu = 0.5$ and an accrual rate $a = 0.0125$ a year.

We start in a world without pension funds and without insurance against longevity risk. These assumptions imply as only source of uncertainty equity income of households.

Figures 1 and 2 give more insight into the life-cycle behaviour of households in the model version without pension funds and without annuity markets. For convenience, we focus on the median case, *i.e.* we present results for the case in which the rate of return on equity equals its mean in all years: $\tilde{e}_s(t) = \mu_s$.

The left panel of Figure 1 portrays the development of financial wealth, human wealth and their sum, total household wealth, as a function of the age of the household. The household accumulates financial wealth during the working phase in order to finance consumption during retirement. Human wealth is highest when households enter the labour market and falls gradually to zero over the working phase.

The right panel of Figure 1 displays average consumption and income as a function of age. Consumption increases during the working ages due to the fact that the return on savings is larger

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[14] The values taken for the mean and the standard deviation of the rate of return on equity are much lower than in the data. This is not so much of a problem, as this paper only *explores* the effects of pension reform. For a more thorough assessment of the issue, obviously more realistic values need to be included. We leave this for future research.

**Figure 1**

**Age Profiles of Wealth (left panel) and of Consumption and Income (right panel)**

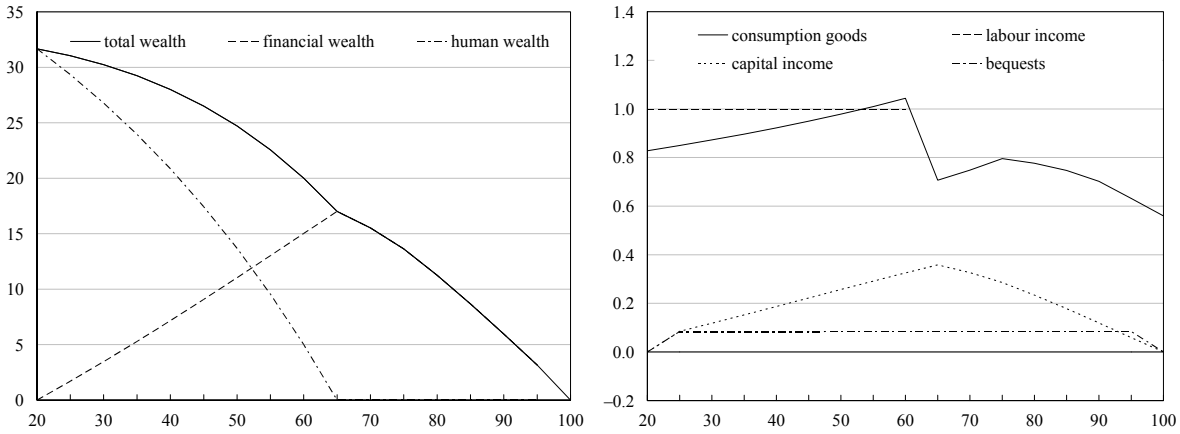



**Figure 2**

**Equity as a Fraction of Total Wealth (left) and Financial Wealth (right)**

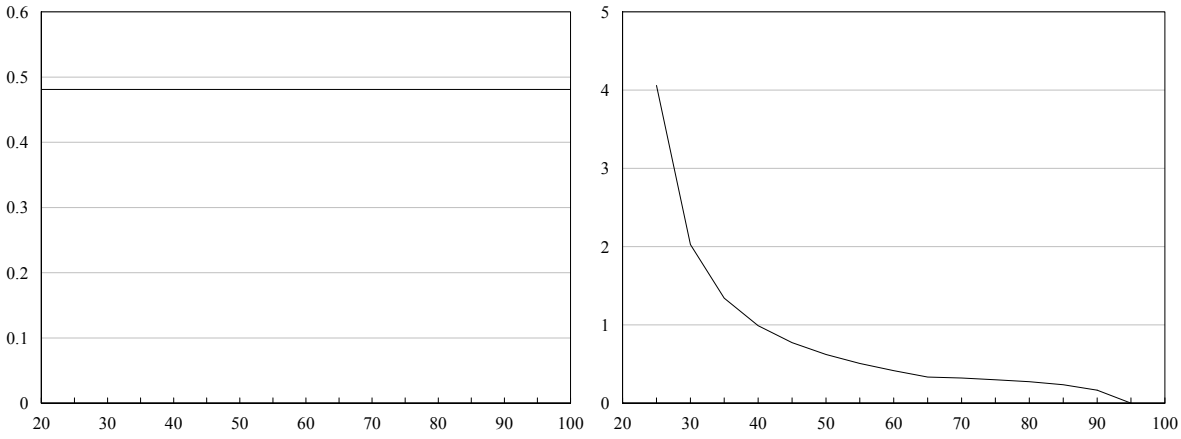
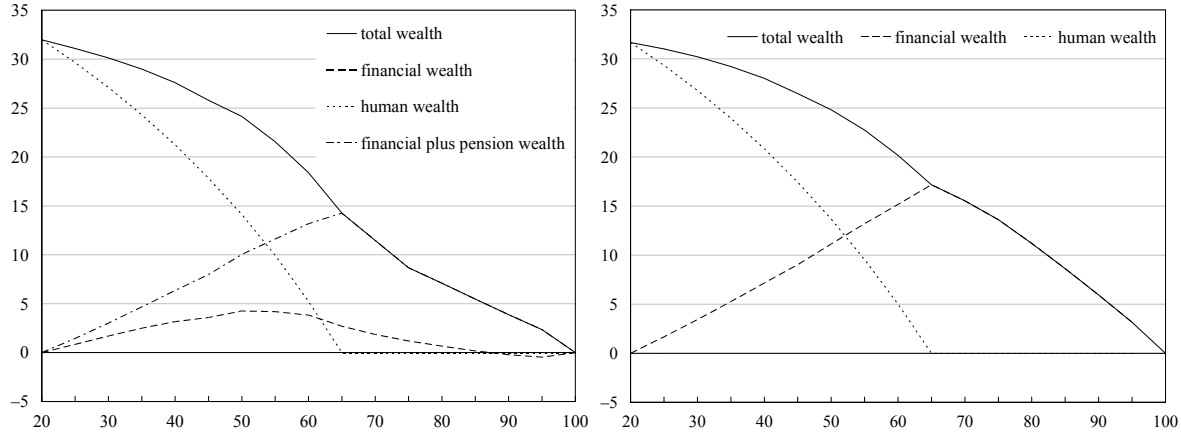


**Figure 3**

**Wealth Profile with (left) and without Pension Funds (right)**



than the rate of time preference. At retirement, consumption drops. This may look as a violation of the Euler condition that characterizes optimal consumption behaviour. It is not however. Retirement implies that the household is forced to reduce its labour supply to zero and to start consuming leisure at the maximum rate. In order to achieve marginal utility smoothing, the household then has to reduce the consumption of commodities upon retirement.

After the age of 65, consumption starts increasing again. The increase turns into a decline at later ages. This occurs in the years with a positive death probability. Without annuity markets households prefer to frontload consumption, *i.e.* the time preference increases relative to the return of savings in this period.

There are three sources of income: labour income, capital income and income from bequests. Labour income is generated during the working ages. Capital income develops in line with financial wealth. Bequests are constant over the life cycle. This is based on our assumption that in the absence of annuity markets aggregate wealth of those who die is distributed equally over all living households by the government.

The left panel of Figure 2 displays the fraction of households' total wealth invested in equity. Equity investment as a fraction of total household wealth is constant over the life-cycle, a well-known property of the CRRA function (Merton, 1969; Samuelson, 1969). Since financial wealth as a share of total wealth increases over the life-cycle, the ratio of equity investment over financial household wealth falls over the life cycle. Note that we have assumed perfect capital markets in which there are no short-selling constraints. Indeed, young cohorts start to invest about 4 times their stock of private savings into equity. Only at the age of 40, the share of financial wealth drops below unity and the household no longer needs to go short in riskless bonds.

## 4 Stochastic Simulations

### *4.1 Privatising pensions*

We draw 100 different stochastic paths. For convenience, we only present the means. This section compares the case with pension funds (left panels) with that without pension funds (right panels).

The accumulation of private financial wealth is slower in the model with a pension fund for the obvious reason that pension savings and private savings are substitutes. It is not that obvious that the sum of private and pension savings in the model with a pension fund is also smaller than private savings in the model without a pension fund. The reason is that the insurance that the pension scheme provides against equity return and lifetime uncertainty reduces the need for precautionary saving, thereby decreasing the accumulation of financial wealth. Figure 4 shows the counterpart of this: the smaller savings in the model with a pension fund imply higher consumption during working ages, but lower consumption at higher ages.

Privatization is calculated to imply a negative welfare effect. Although the pension scheme in our model distorts the labour market in two ways, the insurance that the pension scheme provides to the household against capital income risk and longevity risk obviously dominates. In particular, the welfare loss of privatization equals 13.3 per cent. To see how this effect can be decomposed, the next sections will calculate the effects of the same reform with alternative model versions.

**Figure 4**

**Consumption and Income Profile with (left) and without (right) Pension Funds**

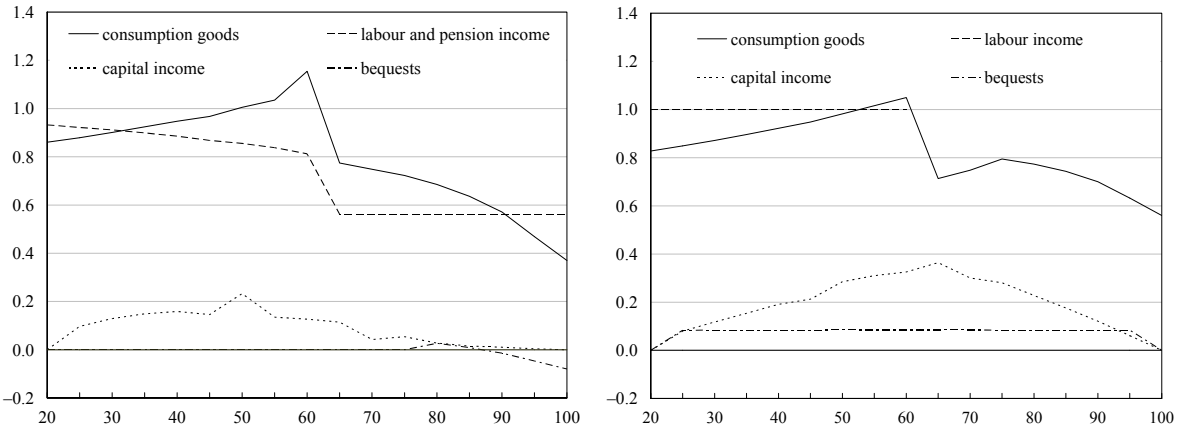
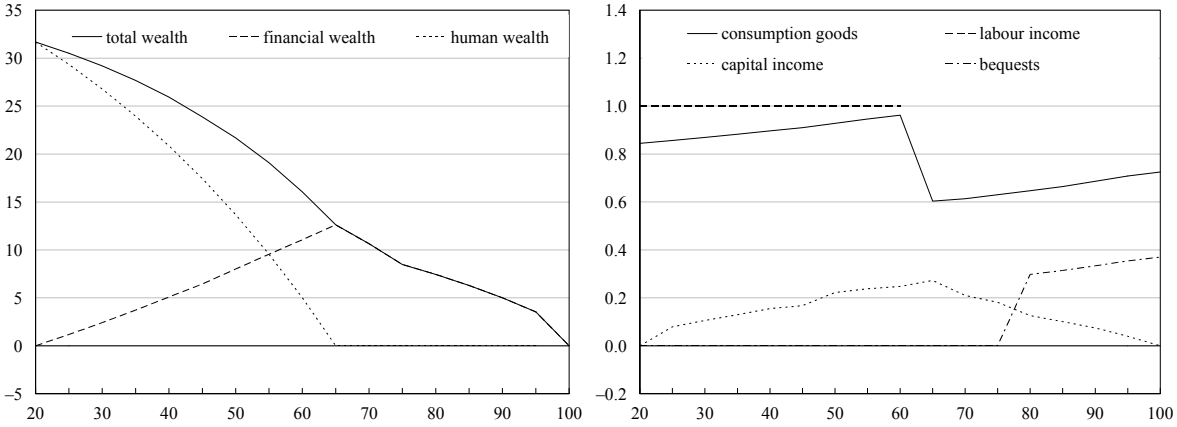



**Figure 5**

**Wealth Profile and Consumption with Annuity Market**




### *4.2 The contribution of annuity markets*

The previous section showed a welfare decline of 13.3 per cent for the steady state generations in case pensions are privatised. The absence of annuity markets in the model without a pension fund explains about 8 per cent of this overall welfare decrease. The reason is that without annuity markets, the household needs to hold additional savings to protect himself against under-consumption in case he lives longer as expected. Hence, with annuity markets, he can consume at a higher rate at more advanced ages (compare the right panels of Figure 4 and 5). In order to finance the higher consumption, consumption at lower ages is somewhat reduced.

### *4.3 The contribution of diminished intergenerational risk sharing*

Coverage deficits are reflected in catching-up premiums, levied upon labour income. Similarly, higher than expected returns on equity imply surpluses in the pension scheme that

translate into negative premiums on labour. The two cases have in common that they distort the labour supply decision of individual households. Privatization of the pension schemes removes this effect. This amounts to a 0.8 per cent welfare gain.

### *4.4 The influence of uniform premiums*

The impact of uniform pension pricing when compared with actuarially fair pricing on welfare is about 2.5 per cent. Like catching-up premiums, uniform pension pricing leads to distortions on the labour market. Unlike catching-up premiums which in an average simulation will be close to zero, the implicit premiums that are due to uniform pension pricing are non-zero on an average simulation. They are positive for young workers and negative for old workers. This may help to explain our finding that the welfare gain that stems from the removal of the distortion due to uniform pricing is an order of magnitude larger than the welfare gain attached to the removal of catching-up premiums. Should we include taxes in our model, this conclusion may again be modified. This is beyond the scope of this paper, however.

## 5 Concluding remarks

Our analysis has shown that privatising a funded DB pension scheme is on net welfare-decreasing. The steady-state loss from privatization is 13.3 per cent. Of this, 8.4 per cent can be attributed to valuable intergenerational risk sharing between non-overlapping generations. This is lost when the scheme is privatized. Another 8 per cent is due to insurance against lifetime uncertainty. This is also lost upon privatization if annuity markets are assumed to be absent. Should we assume that well-functioning annuity markets exist, this part of the welfare loss can be avoided as households can switch to annuity markets to insure against lifetime uncertainty.

Pension schemes like the ones studied here are also known to distort labour markets. The fact that pension contributions are levied on labour income implies that the part of contributions that is used by the pension fund to restore the coverage rate acts as wedge on labour supply, similar to a labour income tax. The elimination of the labour market distortion that is due to the levying of (positive and negative) catching-up premiums produces a welfare gain, albeit quite meagre: 0.8 per cent.

Pension schemes distort the labour market for another reason as well. That is that the accumulation of pension rights and the pension contribution rate do not distinguish between generations. Since, the terminal value of pension contributions decreases with age, this means that young working generations pay more than what is actuarially fair; for older working generations, the opposite holds true. The labour market is distorted along two dimensions. Young generations supply too little labour and older generations too much. Privatization eliminates this inefficiency. The contribution to welfare is calculated to be another 2.5 per cent.

Overall, the welfare implications of labour market distortions are non-negligible, but small when compared to the welfare effects that are due to intergenerational risk sharing. This confirms earlier calculations, like those in Nishiyama and Smetters (2007) and Fehr and Habermann (2008).

Although these findings are interesting, our paper cannot be considered finalized. Future research will add a sensitivity analysis. It will also increase the number of stochastic simulations in order to get a more accurate estimation of the distributions of variables. It will also focus on the effects that will occur during the transition form a public to a private pension scheme.

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# THE IMPACT OF THE FINANCIAL CRISIS ON FUNDED PENSION SAVING

*Robert Gillingham,[*] Adam Leive[*] and Anita Tuladhar[*]*

*A key fiscal risk presented by the current financial crisis is its effect on retirement saving. A broad array of retirement plans – public and private, collective and individual – have accumulated a large stock of financial and real assets in recent years that will be used to finance future pension benefits (Figure 1). The level of funding has increased not only in nominal terms, but also as a share of aggregate GDP, with the increase stemming from earnings on existing retirement saving as well as net deposits (contributions less benefits). Deviations from this trend since 1995 occurred in 2000 and 2002. In each of these cases, equity markets were also in decline, more than offsetting the positive returns on some other assets and net contributions (contributions less distributions). The reduction in equity prices that started in 2007 accelerated during 2008. Figure 2 presents indexes of total returns on two broad-based U.S. equity indexes. The indexes equal the value of a $100 investment in each of the portfolios at the end of October 2007, when each portfolio reached its end-month peak. The value of the Dow Jones Industrial Average fell by roughly one-third, and the value of the more broadly based S & P 500 portfolio (and other broad-based portfolios) fell by more than two-fifths. In U.S. dollar terms, European and emerging market equities have fared even worse, although that is likely an exchange-rate artifact (they fared much better in dollar terms before the decline began).*

## 1 Impact of the recent stock market decline on pension fund assets

### *1.1 Distribution of assets, end-2007*

The impact of the stock market on the assets of a pension fund depends on (1) the share of equities in the fund's portfolio and (2) the performance of the particular equities held by the fund. Figure 3 displays pension fund assets at the end of 2007 for those G20 countries for which data are available, as well as several other countries for which data are available. Six countries – the United States, the United Kingdom, Canada, Netherlands, Australia, and Switzerland – accounted for roughly 90 per cent of total pension fund assets. In each of these countries, pension assets equaled at least 90 per cent of GDP, and equities comprised at least 40 per cent of aggregate fund assets. For all countries combined, direct investments in equities comprised almost 45 per cent of total assets, and investments in mutual funds, in which equities play a predominant role, accounted for another 19 per cent.

Figure 3 demonstrates how important equities have been to pension saving, both in the aggregate and for the countries with the largest stock of pension assets. The impact of the stock market declines on a particular country will also depend on how steeply stock prices have fallen in that country (assuming a significant home country bias) and how significant total pension saving is relative to the size of the economy. Figure 4 categorizes countries according to these two variables, as well as the share of equities in pension saving. The domestic stock markets of almost all of the countries have declined by more than one-third. However, only 15 of the 41 countries for which data are available have *either* more than 50 per cent equities in their pension portfolios *or* pension assets greater than 50 per cent of GDP. Only four have all three of these characteristics, but these

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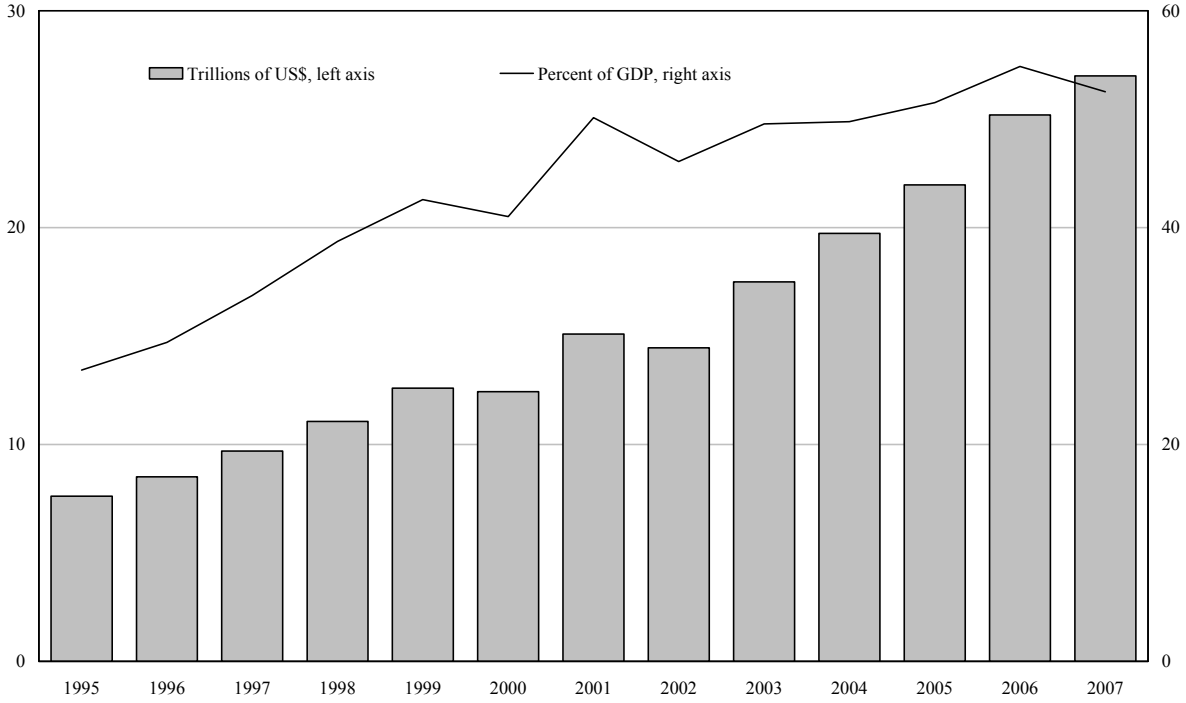
The views expressed in this paper are the authors alone and do not necessarily reflect the views of the International Monetary Fund.

**Figure 1**

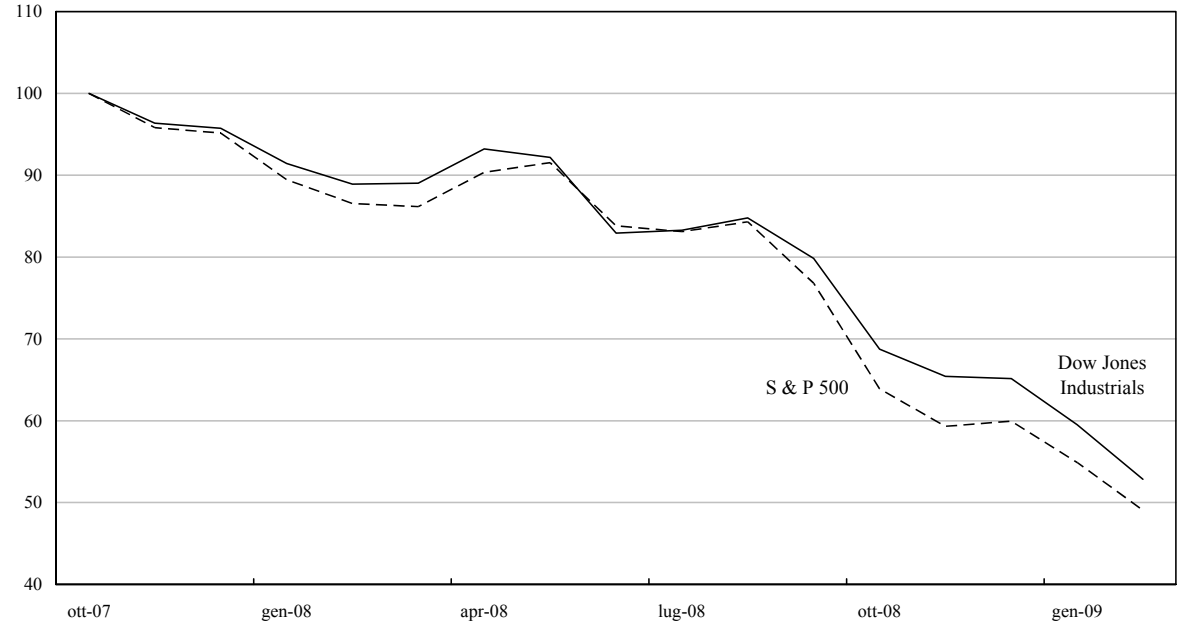
**Pension Fund Assets in OECD Countries, End-year 1995 to End-year 2007**




Note: Totals include both public and private plans.
Source: OECD Global Pension Database; and staff estimates.

**Figure 2**

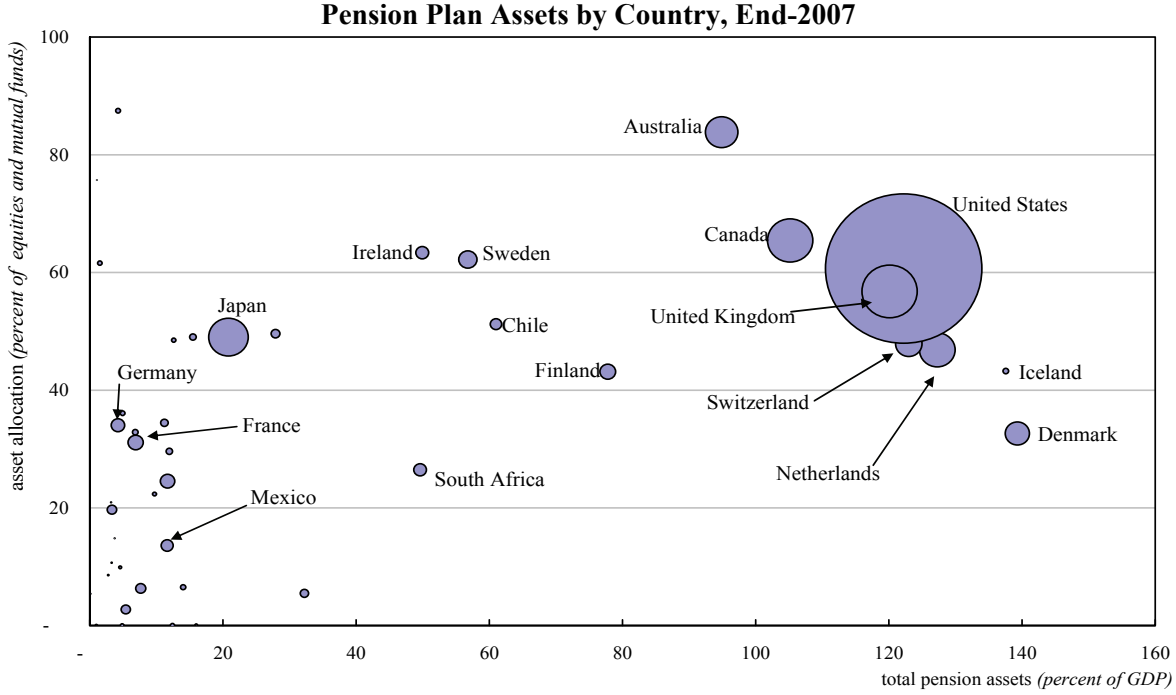
**Total Equity Return Indexes, End-October 2007 to End-November 2008**




Source: Haver Analytics.

**Figure 3**

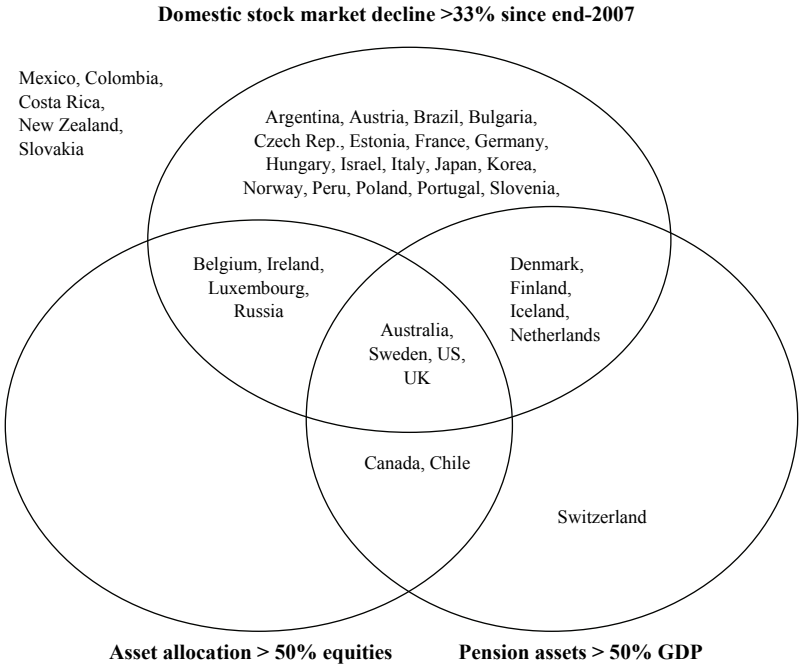
**Pension Plan Assets by Country, End-2007**




Source: OECD Global Pension Database; and staff estimates.

**Figure 4**

**Pension Fund Assets by Country, End-2007**

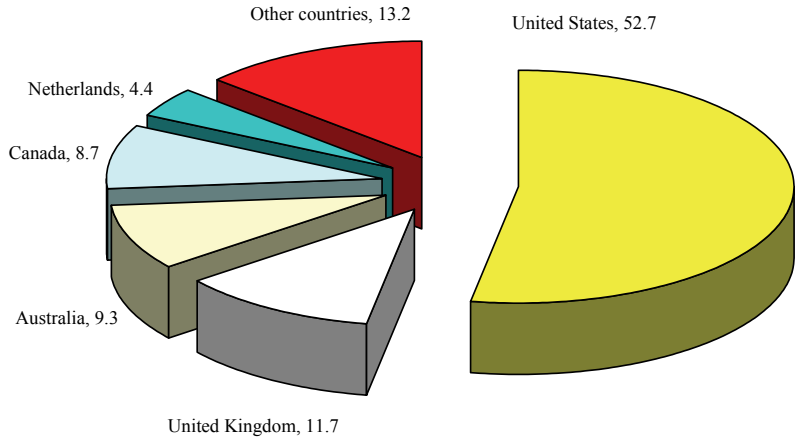



Source: OECD Global Pension Database; and staff estimates.

four countries account for over 80 per cent of pension saving.

**Figure 5**

**Distribution of Equity Losses**




Source: OECD Global Pension Database and staff estimates.

### *1.2 Estimated equity losses*

Applying the domestic stock market decline through November 2008 to the equity and mutual fund holdings for each country as of end-2007 yields a rough estimate of the impact of the stock market declines on global pension assets. The aggregate loss from the fall in domestic equity markets was roughly 36 per cent (Appendix, Table 1). In addition, however, European and emerging-market countries have had additional losses in dollar terms due to an exchange rate depreciation of 15 per cent. The total estimated reduction in the aggregate dollar value of equities and mutual funds is 43 per cent or $6.7 trillion. In absolute terms, these losses are concentrated in the countries with the largest holdings. Losses in the United States are roughly $3.5 trillion, representing more than one-half of the total (Figure 5). Other countries with large aggregate losses include the United Kingdom ($0.8 trillion), Australia and Canada (both at roughly $0.6 trillion).

Another important consideration is what the distributional incidence of these losses is likely to be. Among people over age 65 in the United States, for instance, funded pensions and annuities account for 21 per cent of income of the richest income quintile, but just 3 per cent for the poorest (Burtless, 2008). In the U.K., occupational pensions comprise over 30 per cent of income for the richest quintile of pensioners and only 1 per cent for the poorest. Most European countries rely almost entirely on pay-as-you-go, defined-benefit pension schemes. In a few countries, however, funded plans cover a larger share of the retirement income of lower-income pensioners. For instance, all participants in the Chilean pension system invest in individual accounts, although the government does guarantee a minimum pension level. Where pay-as-you-go systems are (partially) funded or augmented with defined-contribution plans, the benefits from these defined-contribution plans are often guaranteed by the government. Consequently, lower-income households will be relying primarily on faith and credit of their governments either to honor their pay-as-you-go promises (see below for a discussion of the difficulties with this option) or compensate them for losses on their defined-contribution schemes that reduce benefits below a specified minimum. Absent significant cuts in government-provided or government-guaranteed benefits, the distributional incidence is likely to be – for the most part – benign.[1]

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[1] A separate risk is pension fund exposure to potentially "toxic" assets, such as mortgage-backed securities and credit default swaps. The OECD has estimated average holdings of 3 per cent of such assets in the portfolios of pension funds that member countries have (OECD, 2008). Structured products – the class of assets within which toxic assets fall – represent about 8 per cent of pension fund assets worldwide. The risk is concentrated in the U.S., Sweden, and Japan.

## 2 Short- and medium-term responses

An array of economic agents will have to respond to the decrease in pension saving. These responses will depend on how persistent the fall in stock prices is. For this reason, it is useful to distinguish short- and medium-term responses for longer-term responses. These responses can be distinguished depending on whether the plan is defined-contribution or defined-benefit, what entity sponsors the plan, and whether a more broad-reaching government response – with attendant fiscal implications – is appropriate. (In all cases, individuals have the option of adjusting their rate of retirement saving to offset the effects of financial markets on the assets of the official pension plans in which they participate).

### *2.1 Unprotected defined-contribution plans*

For unprotected defined-contribution plans (representing roughly three-quarters of defined-contribution assets), neither the pension plan itself nor the plan sponsor provides any guarantee with respect to the rate of return or the size of benefits. Consequently, the impact of the recent fall in the stock market will fall directly on the individual participant. Of the reported $9.4 trillion invested in unprotected defined-contribution plans as of the end of 2007, $8.0 trillion were in U.S. funds. Roughly $6.8 trillion were, in turn, held in personal accounts, with the remainder in employer-sponsored 401k and similar type accounts. As noted above, these accounts are held primarily by higher-income households, and their responses will likely depend on their age. Younger workers have the luxury of waiting to see if the market recovers. These workers suffered similar losses between 1999 and 2002, but the market had recovered almost completely prior to the recent relapse. Older workers, on the other hand, have less time to recover and are likely to suffer more severe cuts in retirement income. This is especially true if workers would like to purchase annuity with at least some of their retirement saving. The depressed value in their accounts, combined with low interest rates, will make the purchase of annuities far less attractive.

To evaluate the impact of a financial crises on individual retirement saving in the form of equities, we simulate the performance of individual accounts over the past 45 years. We assumed that workers made regular investments in an S&P 500 indexed fund over a 40-year working life. Two profiles of real deposits were simulated, one in which a constant $1,000 is invested each year and one in which the deposits grows smoothly from $667 in the first year to $1,333 in the last year. The only variable within these two profiles is the S&P rate of return, which is allowed to follow its historical path. The results of the simulation are displayed in Figure 6, where the horizontal axis displays the year in which the worker retires.

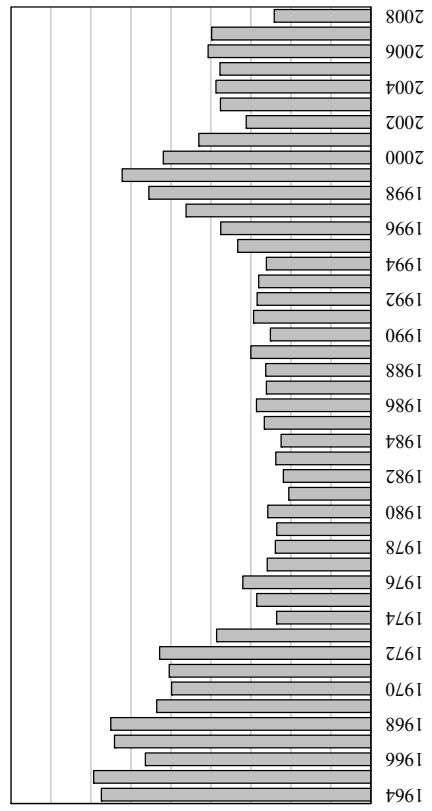
As Figure 6 demostrates, there is a huge amount of inter-cohort variation. The value of the accounts vary from $123 thousand to $400 thousand for the level deposit profile. The variation is comparable for the growing deposit profile ($103 thousand to $347 thousand), although the levels are slightly lower because the a larger share of the deposits occurs later in a worker's career. The real internal rates of return (IRRs) earned on the deposits (the single rate that yields the same account total) show similar variation, ranging from 4.9 to 9.4 per cent for the level deposit profile (4.6 to 9.5 per cent for the growing deposit profile). It is interesting to note, however, that the minimum IRR is over 4.5 per cent in both cases. Moreover, despite the meltdown in the S&P 500 over the past 1½ years, workers retiring at the end of 2008 did not have the worst individual-account performance. In other words, even though the individual accounts produce "lucky" and "unlucky" cohorts, they still provide a reasonable rate of return even for unlucky cohorts.

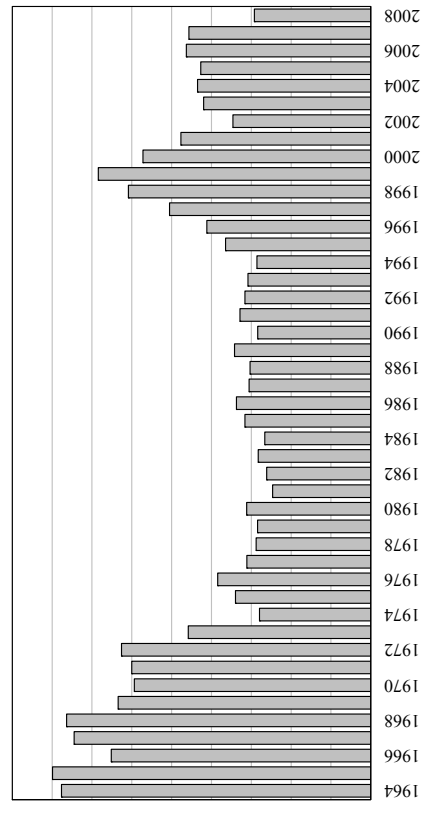
**Figure 6**

**Variation in Performance of Individual Retirement Accounts**

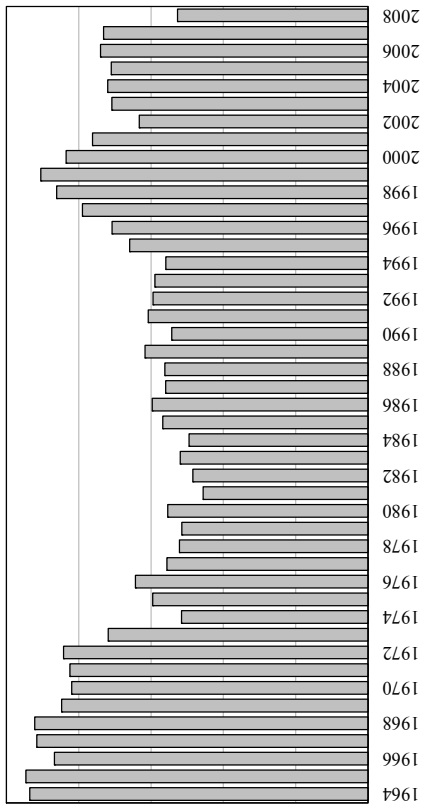
**Equal Real Annual Deposits of $1,000** **Real Deposits Double over Working Life from $667 to $1,333**

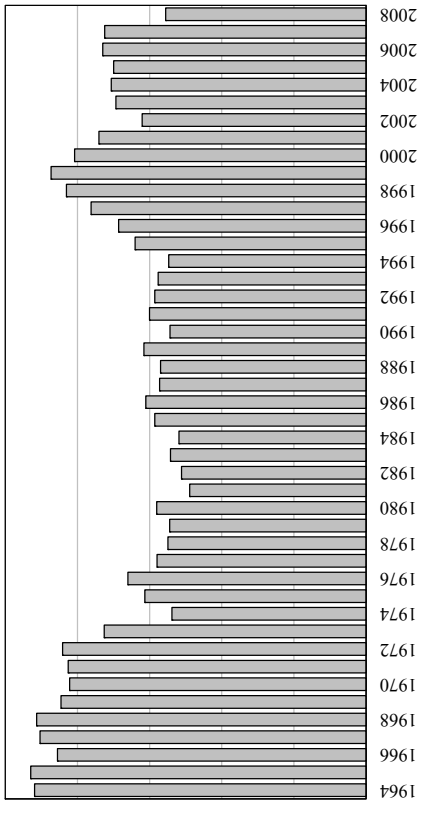
**Value of Individual Retirement Account at Retirement** *(thousands of dollars)*




**Internal Rate of Return on Deposits** *(percent)*




Note: Retirement accounts cumulate over 40-year working life with returns equal to historical total returns on S&P 500 portfolio. Label on horizontal axis identifies the final year of contribution.
Source: Haver Analytics and staff estimates.

### *2.2 Private-sector defined-benefit and protected defined-contribution plans*

For these plans, the benefit risk is shared in a variety of ways, depending upon how the plan is structured (OECD 2005):

- "Traditional" DB plan: a DB plan where benefits are linked through a formula to the members' wages or salaries, length of employment, or other factors. In this case, the plan sponsor bears the "rate-of-return risk" – that is, the risk that contributions plus investment returns will be insufficient to cover benefits – but the participant bears the risk that the sponsor will default if it cannot afford the benefits.
- "Hybrid" DB plan or protected DC plan: a DB plan where benefits depend on a rate of return credited to contributions, where this rate of return is either specified in the plan rules, independently of the actual return on any supporting assets (e.g. fixed, indexed to a market benchmark, tied to salary or profit growth, etc.), or is calculated with reference to the actual return of any supporting assets and a minimum return guarantee specified in the plan rules. In this case, the plan sponsor and participant share the rate-of-return risk when it is tied to a market rate or the guarantee applies to benefits, and, again, the participant bears the default risk.
- "Mixed" DB plans: a DB plan that has two separate DB and DC components but which are treated as part of the same plan.

For defined-benefit plans sponsored by private employers, funding rules determine the response, which typically comprises the extent and timing of increase in contributions by sponsoring employers and the degree to which benefits can be reduced or are conditional:

- Rules for Underfunding: Typically, the strength of the guarantee from the sponsoring agency is correlated with the extent of financing provided. The responsibility for closing the funding gap rests largely with the sponsoring agency if the benefits are underwritten by them (Austria, Canada, Ireland, Japan, Portugal, United Kingdom and United States). In countries where the plans are not as strongly tied with the employer and usually underwritten by insurance companies, the burden sharing is generally more flexible (Denmark, Germany, Iceland, Netherlands, Sweden). Nonetheless, even in the former group of countries, the risk can be shared with the members through, for instance, cuts in non-accrued benefits (United States) or accrued benefits with agreement with labor support (Japan).
- Rules for Plan Termination by Solvent Employer: In more severe case of underfunding, with the approval of the pensions regulator, the plans may be terminated by solvent employers. In such a case, detailed rules specify actions such as transfer of the accounts (Austria, Finland, Iceland), purchase of annuities (Canada, the UK, the US), "freeze" of the plan (US), and allocation of assets to members and beneficiaries.

To avert the wind-up of plans, there are increasing demands for temporarily amending the funding rules. Since the requirements for increasing contributions comes precisely at the time of a liquidity crunch faced by companies, several countries are already considering relaxing the time required for making up shortfalls (Canada, USA), valuation methodology, and preventing a freeze of plans. Concerns remain, however, that such a relaxation would affect the long-term health of the plans adversely affecting members and the government in the future.

### *2.3 Defined-benefit and protected defined-contribution plans for government employees*

Pension plans sponsored by governments for their employees represent a sort of "halfway house" between private employer-sponsored plans and national social insurance. This is especially true for pension plans sponsored by subnational governments, where the distinction between social insurance and an employer-sponsored pension plan is typically more sharply drawn. Government

sponsors have a broader menu of possible responses since they can draw on the future taxing power of the government in response to financial market developments. The government options for reform are also different, since they will typically depend on specific legislation rather than a generally applicable regulatory structure.

These plans are important. For instance, as of the end of 2007, almost $4 trillion were held by federal, state, and local government defined-benefit pension plans in the United States (almost one-third of the assets held by occupational pension plans worldwide and more than one-fifth of total U.S. pension assets). The value of these assets had fallen by roughly $1 trillion dollars by October 2008 (Munnell, et al. 2008). Three-quarters of these assets are held by state and local pension plans, which are typically subject to stringent funding requirements. The recent drop in equity prices will trigger requirements to close the resulting funding gap (on a mark-to-market basis, the estimated aggregate funding ratio fell to 65 per cent in October 2008).

## 3 Central government responses

The responses of the central government fall into four categories:

1) Plan sponsor for national social insurance programs – National social insurance pension plans hold significant assets (Table 2). In some cases, these assets are specialized and largely impervious to financial market movements. (In the United States, the social security system holds $2 trillion in "Treasury specials," which are non-marketable government bonds that can be redeemed at par at any time, that offset a small portion of the present value of future cash flows.) However, in other countries, such as Canada, the Netherlands, New Zealand, and Norway, the national pension system holds a substantial quantity of marketable securities, including equities. The recent decline in financial markets will present these countries with the same challenges faced by private- and public-sector employers. Since national pension systems are not typically fully funded (Norway is a notable exception), the percentage impact on the pension systems will be smaller. This fact provides scant relief, however, since most national pension schemes face significant pay-as-you-go funding shortfalls absent reform.

   Chile is a special case, in which the national social insurance program has been transformed into a system of funded individual accounts. The government guards against risk by providing holders of individual retirement accounts with a choice of portfolios, with one portfolio specifically designed to shield risk for workers near retirement. This "E portfolio" had losses of only 1 per cent over 2008.

2) Pension plan guarantor – A number of countries have pension fund guarantee schemes that offer insurance against the loss of assets in private defined-benefit plans due to employer insolvency. Implemented in 1961, Sweden's guarantee scheme is the oldest and has been followed by the United States (1974), Germany (1974), Ontario, Canada (1980), Switzerland (1986), Japan (1989), and most recently, the United Kingdom (2005). Premiums collected from employers are based on some combination of a flat rate per member, the size of unfunded liabilities, and, in Sweden and the United Kingdom, the risk of sponsor default. The schemes also collect income from investments, which are mostly in fixed-income securities. Equities generally represent less than a third of investment assets across countries. In case of employer insolvency, benefits range across countries, with the United States, United Kingdom, Sweden, and Germany offering relatively higher amounts.

   Partly due to low pricing of premiums, weak funding rules, and limited adjustment for plan sponsor risk, guarantee schemes in the United States, United Kingdom, and Ontario, Canada were in deficit in 2008. The U.S. Pension Benefit Guaranty Corporation (PBGC), which covers 44 million workers, currently has a projected deficit of $11.1 billion in net present value terms.

The smaller Ontario Pension Benefit Guarantee Fund (PBGF), which covers 1 million workers, currently has a deficit exceeding $CAD 100 million. Just three years since its inception, the deficit in the United Kingdom Pension Protection Fund (PPF) stands at 500 million pounds.

The current financial crisis has yet to lead to widespread claims on the guarantee schemes; however, it is possible that the current systemic shock may overwhelm those already in deficit and require government intervention. As a federal corporation, the PBGC represents a sizeable contingent liability to the federal government. Already, the U.S. Congress on December 11, 2008, rolled back part of the Pension Protection Act of 2006, which increased the funding requirements of underfunded plans. (In the United States, however, PBGC benefits are limited to the income and assets of the guarantor agency. Consequently, a surge in defaults would trigger reduced benefits and place additional pressure on the government to allocate additional resources to the agency.) While Ontario's PBGF is not explicitly backed by government, the fund has borrowed money on two occasions: in 1988, it received a $CAD 22 million loan when an automaker failed and in 2001, it received a $CAD 330 million loan when a large steel company did. The United Kingdom's PPF is not explicitly backed by taxpayers. However, should the balance on these schemes substantially deteriorate further, it appears likely that government financial support may be forthcoming.

In addition to creating pension plan guaranty agencies, some governments also guarantee minimum benefits or minimum rates of return to defined-contribution pension plans (Whitehouse, 2007). The recent fall in financial markets significantly increases the option value of these guarantees, increasing the contingent liabilities of the government directly.

3) Pension plan regulator – The national government typically regulates the operation of private-sector pension plans, in particular with respect to funding requirements. The recent fall in pension-plan assets would typically trigger action under these regulations. One option is to adjust funding requirements and, especially, the time within which pension plans have to restore adequate funding levels. Such action could forestall plan defaults.

4) Political pressure – Arguably the largest risk faced by governments with respect to pension funding is the possibility that the government – and, in turn, the taxpayer – will be forced to compensate pension plans for at least a portion of the reductions in asset value they have suffered. This type of contingent liability is more open-ended. As recent calls for government action to compensate homeowners for the loss in house values demonstrate, the call on government resources could approach a significant portion of the recently suffered losses.[2]

## 4 Longer-term concerns

### *4.1 Short- and medium-term responses should not compromise fiscal sustainability*

The immediate long-term concern with respect to the fiscal impact of the financial crisis is that any short- or medium-term response be consistent with long-term fiscal sustainability. With fiscal responses to the financial crisis and the economic recession threatening to exceed several percentage points of GDP for possibly several years, it is important that any budgetary resources allocated to assist pension funds be carefully circumscribed. As the recovery from the financial crisis in the early years of this decade demonstrated, equity markets can recover quickly. Any assistance to pension plans should be targeted only on those lower-income households for whom

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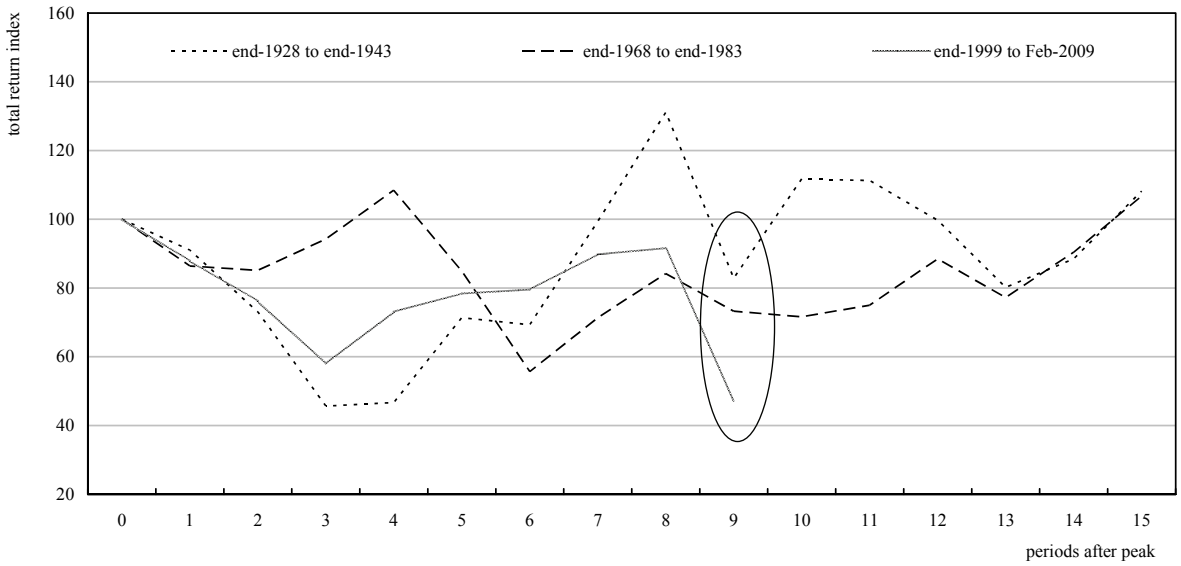
[2] In the United States, pension plans of S&P 1500 companies lost nearly half a trillion dollars in 2008, nearly 80 per cent of which occurred in the last quarter (Mercer, 2009).

**Figure 7**

**Real S&P 500 Total Return Index for Three Extended Market Slowdowns**




Source: Haver Analytics.

current retirement income is likely to be seriously reduced. Assistance to higher-income households will either trigger tax increases that these households would be likely to bear or cuts in other, higher-priority spending programs.

### *4.2 How persistent is the current financial crisis likely to be?*

The key long-term concern is whether the current financial crisis is part of a structural break in the dynamics of economic growth and financial-market returns. A relatively short drop in financial markets would have limited and specific effects, primarily for households that are either in or near retirement. On the other hand, a longer structural break similar to that experienced from the end-1968 to end-1983 would have serious consequences for the size and adequacy of retirement saving that go beyond the impact on pension funding levels. Figure 7 presents market return indexes similar to those in Figure 2 for three periods during which equity markets were stagnant for relatively long periods in the United States. During the Great Depression, the value of an investment in the S & P 500 portfolio fell by almost 60 per cent in three years. It recovered in year 8 only to fluctuate above and below its initial value until well into World War II. A similar investment at the end of 1968 never reached a similar low point, but it remained below its original value for 13 of the next 14 years. More recently, an investment at the end of 1999 has yet to recover to its original value after nine years. Moreover, its value at this point is below the value of the investments in the earlier periods after the same number of years.

The more important correlate with the financial market during the 1970s and early 1980s was the structural break in labor productivity growth. Over this period, productivity grew at an annual rate of 1.4 per cent, significantly below the postwar average (through 2008 QIV) of 2.1 per cent. Fortunately, labor productivity growth during the current market slowdown has averaged 2.4 per cent per year, slightly higher than the postwar average. If, however, the current

financial crisis were to persist and be accompanied by a global productivity or growth slowdown, it would seriously impact the ability of countries to address their long-term fiscal challenges, most notable population aging. The impact on the finances of pay-as-you-go pension schemes, where productivity growth is a major determinant of the sustainable steady-state rate of return to pension contributions, would threaten the fiscal sustainability in a broad range of industrial countries, with indirect and serious implications for growth in developing economies.

# APPENDIX

## Table 1

## Funded Pension Saving and Estimated Losses

| Country | Total Assets | | | Total Equities and Mutual Funds | | | Share of Equities | Stock Market Decline | Exch. Rate Depreciation | Equity & Mutual Fund Losses | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Billions of Dollars | Share of Total | Share of GDP | Billions of Dollars | Share of Total | Share of GDP | | | | Percent | Billions of Dollars | Share of Total | Share of GDP |
| Australia | 956.5 | 3.6 | 96.7 | 801.6 | 5.2 | 81.0 | 83.8 | 41.3 | 24.9 | 76.4 | 612.6 | 9.3 | 61.9 |
| Argentina | 27.7 | 0.1 | 9.3 | 8.2 | 0.1 | 2.7 | 29.6 | 49.8 | 9.5 | 64.0 | 5.3 | 0.1 | 1.8 |
| Austria | 18.0 | 0.1 | 4.5 | 6.3 | 0.0 | 1.6 | 35.1 | 61.2 | 7.7 | 73.7 | 4.7 | 0.1 | 1.2 |
| Belgium | 18.2 | 0.1 | 3.7 | 16.4 | 0.1 | 3.3 | 90.1 | 53.8 | 7.7 | 65.7 | 10.7 | 0.2 | 2.2 |
| Brazil | 288.4 | 1.1 | 19.4 | 174.8 | 1.1 | 11.7 | 60.6 | 41.2 | 21.2 | 71.1 | 124.4 | 1.9 | 8.4 |
| Bulgaria | 1.6 | 0.0 | 3.6 | 0.5 | 0.0 | 1.1 | 31.1 | 79.5 | 12.6 | 102.1 | 0.5 | 0.0 | 1.1 |
| Canada | 1,475.0 | 5.5 | 98.3 | 955.8 | 6.2 | 63.7 | 64.8 | 35.0 | 18.7 | 60.2 | 575.8 | 8.7 | 38.4 |
| Chile | 105.6 | 0.4 | 61.2 | 54.7 | 0.4 | 31.7 | 51.8 | 22.1 | 20.3 | 46.9 | 25.7 | 0.4 | 14.9 |
| Colombia | 24.6 | 0.1 | 10.9 | 1.7 | 0.0 | 0.8 | 7.0 | 31.6 | 13.4 | 49.2 | 0.8 | 0.0 | 0.4 |
| Costa Rica | 5.0 | 0.0 | 17.5 | 0.1 | 0.0 | 0.4 | 2.1 | 4.4 | 10.2 | 15.0 | 0.0 | 0.0 | 0.1 |
| Czech Republic | 8.2 | 0.0 | 4.2 | 0.9 | 0.0 | 0.4 | 10.4 | 52.7 | 8.8 | 66.1 | 0.6 | 0.0 | 0.3 |
| Denmark | 438.2 | 1.6 | 128.6 | 148.6 | 1.0 | 43.6 | 33.9 | 46.6 | 12.5 | 64.9 | 96.5 | 1.5 | 28.3 |
| Estonia | 1.0 | 0.0 | 4.2 | 0.1 | 0.0 | 0.4 | 9.7 | 63.5 | 12.6 | 84.0 | 0.1 | 0.0 | 0.3 |
| Finland | 175.2 | 0.7 | 65.6 | 75.5 | 0.5 | 28.3 | 43.1 | 53.4 | 7.7 | 65.3 | 49.3 | 0.7 | 18.5 |
| France | 179.2 | 0.7 | 6.4 | 55.7 | 0.4 | 2.0 | 31.1 | 42.7 | 7.7 | 53.7 | 29.9 | 0.5 | 1.1 |
| Germany | 136.5 | 0.5 | 3.8 | 42.7 | 0.3 | 1.2 | 31.3 | 40.4 | 7.7 | 51.2 | 21.9 | 0.3 | 0.6 |
| Greece | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.4 | 65.5 | 7.7 | 78.3 | 0.0 | 0.0 | 0.0 |
| Hong Kong | 64.6 | 0.2 | 30.0 | 33.8 | 0.2 | 15.7 | 52.4 | 48.3 | -0.6 | 47.4 | 16.0 | 0.2 | 7.4 |
| Hungary | 15.1 | 0.1 | 10.0 | 4.5 | 0.0 | 3.0 | 30.0 | 53.3 | 16.5 | 78.6 | 3.6 | 0.1 | 2.3 |
| Iceland | 27.6 | 0.1 | 140.7 | 11.9 | 0.1 | 60.8 | 43.2 | 94.4 | 48.3 | 188.3 | 22.5 | 0.3 | 114.5 |
| Ireland | 118.6 | 0.4 | 43.4 | 78.7 | 0.5 | 28.8 | 66.3 | 66.2 | 7.7 | 79.1 | 62.2 | 0.9 | 22.8 |
| Israel | 54.5 | 0.2 | 30.9 | 4.0 | 0.0 | 2.3 | 7.3 | 46.2 | -0.4 | 45.7 | 1.8 | 0.0 | 1.0 |
| Japan | 1,021.0 | 3.8 | 22.1 | 500.3 | 3.2 | 10.8 | 49.0 | 41.8 | -16.1 | 18.9 | 94.8 | 1.4 | 2.1 |
| South Korea | 76.8 | 0.3 | 8.0 | 5.5 | 0.0 | 0.6 | 7.2 | 40.7 | 32.0 | 85.7 | 4.7 | 0.1 | 0.5 |
| Latvia | 0.3 | 0.0 | 1.1 | 0.0 | 0.0 | 0.0 | 1.2 | 45.9 | 12.7 | 64.4 | 0.0 | 0.0 | 0.0 |
| Luxembourg | 0.5 | 0.0 | 1.0 | 0.4 | 0.0 | 0.7 | 74.0 | 59.5 | 7.7 | 71.9 | 0.3 | 0.0 | 0.5 |
| Mexico | 110.4 | 0.4 | 10.2 | 13.7 | 0.1 | 1.3 | 12.4 | 24.2 | 16.9 | 45.3 | 6.2 | 0.1 | 0.6 |
| Netherlands | 1,013.4 | 3.8 | 120.2 | 453.0 | 2.9 | 53.7 | 44.7 | 52.3 | 7.7 | 64.1 | 290.4 | 4.4 | 34.4 |
| Norway | 27.4 | 0.1 | 6.3 | 8.9 | 0.1 | 2.0 | 32.5 | 54.3 | 20.5 | 86.0 | 7.7 | 0.1 | 1.8 |
| Pakistan | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30.4 | 58.3 | 22.6 | 94.1 | 0.0 | 0.0 | 0.0 |
| Peru | 19.5 | 0.1 | 16.3 | 10.2 | 0.1 | 8.5 | 52.1 | 59.8 | 3.6 | 65.5 | 6.7 | 0.1 | 5.6 |
| Poland | 51.5 | 0.2 | 10.4 | 18.1 | 0.1 | 3.7 | 35.1 | 51.1 | -5.3 | 43.0 | 7.8 | 0.1 | 1.6 |
| Portugal | 34.6 | 0.1 | 14.4 | 16.3 | 0.1 | 6.8 | 47.1 | 49.7 | 7.7 | 61.3 | 10.0 | 0.2 | 4.2 |
| Romania | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.5 | 69.7 | 18.2 | 100.5 | 0.0 | 0.0 | 0.0 |
| Russia | 16.0 | 0.1 | 1.0 | 9.8 | 0.1 | 0.6 | 61.6 | 71.3 | 10.0 | 88.5 | 8.7 | 0.1 | 0.6 |
| Slovak Republic | 3.1 | 0.0 | 3.5 | 0.3 | 0.0 | 0.4 | 11.2 | 19.4 | -13.3 | 3.5 | 0.0 | 0.0 | 0.0 |
| Slovenia | 1.6 | 0.0 | 3.0 | 0.3 | 0.0 | 0.5 | 16.2 | 67.5 | 7.7 | 80.5 | 0.2 | 0.0 | 0.4 |
| South Africa | 201.9 | 0.8 | 69.2 | 34.7 | 0.2 | 11.9 | 17.2 | 35.4 | 32.6 | 79.5 | 27.6 | 0.4 | 9.5 |
| Spain | 128.8 | 0.5 | 8.2 | 30.8 | 0.2 | 2.0 | 23.9 | 39.4 | 7.7 | 50.2 | 15.5 | 0.2 | 1.0 |
| Sweden | 260.7 | 1.0 | 53.9 | 162.1 | 1.0 | 33.5 | 62.2 | 38.8 | 18.6 | 64.6 | 104.7 | 1.6 | 21.6 |
| Switzerland | 505.4 | 1.9 | 109.9 | 243.6 | 1.6 | 53.0 | 48.2 | 34.8 | 4.2 | 40.5 | 98.6 | 1.5 | 21.5 |
| Thailand | 12.8 | 0.0 | 4.9 | 1.8 | 0.0 | 0.7 | 14.2 | 47.6 | 3.8 | 53.1 | 1.0 | 0.0 | 0.4 |
| United Kingdom | 2,151.4 | 8.0 | 76.9 | 1,222.0 | 7.9 | 43.7 | 56.8 | 31.3 | 24.1 | 63.0 | 769.8 | 11.7 | 27.5 |
| United States | 17,076.9 | 63.6 | 121.4 | 10,263.2 | 66.3 | 72.9 | 60.1 | 33.8 | 0.0 | 33.8 | 3,472.8 | 52.7 | 24.7 |
| Total | 26,853.2 | 100.0 | 59.9 | 15,471.4 | 100.0 | 34.5 | 57.6 | 35.7 | 5.1 | 42.6 | 6,592.1 | 100.0 | 14.7 |

**Table 2**

**Pension Reserve Funds**

| Country | Name | Type | Since | Asset size *(millions $USD 2006)* |
|---|---|---|---|---|
| United States | Social Security Trust Fund | social security reserve fund | 1940 | 2,048,112 |
| Japan | National reserve funds (incl. GPIF) | social security reserve fund | 1959 | 1,217,551 |
| Norway | Government Pension Fund – Global | sovereign pension reserve fund | 1990 | 278,124 |
| Korea | National Pension Fund | social security reserve fund | 1988 | 190,842 |
| Sweden | National Pension Funds | sovereign pension reserve fund | 2000 | 117,468 |
| Canada | Canada Pension Plan reserve fund | social security reserve fund | 1962 | 86,392 |
| Spain | Social Security Reserve Fund | social security reserve fund | 1997 | 44,875 |
| France | Pension Reserve Fund (FRR) | sovereign pension reserve fund | 1999 | 39,140 |
| Ireland | National Pensions Reserve Fund | sovereign pension reserve fund | 2001 | 23,710 |
| Australia | Future Fund | sovereign pension reserve fund | 2006 | 13,678 |
| Portugal | Financial Stabilisation Fund | sovereign pension reserve fund | 1989 | 8,330 |
| Mexico | IMSS Reserve Fund | social security reserve fund | | 7,392 |
| New Zealand | Superannuation Fund | sovereign pension reserve fund | 2001 | 6,666 |
| Poland | Demographic Reserve Fund | sovereign pension reserve fund | 2002 | 1,760 |
| Denmark | Social Security Fund | social security reserve fund | 1964 | 659 |

Note: Social security reserve funds are classified as funds managed and legally ownded by the social security scheme. Sovereign pension reserve funds are classified as being owned by government but "legally assigned to support the social security system or more generally to address fiscal imbalances caused by demographic ageing".
Source: Yermo, J. (2008), "Governance and Investment of Public Pension Reserve Funds in Selected OECD Countries", OECD, Working Paper on Insurance and Private Pensions, No. 15.

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# PENSION SYSTEMS IN EMES: IMPLICATIONS FOR CAPITAL FLOWS AND FINANCIAL MARKETS

*Ramón Moreno*[*] *and Marjorie Santos*[*]

## 1 Introduction and summary

Pension systems can influence capital flows by affecting saving and investment. At the same time, the growth of pension fund assets has implications for the depth of financial markets. This paper seeks to shed light on these effects, by highlighting three relevant aspects:

- *first, the stage in the demographic transition.* Since around the mid-1960s, lower emerging market economy (EME) fertility rates have meant lower dependency ratios, which has tended to boost saving, and also a rise in the working-age population, which has tended to boost investment. The transition has worked out as predicted in some countries but not in others. In particular, in the aftermath of crises (e.g., Asia in the late 1990s), saving and investment have tended to fall, and current account balances to rise. Nevertheless, current account surpluses are expected to fall or turn to deficits as populations age in coming decades. In some countries, this process has already begun.
- *second, pension system design.* National saving could be affected by how pension benefits are financed. Recent reforms have favoured plans based on defined contribution and prefunding, moving away from defined benefit and pay-as-you-go plans. However, with a few exceptions, it is not clear that such pension system reforms have helped increase saving. This could be due to lower precautionary saving, transitional fiscal costs associated with pension reforms, problems with low or declining pension fund coverage, and high costs.
- *third, pension fund asset accumulation and financial deepening.* Rapid growth in pension fund assets appears to be associated with deeper financial markets in a number of EMEs. This could also influence capital flows by affecting saving and current account balances, as well as the pattern of gross capital flows.

## 2 Stages in the demographic transition

The demographic transition in EMEs over the past 40 years may be described as follows. In a first stage, which began around the mid-1960s, declining fertility rates[1] resulted in an increase in the working-age population and a decline in the share of the dependent young, with only a gradual increase in the share of the elderly population (Table 1).[2] The result has been declines in overall dependency ratios (the ratio of dependent young plus elderly to the working-age population) from around the mid-1960s to the present. (Annex, Figure 8). However, this stage of the demographic

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[*] Bank for International Settlements (BIS). The views expressed in this paper are those of the authors and do not necessarily reflect those of the BIS. The authors thank, without implicating, Már Gudmundsson, Philip Turner and William White for valuable comments. Contributions by Pablo García-Luna and Jimmy Shek to this paper are also gratefully acknowledged. This paper first appeared in BIS (2008) and covers the period to about 2007, before the full impact of the crisis was felt in EMEs. A final section has been added to highlight some issues associated with the implications of the global financial crisis.

[1] Lee (2003), Figure 2, observes that fertility rates in developing countries began to fall in the 1960s. This reflects factors that raise the opportunity costs of bearing children. Such factors include increased productivity of labour, which raises the value of time for parents, increased investment in children because of higher incomes and higher returns on education (due to longer life spans and greater demand for more skilled workers) and higher rates of urbanisation. Certain developments reduce the value of children, such as government provision of a safety net or the availability of pensions.

[2] The population forecasts are taken from the United Nations *World Population Prospects*, the most widely used source for population forecasts. The forecasts assume medium fertility.

**Table 1**

**Changes in Population Shares**[1]
*(percent)*

| Country | 1950–65 | | | 1965–2010 | | | 2010–50 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Young[2] | Working[3] | Elderly[4] | Young[2] | Working[3] | Elderly[4] | Young[2] | Working[3] | Elderly[4] |
| China | 6.6 | –6.1 | –0.5 | –20.6 | 15.0 | 5.5 | –4.3 | –14.3 | 18.6 |
| India | 4.0 | –3.9 | –0.1 | –10.8 | 8.1 | 2.7 | –12.5 | 0.2 | 12.3 |
| Other Asia[5] | 2.7 | –1.9 | –0.8 | –17.5 | 12.6 | 5.0 | –9.1 | –7.4 | 16.4 |
| Latin America[6] | 2.8 | –3.4 | 0.6 | –16.5 | 12.2 | 4.3 | –9.6 | –5.6 | 15.3 |
| CEE[7] | 0.9 | –2.6 | 1.8 | –14.6 | 7.2 | 7.5 | –0.5 | –15.1 | 15.6 |
| Other EMEs[8] | 2.9 | –3.1 | 0.2 | –13.8 | 12.1 | 1.8 | –9.4 | –2.7 | 12.1 |
| *Memo:* | | | | | | | | | |
| *United States* | *3.3* | *–4.3* | *1.0* | *–10.2* | *5.6* | *4.6* | *–2.9* | *–5.9* | *8.8* |
| *Japan* | *–9.5* | *7.6* | *1.9* | *–12.6* | *–8.1* | *20.7* | *–2.1* | *–11.6* | *13.7* |
| *Western Europe*[9] | *1.0* | *–3.6* | *2.6* | *–7.8* | *1.8* | *6.0* | *–0.9* | *–8.5* | *9.3* |

Aggregates are weighted averages based on total population data for 2000.
[1] Population in each age group as a share of total population. [2] Population aged 14 or less. [3] Population aged 15–59. [4] Population aged 60 and above. [5] Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore and Thailand. [6] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [7] The Czech Republic, Hungary, Poland and Russia. [8] Saudi Arabia, South Africa and Turkey. [9] France, Germany, Switzerland and the United Kingdom.
Source: United Nations, *World Population Prospects*.

transition is over or will end in the next couple of decades in some EMEs. Many countries are entering a second stage in which child dependency ratios are falling more gradually or have stabilised while elderly dependency ratios are rising more steeply (three right-hand columns in Table 1). As a result, projections up to 2050 indicate that overall dependency ratios will generally tend to rise. The implications of these trends for rates of investment and saving are discussed below.

### *2.1 Implications for saving, investment and capital flows*

To see how the demographic transition would affect capital flows, it is worth recalling that a country's net capital flows, or net financing requirements, depend on the current account balance $CAB_t$, which in turn reflects the behaviour of saving ($Sav_t$) and investment ($Inv_t$). That is:[3]

$$CAB_t = Sav_t - Inv_t \quad (1)$$

The implications of demographic changes for saving and investment would depend on the stage in the demographic transition. When populations are relatively young, increases in the labour

[3] In this paper, current account and investment data are used to estimate national saving.

**Table 2**

**Saving, Investment and Current Account**[1]

| Country | Change from 1980-2006 (*percent*)[2] | | | Level in 2006 *(percent)* | | |
|---|---|---|---|---|---|---|
| | Saving | Investment | Current Account | Saving | Investment | Current Account |
| China | 19.5 | 10.1 | 9.4 | 54.1 | 44.6 | 9.4 |
| India | 15.0 | 14.8 | 0.2 | 33.8 | 34.9 | –1.1 |
| Other Asia[3] | 3.5 | –5.3 | 8.8 | 30.8 | 25.6 | 5.2 |
| Latin America[4] | 0.9 | –4.1 | 5.0 | 21.9 | 20.1 | 1.8 |
| CEE[5] | 2.2 | –2.6 | 4.8 | 25.9 | 21.1 | 4.8 |
| Other EMEs[6] | –11.4 | –2.5 | –9.0 | 25.8 | 21.2 | 4.7 |
| *Memo:* | | | | | | |
| *United States* | –7.0 | –0.7 | –6.2 | 13.9 | 20.0 | –6.2 |
| *Japan* | –3.8 | –8.7 | 4.9 | 28.0 | 24.1 | 3.9 |
| *Western Europe*[7] | –1.8 | –3.8 | 2.0 | 20.3 | 19.0 | 1.3 |

[1] As a percentage of GDP. [2] For CEE, change from 1992–2006. [3] Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore and Thailand. For this group, saving and investment increased by about 7 percentage points from 1980–96. [4] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [5] The Czech Republic, Hungary, Poland and Russia. [6] Saudi Arabia, South Africa and Turkey. [7] France, Germany, Switzerland and the United Kingdom.
Source: IMF, *World Economic Outlook*.

force would tend to raise the marginal product of capital, supporting higher rates of investment spending. At the same time, the falling overall dependency ratios resulting from lower fertility and child dependency would allow households to increase their rates of saving. (This is sometimes described in the literature as the first demographic dividend).[4] Conversely, when populations are relatively old, the declining labour force would tend to lower rates of investment while the increases in overall dependency associated with ageing populations would tend to lower saving.

To shed some light on these demographic effects, Table 2 summarises trends in saving and investment over the past quarter century, with more details in Annex, Figure 9.

Table 2 covers the period 1981-2006, for which data on saving and investment in EMEs are more readily available. As working-age populations tended to increase during this period, investment would have been expected to rise. At the same time, declining overall dependency ratios would tend to increase saving rates. However, Table 2 gives a much more mixed impression. In line with expectations, both saving and investment in China and India increased sharply over the period as overall dependency ratios fell, while declining in Japan where (reflecting a rapidly ageing population) dependency ratios have risen for some time now. However, contrary to expectations, increases in saving in the remaining EMEs have generally been modest, and investment ratios have generally declined. One reason is the effect of crises which appear to have persistent effects in

[4] The ultimate effects on national saving would depend on a variety of other factors. For example, the growth in output associated with higher investment and embedded total factor productivity growth could further increase household saving, corporate and government saving. However, household saving would tend to fall at higher levels of wealth. In line with this, empirical studies find that growth is associated with higher household saving, but higher real per capita income is associated lower household saving. (see, e.g., Loayza *et al.*, 2000 and Bulíř and Swiston, 2006).

dampening national saving and investment. In particular, the Asian crisis of 1997-98 obscures the very large increases in investment and saving that occurred in the region until 1996 (see footnote 3 in Table 2). Indeed, Bloom and Williamson (1998) find that increases in investment and saving rates (with the former exceeding the latter) were apparent in East Asia up to the first half of the 1990s as overall dependency ratios fell (Annex, Figure 9). They conclude that the increase in working-age relative to dependent population contributed to East Asia's so-called economic miracle. The effects of earlier crises also appear to have dampened saving and investment growth in Latin America. In the case of the United States, the sharp decline in saving appears in part to reflect perceived increases in wealth associated with rising asset prices, and the emergence of a financing technology (home equity financing) that increased the liquidity of the wealth held by households.

The ambiguity of the results in Table 2 highlights the extent to which factors other than demographics can play an important role in influencing national saving and investment.

As for current accounts, there appears to have been an extended cycle in which a number of EMEs started with current account deficits but more recently – often in the aftermath of crises – have experienced current account surpluses.[5] Demographics would predict that over time, EME current account surpluses would turn to deficits again. For example, a recent study (IMF, 2004) covering 115 countries found that investment tended to exceed saving on average over the sample period. However, a rise in the share of the working-age population tended to increase the saving to GDP ratio more than it increased the investment ratio (by 0.72 and 0.31 respectively).[6] A rise in the share of the elderly population tended to reduce the saving ratio more than it reduced the investment ratio (by –0.35 and –0.14 respectively). This implies that the current account balance would tend to rise with a larger share of the working-age population, and fall in response to ageing in the population.[7]

Looking ahead, a question of interest is to what extent ageing is already affecting saving and investment or might do so in the near future. Table 1 (three right-hand columns) indicates that particularly sharp declines in the shares of working-age population and increases in the shares of the elderly are projected for CEE and China. The declines in shares of working-age population and increases in elderly population are roughly comparable to those already observed in Japan. In CEE and China, and some other countries, the projected rise in elderly dependency is comparatively steep (Annex, Figure 8).

This implies that saving and investment might be expected to fall and current accounts tend to deficit in CEE and China sooner than in other countries. However, as discussed earlier, there is considerable uncertainty about the timing of these effects because of the influence of other factors on saving and investment. For example, Singapore's population has been ageing for some time now, and elderly and overall dependency ratios are projected to rise more steeply than in other countries (Annex, Figures 8 and 9). However, while saving and investment ratios have fallen, Singapore's saving remains well above the average for EMEs, while investment ratios are somewhat above average.

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[5] In the aftermath of the Asian crisis, these surpluses reflected declines in investment that exceeded declines in national saving. See Moreno (2007).

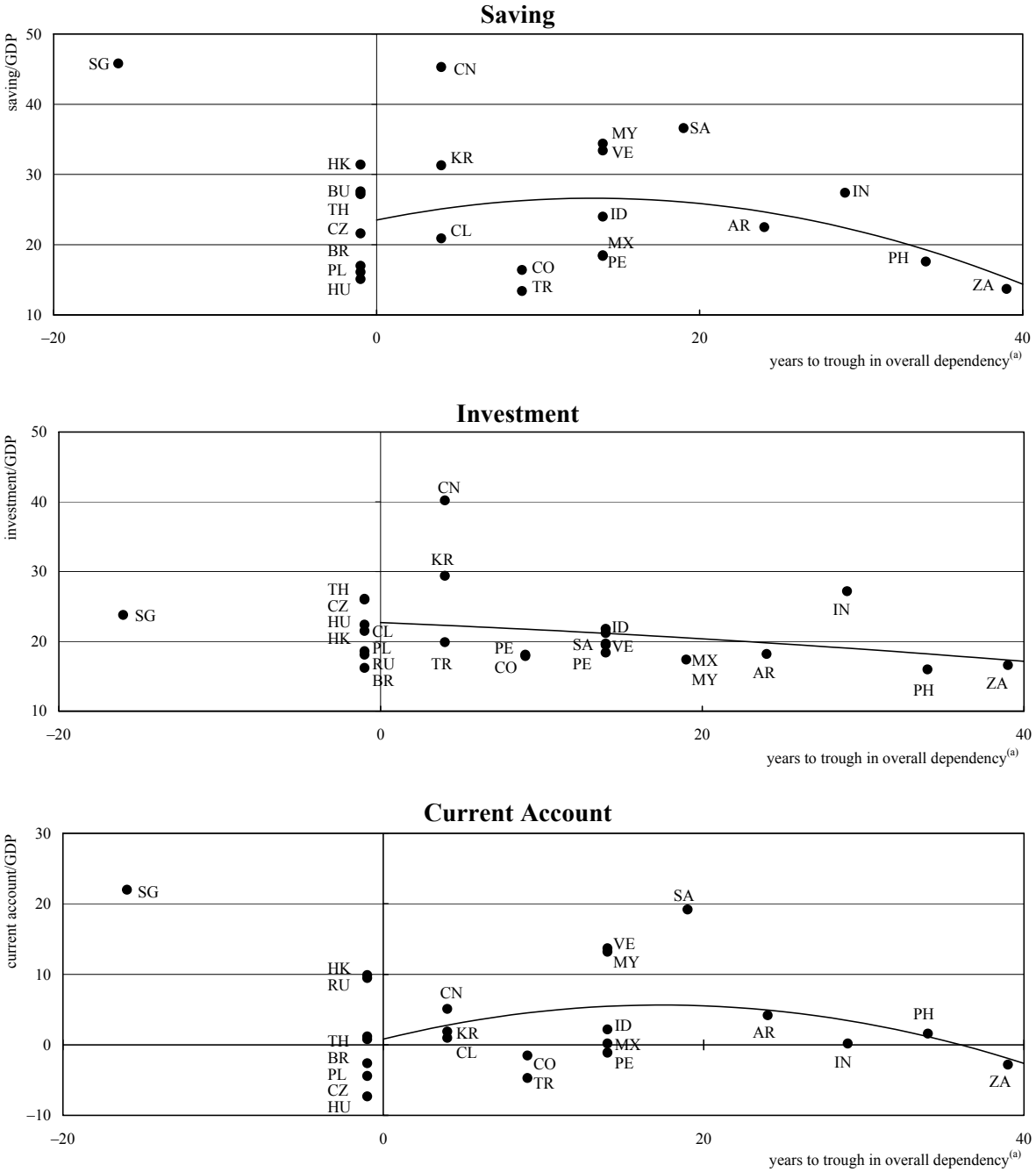
[6] IMF (2004), Table 3.1, page 143, estimates that in a panel of 115 countries over the period 1960-2000 a rise in the share of the working-age population was associated with an increase in real GDP per capita, while a rise in the share of the elderly population was associated with a decline.

[7] Additional perspective is provided by a study by Bulíř and Swiston (2006), Table 2, who estimate the effects of changes in overall dependency ratios on private saving in a cross-section analysis of 44 developed and emerging market economies. They find that in this decade, a 1 point increase in the overall dependency ratio is associated with a 0.3 percentage point decline in the ratio of private saving to GDP. The association is higher (0.63) in industrial countries, and has risen compared to the 1990s (see also Loayza *et al.*, 2000). Furthermore, Asian economies are found to save more than is predicted in the model, and until the end of the 1990s, Latin American countries tended to save less than predicted. These regressions explain between two thirds and three fourths of the cross-country variance of the private saving rate.

**Figure 1**

**Saving, Investment, Current Account and Years to Trough in Dependency Ratios**

*(average of 2002-08, percent)*




AR=Argentina; BR=Brazil; CL=Chile; CN=China; CO=Colombia; CZ=Czech Republic; HK=Hong Kong SAR; HU=Hungary; ID=Indonesia; IN=India; KR=Korea; MX=Mexico; MY=Malaysia; PE=Peru; PH=Philippines; PL=Poland; RU=Russia; SA=Saudi Arabia; SG=Singapore (not included in the regression, but the data points are shown in the figure); TH=Thailand; TR=Turkey; VE=Venezuela; ZA=South Africa.

(a) Where 2008=year 0. Overall dependency ratio is defined as the population less than 15 years of age plus population 80 years or older divided by the population of 15-59 years-olds.

Source: IMF and United Nations.

Additional perspective can be gained from Figure 1, which relates saving, investment and current account balances to the years to trough in overall dependency in a small cross-section of EMEs. In each Figure, countries on the right side of the x-axis are younger, implying higher overall dependency ratios (because of high child dependency). Moving left on the x-axis towards zero, overall dependency ratios are low (reflecting higher working-age populations and lower child dependency ratios). Dependency ratios then rise again in response to a rising share of elderly population and lower share of working-age populations. Focusing first on saving (left-hand panel), we would expect a non-linear relationship in which saving is low in countries where the population is young (right side of the axis), tends to rise towards the middle of the Figure and then declines when approaching the zero point of the x-axis or past it. A quadratic regression line broadly reveals such a relationship in saving and in the current account. (The regression line for investment turns out to be linear). Again, caution is needed in interpreting these results because of wide dispersion in the data. In particular, Singapore is a significant outlier with an older population and very high rates of saving.[8]

## 3 Pension system design

A key challenge faced by pension authorities is to generate enough resources to meet pension liabilities given a desired level of coverage and replacement income while minimising the burden on the working-age population. In this connection, there has been much discussion of how to fund pension benefits, and specifically on the extent to which countries should rely on income transfers or (alternatively) accumulated assets to finance retirement spending. National practices appear to vary considerably. Drawing on research by the National Transfers Account project, Lee and Mason (2007) estimate that reliance on assets has been comparatively high in Thailand and the United States, and comparatively low in Japan and Taiwan, China (Figure 2).[9]

Some of these differences could reflect different institutional arrangements for financing old-age consumption, including differences in pension design and coverage. Traditionally. pension systems have relied on defined benefit (ie guaranteed incomes) pay-as-you-go systems, in which taxes on workers fund the pension incomes of the elderly. However, these systems tended to create very large implicit pension debts that, since they were not fully funded, raised concerns about the adequacy of replacement incomes and potential fiscal burdens. In particular, unfunded systems in which payments have to be implemented via transfers from the working-age population (e.g., traditional pay-as-you-go systems) raised concerns about increasing burdens on a declining pool of workers. Projected declines in the share of workers and increases in the share of elderly dependents in the population (Table 1, three right-hand columns) imply increases in elderly and overall dependency ratios. The issue is of particular interest in countries where populations are ageing more rapidly (e.g., CEE, Korea and China).

The potential financing problems that can arise in more traditional pension systems are illustrated by the experience of Korea, where the pension system is a *partially funded defined benefit* system managed by the government.[10] Holzmann *et al.* (2004) note that reserves accumulated through the public pension system were low compared to the estimated implicit pension debt (IPD), respectively 10 and 47 per cent of GDP, 10 years after the scheme was introduced. It was estimated that the fund would be completely exhausted within the first half of

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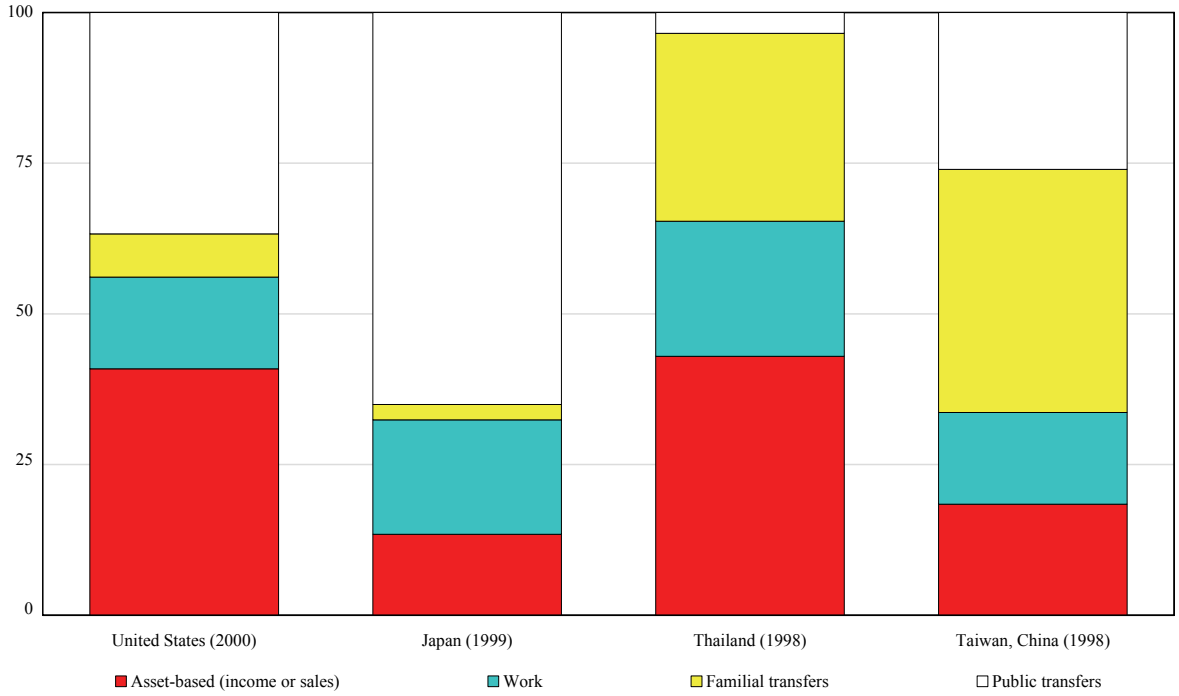
[8] Singapore is such an outlier that it was not included in the regression analysis. However, all other countries shown in the figure were included in the regression.

[9] At the same time, however, there appears to be significant reliance on familial transfers in Thailand and Taiwan.

[10] However, in 2007, the National Pension Service (NPS) mandated several investment banks (Morgan Stanley, Credit Suisse) to manage part of its assets. See Song Jung-a, "S Korea turns to global banks on pensions", *Financial Times*, 25 July 2007.

**Figure 2**

**Financing of Old-age Consumption**
*(percent of total consumption)*




We thank Ronald Lee for permission to use this figure.
Source: Lee and Mason (2007).

the 21st century.[11] One difficulty is that payment promises in a defined benefit plan do not depend on a pension system's performance or ability to accumulate assets. Another difficulty pertains to incentives to save under these arrangements discussed below.

Recent pension legislation (e.g., in Latin America) has instead sought to encourage wealth accumulation via personal saving to fund retirement consumption. In particular, there has been more emphasis on defined contribution, rather than defined benefit, which reduces the implicit pension debt. For example, Chile's pension system (introduced in 1981) is a *fully funded defined contribution* system of mandatory individual accounts managed by private pension fund administrators (AFPs). In the 1990s, eight emerging market economies implemented pension reforms similar to Chile's.[12]

In assessing the extent to which pension reforms of this latter type could reduce the burden on the working-age population, it is worth noting that in a closed economy, consumption by the old would always involve some transfer of resources away from the young. In a pay-as-you-go system, the transfer would involve the payment of taxes (e.g., for social security, as in the United States). In

[11] The precise estimated dates vary: by 2031 according to Moon (2002) and by 2047 according to the Ministry of Health and Welfare (Bateman, 2007).

[12] These are Peru (1993), Argentina and Colombia (1994), Uruguay (1995), Mexico and Bolivia (1997), El Salvador (1998) and Poland (1999). In contrast, Brazil has not adopted individual accounts and recently introduced a notional defined contribution system, which links contributions to benefits, but the contributions are not placed in individually funded accounts (Matijascic and Kay, 2008).

a fully funded system with private accounts (e.g., as in Latin America) the transfer would involve the payment of rent, interest income or dividends to, or purchases of assets from, retirees. Nevertheless, a fully funded defined contribution system can still reduce the burden on the working-age population if over time it increases saving and the stock of capital of the economy. Higher capital/labour ratios would raise worker productivity, making it easier to sustain any given level of elderly consumption out of current income. In an open economy, burdens on the working-age population could also be reduced via the accumulation of foreign assets, which can result from additional saving, or the diversification of pension fund portfolios (see below). This would reduce claims on domestically produced goods and services at the time of retirement (compared to the case of pay-as-you-go financing or domestic investment only).

Reformed pension systems could increase the incentive to save and reduce evasion because pension contributions are not transfers to others but are savings explicitly accruing to the individual.[13] However, the impact on saving rates of pension reforms similar to those adopted in Chile does not appear to be large.[14] Saving ratios in countries listed earlier as having adopted these reforms have generally not increased markedly over time (Annex, Figure 9). In Poland, for example, sharp increases in saving rates pre-date the 1999 pension reforms, and national saving rates have by and large drifted downwards since the reforms were adopted. In Latin America, saving rates are still comparatively low, and increases in some cases have only offset earlier declines.[15] An exception is Chile, where national saving rates have risen since the adoption of pension reforms in the 1980s.

Several factors may have limited the impact of pension reforms on national saving:

- *lack of financial literacy*. Pension reforms will not increase saving if contributors are not aware of the possible returns from saving. Some recent survey data from Chile suggests that many pension contributors (up to around 60 per cent) probably lack such awareness as they cannot provide estimates of the balances on their pension accounts. It also appears that contributors with lower awareness have smaller balances (Arenas de Mesa *et al.*, 2008);
- *reduced precautionary saving.* Precautionary household saving outside the pension system may have been reduced to the extent to which fully funded defined contribution plans are seen as more credible than defined benefit plans that are not fully funded. This effect may be accentuated if pension funds also contribute to financial deepening (see below). The impact on overall saving would then be small and could even be negative. In a number of countries, there has also been a decline in private saving offsetting increases in government saving. Indeed, Bulíř and Swiston (2006) find that the private saving offset to public saving has increased considerably in this decade; a 1 point rise in the ratio of public saving to GDP is offset by a 0.9 point decline in private saving (up from 0.4 to 0.6 in the 1990s). This may reflect lower precautionary saving, due not only to pension reforms but also to more credible macroeconomic policies;
- *transitional costs*. While pension reforms have increased assets to cover implicit pension debts, explicit recognition of such debts has resulted in larger fiscal deficits over a relatively extended transition period. Roldos (2007) notes that "the loss of contributions to individual accounts and

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[13] Indeed, in Korea, the contributions tend to be low due to a relatively large self-employed sector, where plan participants tend to underreport their income. A less developed infrastructure for enforcement and collection also plays a role. Reforms adopted in 2007 seek to improve the sustainability of the system by gradually reducing the income replacement rate from 60 to 50 per cent in 2008 and then to 40 per cent by 2028.

[14] The same could be said for current accounts. In Figure 1, the largest surpluses appear to be in countries that are export-oriented (*i.e.*, Singapore and Malaysia) or are commodity exporters (e.g., Venezuela). The extent to which mandatory contributions to provident funds might help explain the large current account surpluses in Singapore and Malaysia remains to be determined.

[15] OECD (2007) reaches a similar conclusion. It also notes that empirical work on the impact of pension reforms on national saving is not conclusive.

the payment of recognition bonds to those who moved to the new partially or fully funded systems added in some cases more than 10 percentage points of GDP to public debt ratios". It may also be noted that in some cases, such as Peru, reforms were implemented in such a way that workers had an incentive to stay with the traditional pay-as-you-go system, although this was later modified (Carranza and Morón, 2008);

- *declining pension coverage of workers.* OECD (2007, Box 2.1, pp 69-70) estimates that the weighted average of coverage for the Latin American region fell from 63 per cent before the pension reforms to 26 per cent in 2006 (however, the initial coverage could be an overestimate). In particular, while membership in pension funds has increased as a proportion of the registered workforce, the share of members who actually contribute has fallen in every country.[16] Research is needed to uncover the reasons, but an important factor appears to be whether a pension plan is mandatory, or the default is set to automatic enrolment (Beshears *et al.,* 2008). Given that pension plan contributions are mandatory in a number of EMEs, a large informal sector may also play a role. High administrative costs of pension systems (see next item) may also be partly responsible;[17]
- *high administrative costs*. Reforms that have forced workers to channel savings to fund their own retirement through private financial institutions have resulted in high fees.[18] Costs in these systems average 1 to 2 per cent in the long run, which can have the effect of lowering future pensions 20-30 per cent. Against this it has been argued that that high operating costs largely reflect marketing expenditures in retail-oriented pension fund systems and institutional reforms could reduce them (James *et al.*, 2001). It is also argued that government-run pension systems deliver much lower returns than private systems.[19]

## 4 Asset accumulation and financial deepening

### *4.1 Pension funds: asset growth and composition*

Experience suggests that pension funds can contribute to financial sector deepening. As pension fund assets grow, they can help diversify the investor base and provide stable demand for fixed income securities as well as for new financial instruments (e.g., high-yield bonds, mortgage-backed securities (MBS), and foreign exchange and interest rate derivatives). The process is potentially symbiotic, as this in turn supports pension fund growth by increasing the availability of longer-maturity assets for pension fund investments.

Since 2000, pension fund assets have grown rapidly in a number of EMEs. As shown in Figure 3, as a percentage of GDP these assets have risen by more than 8 percentage points in Chile, Colombia, Peru and Poland. (In contrast, partly reflecting their initially greater size, pension fund assets have grown only moderately in Singapore and declined in Malaysia over the same period). However, there is still ample scope for further growth, as pension fund assets are generally still small in EMEs. In 2006, eight out of 13 EMEs shown in Figure 7 had assets of less than 20 per cent of GDP. Among EMEs, only in Chile, Singapore and Malaysia did pension fund assets exceed 50 per cent of GDP. Although this is comparable in size to some developed economies, it is still small compared to the 100 per cent of GDP recorded in the United States.

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[16] The percentage of registered workers who contribute ranges from 11 per cent in Peru to 31 per cent in Mexico and 58 per cent in Chile.

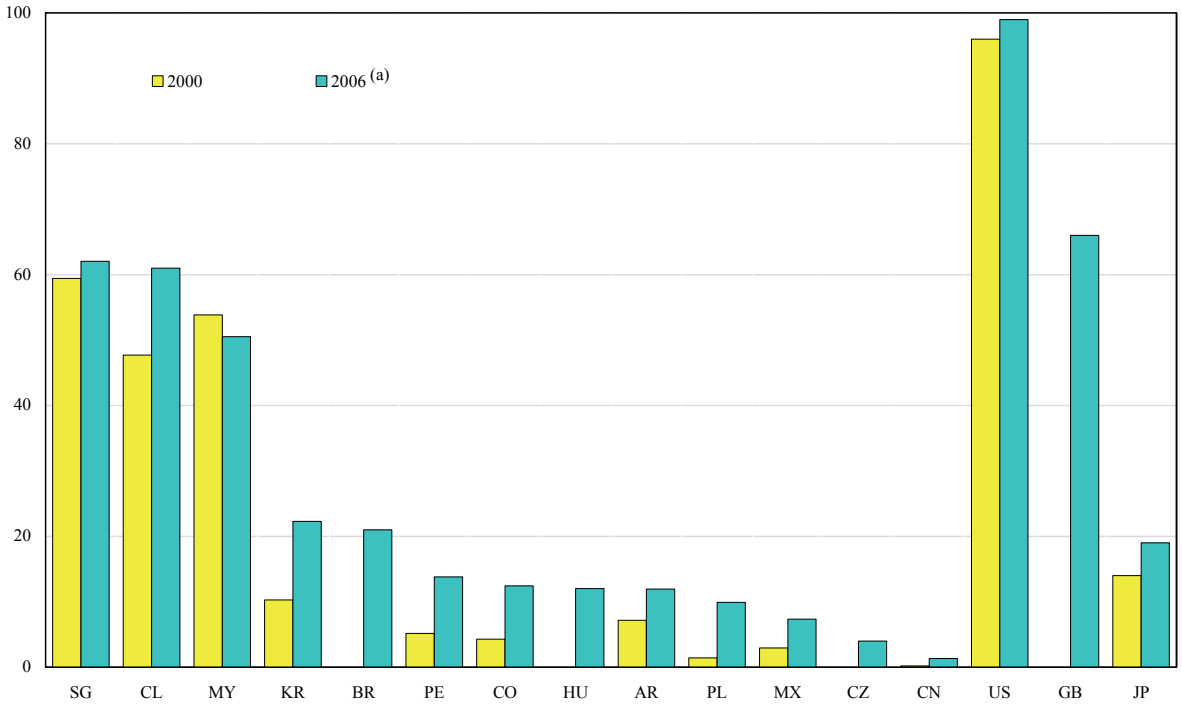
[17] In line with some of these developments, the success of recent (three-pillar) pension systems in achieving their social goals is being questioned, notably in Chile (Kay and Sinha, 2008). Efforts to address this could have effects on saving and investment as well.

[18] For a more severe critique, see Kotlikoff (2006).

[19] See James (2004) and Roldos (2007).

**Figure 3**

**Pension Fund Assets**
*(percent of GDP)*




AR=Argentina; BR=Brazil; CL=Chile; CN=China; CO=Colombia; CZ=Czech Republic; GB=United Kingdom; HU=Hungary; JP=Japan; KR=Korea; MX=Mexico; MY=Malaysia; PE=Peru; PL=Poland; SG=Singapore; US=United States.
(a) Or latest available.
Source: OECD, Association of Pension Fund Administrators; national data.

### *4.2 Composition of pension fund portfolios*

The impact of pension fund accumulation on the domestic financial sector depends in part on the composition of pension fund portfolios. The following aspects may be highlighted.

First, the share of assets held in financial institutions has tended to decline in a number of EMEs (see Chan *et al*., 2006 for Latin America). This may reflect less reliance on bank deposits as investments, which could enhance demand for other financial instruments and financial deepening. However, in some countries, bank deposits remain significant. According to OECD statistics, in 2005 the share of cash and deposits in total pension fund assets in Thailand, Brazil and Indonesia was 40, 44 and 71 per cent respectively.

Second, the portfolio composition of pension fund assets in some EMEs, Latin America in particular, is highly weighted towards government bonds. Indeed, as reported by Chan et al., (2006), in the majority of Latin American countries they sampled pension funds held more than half of their portfolios in government debt (in Mexico and El Salvador it was more than four fifths). Of particular interest is that in five Latin American countries (Argentina, Bolivia, El Salvador, Peru and Uruguay) pension fund assets became more concentrated in government debt between 1999 and 2005. By way of comparison, the share of pension fund assets invested in bonds (both public and private) in the United States and Japan tended to fall (between 1995 and 2005, from 26 to 19 per cent and from 46 to 30 per cent, respectively; see Committee on the Global Financial System, 2007).

**Table 3**

**Restrictions on Portfolio Composition and Actual Asset Composition**
*(percent of total assets, 2006 or 2007)*

| Country | Domestic Equities | | Foreign Assets | |
|---|---|---|---|---|
| | Maximum Limits | Actual Composition | Maximum Limits | Actual Composition |
| India | | | | |
| Korea | 12 | 11 | 20 | 9 |
| Singapore | PPR | 0 | PPR | … |
| Argentina | 50 | 13 | 20 | 10 |
| Chile | 39 | 17 | 30 | 32 |
| Colombia | 30 | 15 | 20 | 14 |
| Mexico | 15 | 0.4 | 20 | 8 |
| Peru | 35 | 42 | 10.5 | 8 |
| Hungary | 50 | 8 | 30 | 5 |
| Poland | 40 | 32 | 5 | 2 |
| *Memo:* | | | | |
| *United States* | *PPR* | *41* | *PPR* | |
| *United Kingdom* | *PPR* | *40* | *PPR* | |
| *Japan* | *30* | | *30* | |

PPR = "prudent person rule".
Source: Poirson (2007); OECD, *Global Pension Statistics*; OECD (2008), *Latin American Economic Outlook*; Korea National Pension Service.

Third, some pension funds (e.g., Korea or Mexico, Table 3) tend to allocate a relatively small amount of their portfolios to equities, even if relatively young populations (e.g., in India) suggest that there is scope for increasing allocation to equities.[20] By way of comparison, in the United States, 41 and 24 per cent of pension fund assets are invested in equities and mutual funds, respectively. Fourth, with some exceptions (e.g., Chile), the allocation to foreign assets by EME pension funds also tends to be small.

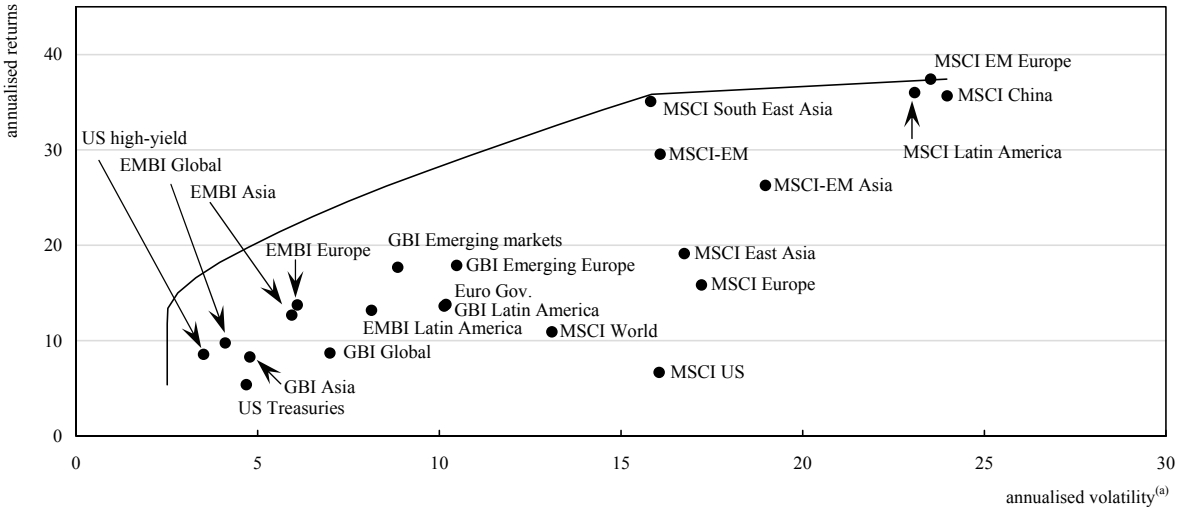
The lack of diversification in pension fund portfolios is in a number of cases the result of restrictions on pension fund investments in equities and foreign assets (Table 3). A major reason for these restrictions is that expanding pension fund portfolios to include assets with returns exhibiting very high volatility (domestic equities and foreign assets) is believed to create an unacceptable risk of losses that could impoverish pension fund participants.

There are two arguments for liberalising restrictions on pension fund investments, both of which have to do with the gains from diversification. First, liberalisation can reduce concentration in a portfolio and consequently lower the risk of very large losses. This can be particularly

[20] Some research suggests that it would be optimal to have portfolios that are more heavily skewed towards equities in economies where populations are younger (Gollier, 2005). However, this is a contentious issue.

**Figure 4**

**Returns and Volatility, 2002-07**
*(unhedged returns in US dollars, percent)*




The line represents the efficient portfolio frontier. EM= Emerging Markets; EMBI=Emerging Markets Bond Index; GBI= Government Bond Index; MSCI=Morgan Stanley Capital International.
(a) Standard deviation of returns, calculated using daily percentage changes in the return index.
Source: JPMorgan Chase; Merrill Lynch; Datastream.

important in emerging market economies which, in the past, have been vulnerable to sharp downturns or even financial crises. For example, a pension fund investing in domestic bank deposits avoids market and liquidity risk but retains counterparty risk to the domestic banking system. This risk can be reduced (at the cost of assuming some exchange rate risk) by adding foreign assets to its portfolio.

Second, liberalisation increases the set of investable instruments and potential gains from diversification. The recent performance of a variety of financial instruments suggests that these gains can be very large. For example, in this decade domestic Latin American government securities (GBI-Latin America) earned a shade over 10 per cent annualised return (in US dollars) with an annualised volatility of 10 per cent (Figure 4). However, roughly triple those returns could have been earned by investing in Latin American equities, at the cost of more than doubling volatility.

Returns can be improved not only by diversifying into equities (at home or abroad), but also by diversifying into foreign bonds. For example, adding domestic bonds from other regions to an investment portfolio could be associated with increased returns with less than proportional increases in volatility; indeed, the GBI-EM index has higher returns and lower volatility than the GBI-Latin America index. This reflects diversification benefits resulting from combining assets in a portfolio whose returns have low or negative correlations (see below).

Berstein and Chumacero (2005) provide more precise estimates of the gains from easing specific restrictions on pension fund asset allocations in Chile. Their analysis suggests that by mid-2002, in the absence of the specific pension fund restrictions applied in Chile, pension fund assets could have been higher by between 10 per cent (for a quadratic preference or an efficient value-at-risk portfolio) and 30 per cent (for a minimum variance portfolio) without increasing the volatility of returns (see their Figure 3). Put differently, for a minimum variance portfolio, with the same volatility of returns, returns to the unrestricted portfolio averaged 0.85 per cent a month,

compared to 0.67 per cent per month for the restricted portfolio.[21] This is because the unrestricted optimal portfolio implied a larger allocation to foreign bonds and equities (about a ⅓ share for the minimum variance model) than would have been the case for the restricted portfolio. Thus, for the minimum variance model, the probability of hitting the investment limit for foreign fixed income and equity instruments was estimated at about 62 and 90 per cent, respectively.

### *4.2.1 How much would pension funds invest abroad?*

While steps are being taken to liberalise pension fund investments abroad in a number of EMEs, it is not clear how much pension funds will increase their investments abroad in response. On the one hand, in the case of Chile, or other EMEs, the returns from moving to an optimum share of foreign assets (and corresponding gross outflows channelled via pension funds) could be even higher than suggested by Berstein and Chumacero's (2005) estimates. In their analysis, they only consider developed country fixed and variable income instruments as alternatives to domestic assets,[22] while recent experience suggests that EME pension funds could earn even higher-risk adjusted returns by investing in assets issued in other EMEs. As can be seen in Figure 4, a number of regional (EMBI, GBI and MSCI) indices dominate their developed country counterparts in terms of risk-adjusted returns. Against these advantages is the possibility that EMEs might be more vulnerable to crises, so that a pension fund that is very concerned about the risk of large losses might be less inclined to invest in EME instruments.

Much depends on the diversification benefits provided by EME instruments on average and during episodes of financial stress. As can be seen in Figure 5, equities are not fully correlated across regions over a longer period (2001-07). This highlights the opportunities for diversification benefits from EME pension fund investments in both developed market and other emerging market equities. However, an important concern is that correlations in cross-country equity returns tend to rise during episodes of financial stress. Nevertheless, EM pension funds may be in a better position to manage the risks of diversification (than, say, EM banks) because pension fund liabilities tend to be longer-term. Also, bond investments do not appear to raise such concerns, as correlations in some cases have actually fallen during episodes of financial stress.

On the other hand, diversification could be limited by a number of factors.[23] Even in the absence of restrictions, there is evidence that investors prefer to invest in their own domestic markets (home bias). This is reflected in the fact that pension fund investment abroad is below the ceiling in a number of countries (Table 3).[24] An important reason is that developing monitoring and management capacity to invest abroad *is costly*, particularly for pension funds in EMEs having

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[21] The authors estimate the restricted portfolio by (where applicable) calibrating parameters in the objective function so as to replicate the *ex post* pension fund portfolio returns and volatilities. The unrestricted portfolio is selected so that in each period it is exposed to the same volatility as the restricted portfolio. The return corresponding to that volatility is then estimated. These results vary somewhat with differing assumptions about transaction costs, but the basic conclusions hold; see Berstein and Chumacero (2005), Table 3.

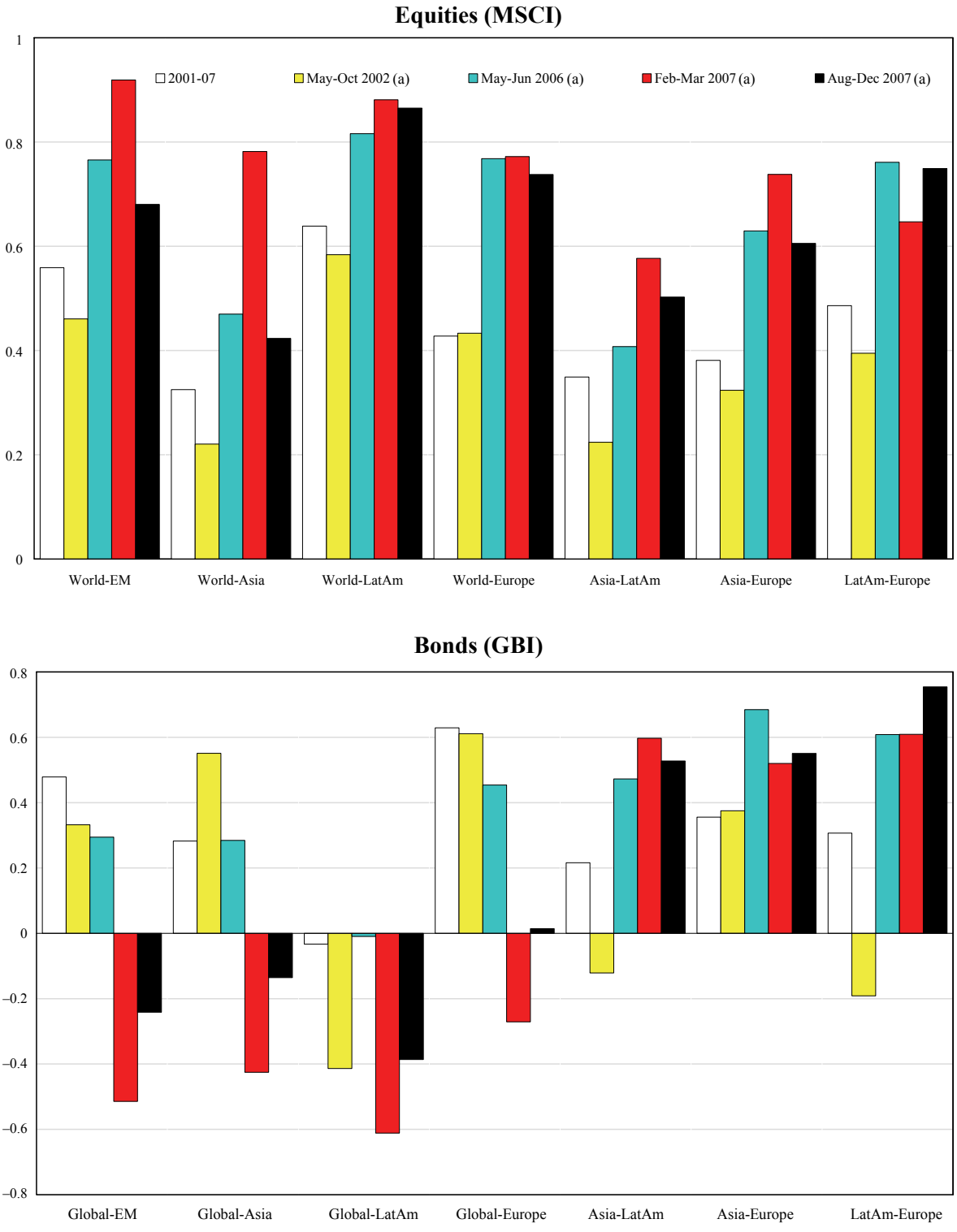
[22] They assume that there are four types of assets: domestic fixed, domestic variable, foreign fixed and foreign variable income (as proxied for, respectively, by promissory notes of the Central Bank of Chile of eight-year maturity, an index of all Chilean variable return instruments, an index based on all US indices, and the Dow Jones Industrial Average).

[23] Limited diversification of pension portfolios has also been observed in countries with higher incomes per capita. Gudmundsson (2001) describes stages in which pension funds in Iceland first invested in domestic bonds, lending directly to members (for housing), and then increased the share of foreign assets and equity in their portfolios over a short period of time (from low single digits to 19-26 per cent between the mid-1990s and 2000), resulting in large increases in returns on assets. In part, this reflected liberalisation, but also awareness by pension fund managers of the need to increase returns.

[24] Actual limits could also turn out to be below the ceiling because the ceiling applies to each fund individually and there are significant penalties for breaching the ceiling (e.g., forced sales). Under those conditions, fund managers would want to stay well below the ceiling to avoid breaches because fluctuations in market prices and mark to market accounting can push restricted asset holdings above the ceiling without any trade taking place.

**Figure 5**

**Correlations in Asset Markets**
*(daily unhedged returns in US dollars)*




[a] Period of increased global market volatility.
Source: Datastream; JPMorgan Chase.

little experience with investments in global financial markets. For example, as pension fund liabilities are denominated in domestic currency pension funds need to develop the capacity to manage currency risks;[25] There is also limited availability of instruments to hedge risks, including those arising from currency or interest rate fluctuations.[26]

There is growing awareness of the need to provide such hedging instruments. For example, in India market participants are now allowed to use foreign exchange forwards, swaps and options. While this is usually only against "crystallised foreign currency exposures", the range of hedging tools available is now to be expanded (Mohan, 2007). However, it is still not clear to what extent pension funds would engage in hedging even were the appropriate instruments to be made available, because hedging would be costly. An additional concern is whether pension funds could contribute to increased volatility of capital flows (Vargas and Varela, 2008), which could reduce risk-adjusted returns or raise broader risk management concerns.

### *4.3 Deeper financial markets*

As pension fund assets have grown, *emerging securities markets have deepened in recent years*. Domestic debt markets, which are largest in Asia, South Africa and Turkey, have generally grown in this decade. However, they have not grown in central Europe (Figure 6 and Annex, Figure 10). There has also been a tendency for stock market capitalisation to rise in EMEs in this decade, reflecting steep increases in equity prices.

However, financial markets in EMEs are still not as deep as in developed countries. This is broadly reflected in (i) still low ratios of market capitalisation in securities to GDP; (ii) high ratios of bank deposits to GDP; (iii) lack of liquidity in securities markets; and (iv) low reliance on securities markets for financing.

*Low ratio of securities to GDP*. As illustrated in Figure 6, the ratio of debt securities to GDP ranged from less than 30 per cent for CEE to 60 per cent or higher in Asia and Latin America. (Annex, Figure 10 provides country details). However, this ratio was around 200 per cent in the United States and Japan (Annex, Figure 11). With the recent run-up in EME equity prices, stock market capitalisation ratios are more comparable with the 100 and 150 per cent observed in Japan and the United States respectively, although they remain at a comparatively low 50 per cent in Latin America.

*Relatively high bank deposits*. M2/GDP has recently averaged around 140 per cent in Asian EMEs and 45-60 per cent in other EMEs. Bank deposits are thus relatively more important in EMEs than in the US, where the M2/GDP ratio averaged 50 per cent. However, M2/GDP ratios are about as high in Japan (nearly 150 per cent) as they are in Asian EMEs.[27]

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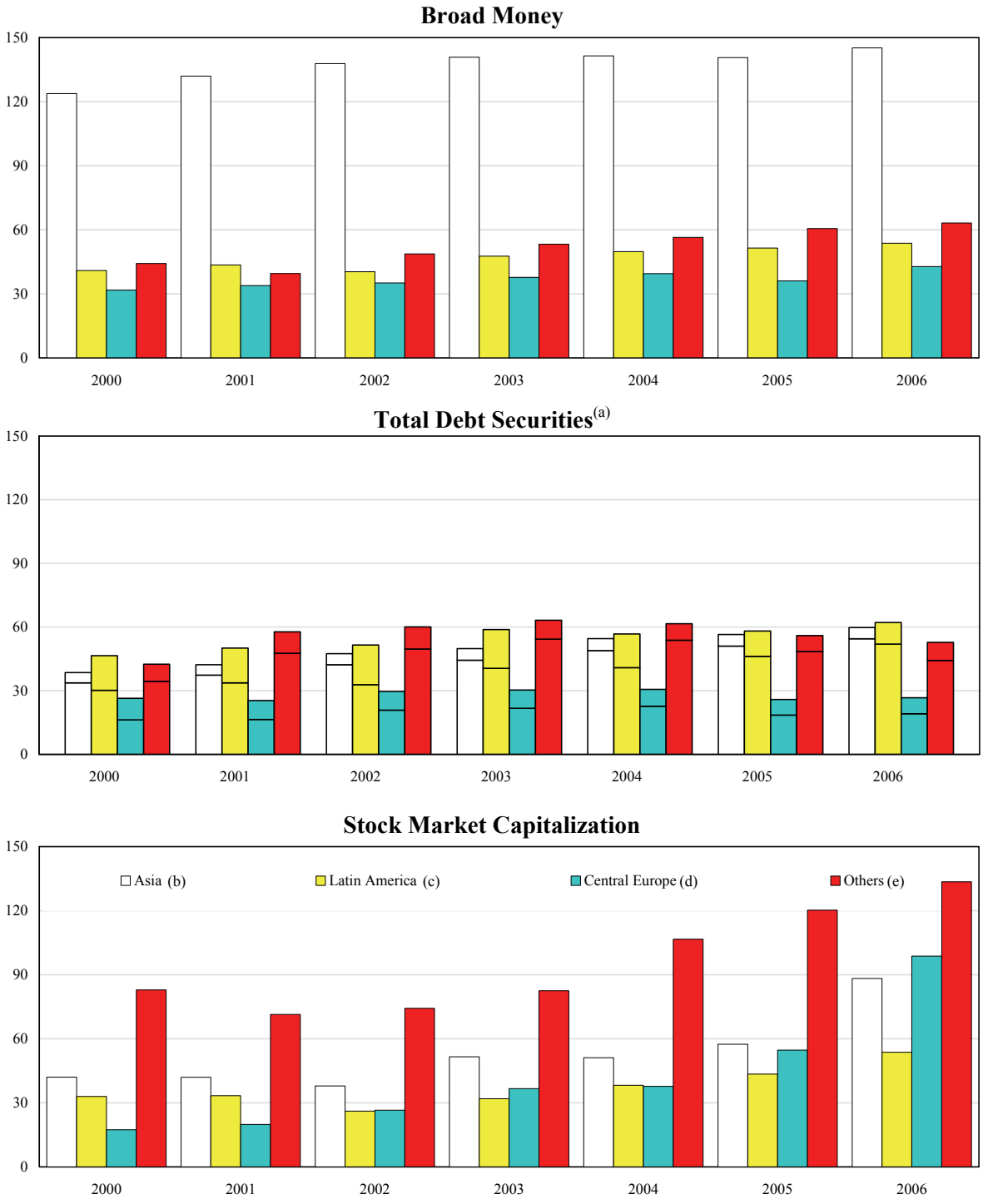
[25] With regard to monitoring investments abroad, pension funds could draw on the risk management capacity of global financial institutions by investing in vehicles such as mutual funds.

[26] See Moreno (2006), Table A6 and Mohan (2007).

[27] One implication is that in countries where pension funds hold a significant proportion of bank assets, bank interest rate liberalisation could significantly increase pension fund returns, particularly where rising inflation is a concern. Bank interest rates have been liberalised in many EMEs, although restrictions are still relevant in certain countries, like China or India. See Mohanty and Turner (2008, Tables 11 and 12) for information on the liberalisation of bank interest rates between 1997 and 2006. In some cases, pension funds could help promote interest rate liberalisation. In the case of India, pension funds could help eliminate distortions in interest rates caused by existing arrangements to support small savers (Mohan, 2007). To compensate for the lack of a social security system, the government gives small savers access to saving instruments (administered through post offices and commercial banks) that benefit from tax incentives and favourable interest rates set by the government. However, to attract deposits, banks competing with these small saving schemes tend to set rates on long-term deposits at levels higher than those which would have been obtained under competitive market conditions. This has been seen as contributing to downward stickiness of lending rates (with implications for the effectiveness of monetary policy). Improvements in the social safety net (including pensions) could address this issue. (A proposed interim solution is to benchmark these administered interest rates to market determined rates).

**Figure 6**

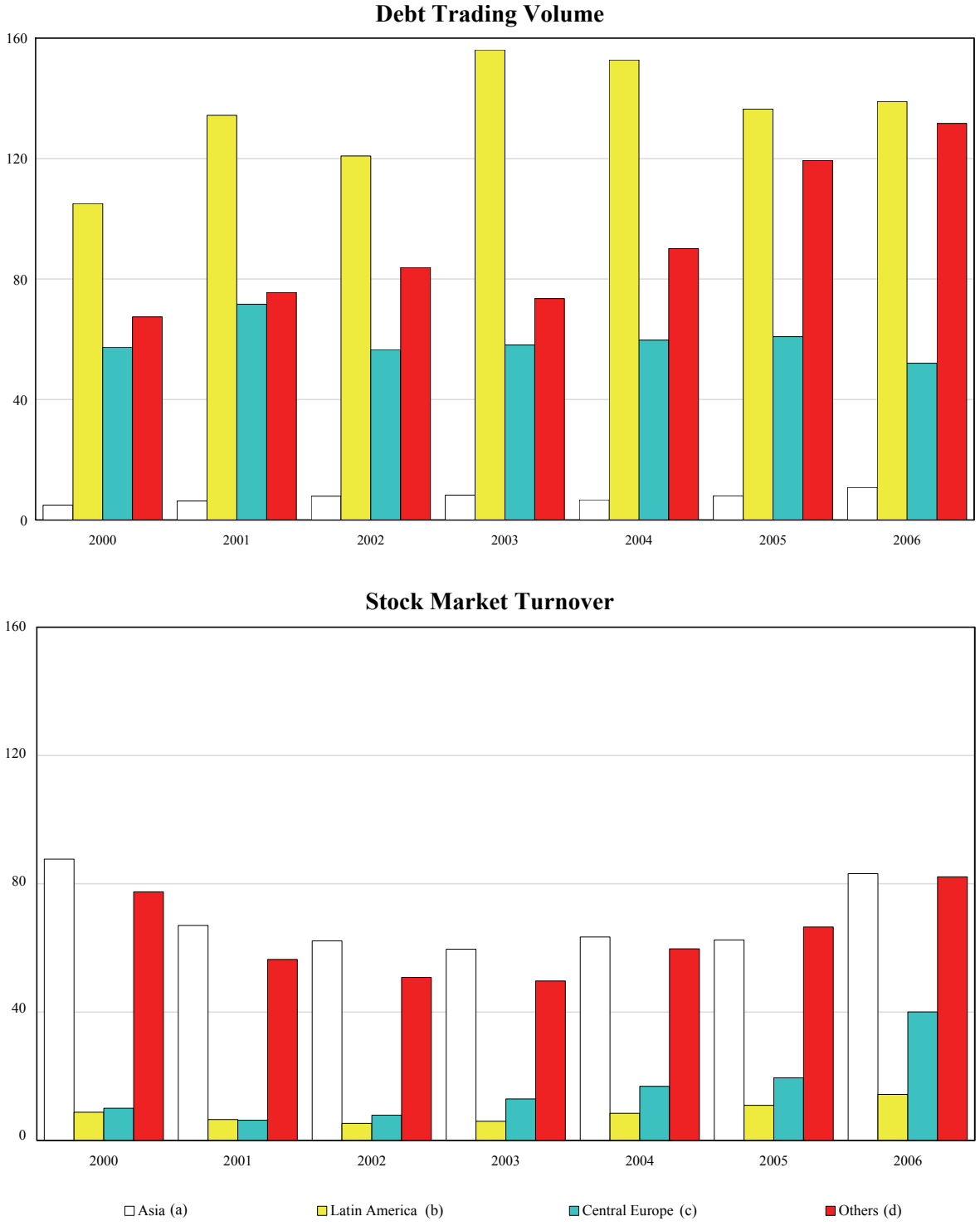
**Size of Financial Market**
*(percent of GDP)*




(a) Covers domestic (lower portion of bars) and international (upper portion of bars) debt securities. (b) China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan (China) and Thailand. (c) Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. (d) Czech Republic, Hungary, Poland and Russia. (e) South Africa and Turkey.
Source: IMF; Standard & Poor's, BIS.

**Figure 7**

**Liquidity Indicator**
*(percent of GDP)*




(a) China, India, Indonesia, Korea, Malaysia, Philippines, Taiwan (China) and Thailand. (b) Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. (c) Czech Republic, Hungary, Poland and Russia. (d) South Africa and Turkey.
Source: IMF; EMTA; Standard & Poor's.

*Low liquidity*. The rate of turnover in financial instruments tends to be lower in EMEs than in developed markets. This can present problems for risk management (and eventual wealth accumulation), by making it difficult for investors to change their positions. As can be seen in Figure 7, debt trading volume as a percentage of GDP ranged from a low of around 10 per cent of GDP in Asia to a high of around 150 per cent in Latin America. By way of comparison, the corresponding ratios for Japan and the US were respectively about 500 per cent and nearly 2000 per cent. As for equity markets, turnover tends to be lower in Latin America (around 10 per cent of GDP) and around 80 per cent in Asia and "other". By way of comparison, the corresponding turnover ratios for Japan and the United States are 150 and 280 per cent respectively (Annex, Figure 12).

*Limited reliance on equities for financing*. To illustrate, in China stock market capitalisation as a percentage of GDP is quite high (90 per cent), but flow of funds data indicate that between 2003 and 2005 equities accounted for only about 4 per cent of total increases in liabilities, with bank loans and bond financing accounting for much larger shares (61 and 35 per cent respectively). The reasons why higher share prices do not lead to more share issuance warrant further examination.

### *4.4 Role of pension funds in financial deepening*

The developments highlighted above suggest that further pension fund development could contribute to the deepening of financial markets. One indication is that the correlation between financial deepening and pension fund growth is comparatively strong in a number of EMEs. As shown in Table 4, stock market capitalisation is positively correlated with pension fund asset growth in Korea, Argentina, Chile, Colombia, Peru and Poland. In contrast, the correlation is negative in Malaysia and Singapore. As for domestic debt securities, the correlation is positive (in either levels or changes) in most EMEs listed.

The results in Table 4 are broadly in line with Roldos (2007) and OECD (2007), who note that institutional investment (including by pension funds) has been associated with increases in market capitalisation of stocks and bonds. This relationship is particularly apparent in Chile. In line with this, the share of pension funds in government debt markets in a set of Latin American countries rose from 18 per cent in 1998 to 29 per cent in 2005 (Roldos, 2007, Table 4). Pension fund demand is also believed to have helped stimulate the development of new financial instruments. There is also evidence of lengthening maturities in fixed income markets in Chile and Mexico, and institutional investors, including pension funds, are believed to have played an important role in this. Research also suggests that the growth of institutional investors such as pension funds can lower the cost of capital and encourage the creation of new financial instruments (Walker and Lefort, 2002). A pension fund portfolio reallocation to equities could thus boost investment and growth as well as returns for pension fund investors. The importance of this effect would depend in part on the extent to which firms rely on equity for their financing (which as noted earlier, can be relatively little in some EMEs).[28]

### *4.5 Implications for saving and capital flows*

The implications of greater financial depth for capital flows are uncertain, but some research suggests it could affect capital flows by lowering precautionary saving and current account

[28] On the other hand, some commentary suggests that the relationship between pension asset growth and market capitalisation has been weak in some countries over certain periods. Possible explanations include inadequate regulatory and financial infrastructure and a lack of a critical mass in pension fund assets under management.

**Table 4**

**Correlations with Pension Fund Assets/GDP[(a)]**

| Country | Time Period | | Stock Market Capitalisation/GDP | | Outstanding Domestic Debt Securities/GDP | |
|---|---|---|---|---|---|---|
| | | | Ratio | Change in Ratio | Ratio | Change in Ratio |
| China | 2000 | 2006 | 0.27 | 0.04 | 0.81 | –0.60 |
| Korea | 1990 | 2006 | 0.76 | 0.41 | 0.92 | 0.40 |
| Malaysia | 2000 | 2006 | –0.38 | –0.09 | –0.28 | 0.65 |
| Singapore | 2000 | 2006 | –0.20 | –0.65 | 0.82 | 0.61 |
| Argentina | 1995 | 2006 | 0.48 | 0.34 | 0.94 | 0.85 |
| Brazil | | | n.a. | n.a. | n.a. | n.a. |
| Chile | 1982 | 2006 | 0.68 | 0.79 | 0.30 | 0.71 |
| Colombia | 1995 | 2006 | 0.72 | 0.38 | 0.98 | 0.74 |
| Mexico | 1998 | 2006 | 0.39 | –0.23 | 0.96 | 0.54 |
| Peru | 1994 | 2006 | 0.72 | 0.44 | 0.90 | 0.20 |
| Czech Republic | | | n.a. | n.a. | n.a. | n.a. |
| Hungary | | | n.a. | n.a. | n.a. | n.a. |
| Poland | 2000 | 2006 | 0.86 | 0.33 | 0.96 | 0.91 |
| *United States* | *2001* | *2006* | *0.96* | *0.94* | *0.59* | *0.11* |
| *Japan* | *2001* | *2006* | *0.98* | *0.86* | *0.64* | *–0.58* |

[(a)] Based on annual data covering the time period shown.
Source: OECD; FIAP; S&P Emerging Markets Database; national data; BIS.

balances. A recent study by Chinn and Ito (2007) finds that a larger financial sector could lower current account balances under certain conditions.[29] This is an issue of interest in a number of EMEs, notably China.

The effects of pension fund portfolio liberalisation on net or gross capital flows are also uncertain. However, the experience of Chile since 1998, reported by Desormeaux *et al.* (2008), suggests that pension fund investments abroad can have a large impact on gross outflows. This impression is reinforced by evidence they cite that an increase of 10 per cent in foreign investment limits on Chilean pension funds is associated with an accumulated depreciation of 2 per cent of the Chilean peso against the US dollar (see Cowan *et al.*, 2008). To illustrate orders of magnitude, at the limit of 30 per cent that prevailed until recently, Chilean pension fund assets invested abroad would be equivalent to nearly 20 per cent of Chilean GDP. Pending legislation contemplates significant easing of these limits which could mean large cumulative gross outflows over time in the pension fund sector. By way of comparison, foreign reserves to GDP in Latin America averaged about 10 per cent in 2006 (13 per cent in Chile) and 35 per cent in Asia.

[29] The conditions are that the economy be less open (ie restrictions on capital flows) and the legal system be less developed (not in the top decile).

An issue of interest is whether outflows channelled via pension funds could help offset large gross capital inflows, thus reducing the incentives for foreign exchange market intervention and reserve accumulation in some countries. While they are not perfect substitutes for foreign reserves, pension fund accumulation of foreign assets could provide a channel for intermediating capital inflows abroad, thus providing some of the benefits that have been sought from foreign exchange market intervention and foreign reserve accumulation without the associated disadvantages. In particular, as pension fund foreign asset accumulation would be financed by domestic saving, it does not raise the issues typically associated with the financing of foreign reserve accumulation, such as the possible loss of monetary control or the carrying costs associated with sterilisation of intervention in foreign exchange markets.

## 5 Postscript: The impact of the global financial crisis

As noted earlier, some research suggests that it would be optimal to have portfolios that are more heavily skewed towards equities in economies where populations are younger. One reason is that returns on equity investments tend to outperform returns on fixed income investments over the medium to long-term. However, this proposition is being tested by the sharp deterioration in the performance of equity investments resulting from the crisis that broke out in the second half of 2007. Annualised returns on equities fell from a range of around 5 to 35 per cent (depending on the index) for 2002-07 (shown earlier in Figure 4) to about –1 to 20 per cent for 2002-09 (not shown),[30] while volatility over these periods increased from about 10-25 per cent to around 20-30 per cent. By comparison, the decline in the range of annualised returns for bonds was much more moderate; falling from around 5-20 per cent to 5-15 per cent, with volatility rising from 3-10 per cent to 5-15 per cent. These differences are reflected in pension fund performance of some EMEs. For example, returns in pension funds holding a large proportion of equities in both Chile and Hong Kong experienced large losses. Looking ahead, a question of interest is how long it will take for returns on equity investments to recover as the global financial system emerges from this crisis. At this writing, equity returns had improved significantly in 2009, reducing very large losses on equity investments that had been recorded earlier.

[30] This reflects the fact that for 2008-09 (negative) returns on various equity indices shown in Figure 4 ranged from –20 to –40 per cent.

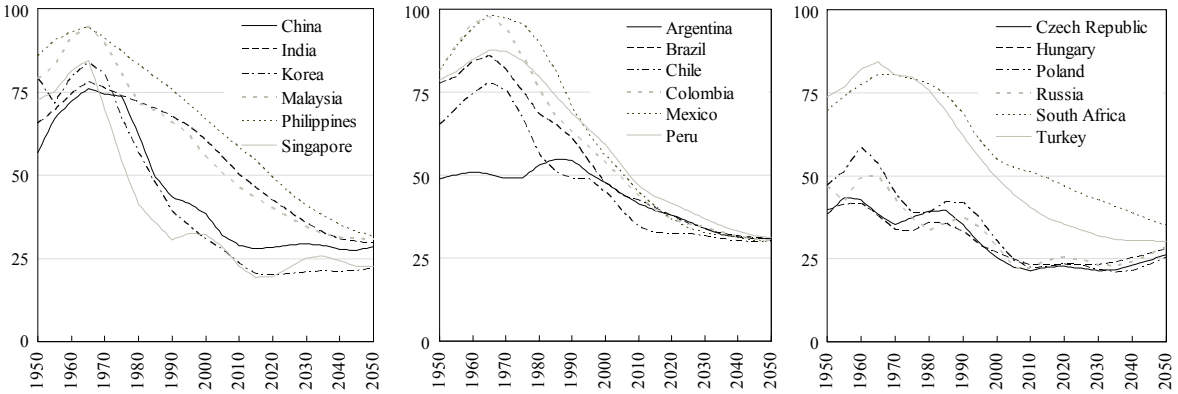
# Annex

**Figure 8**

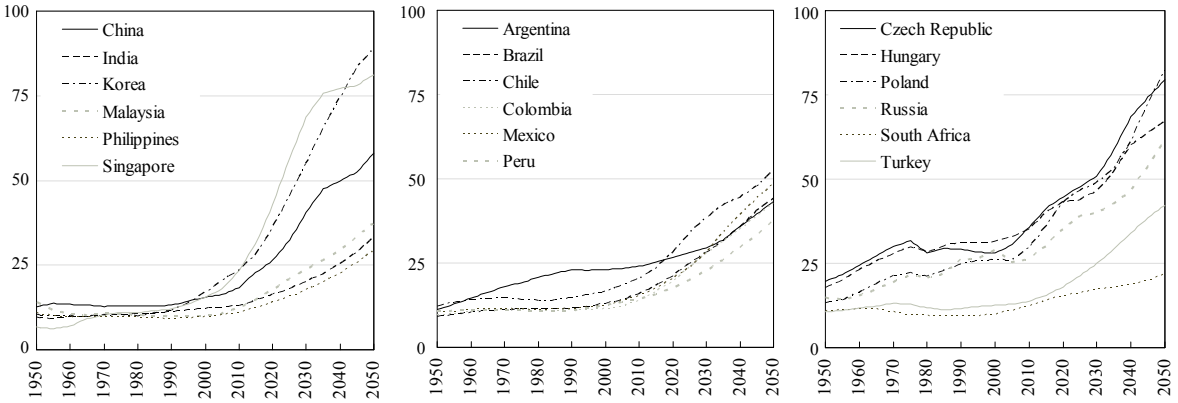
## Dependency Ratios by Country

*(percent)*

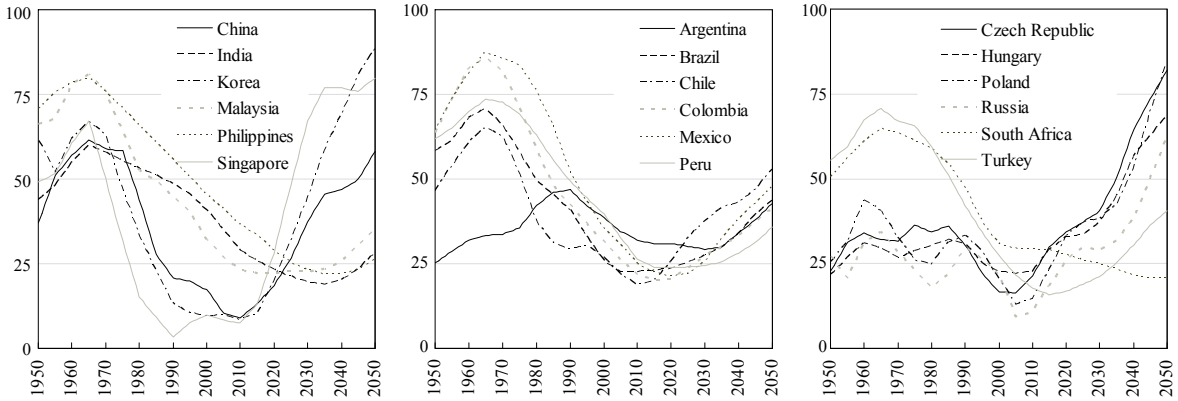
### Child Dependency Ratios[(a)]




### Elderly Dependency Ratios[(b)]



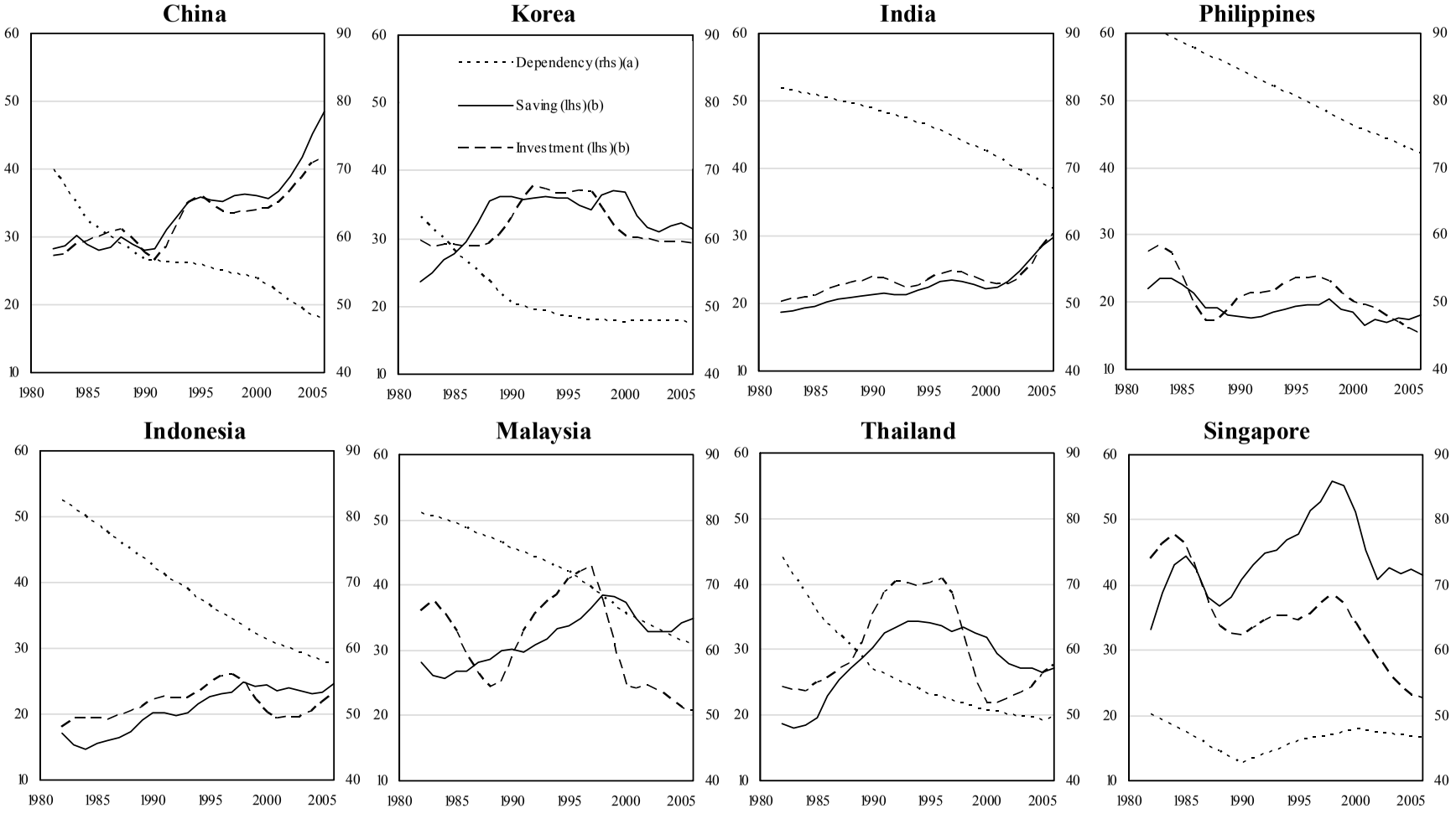

### Overall Dependency Ratios[(c)]




[(a)] Population less than 15 years of age / population 15-59 years old. [(b)] Population 60 years or older / population 15-59 years old. [(c)] Population less than 15 years of age plus population 60 years or older / population 15-59 years old.
Source: IMF; United Nations, *World Population Prospects*.

**Figure 9**

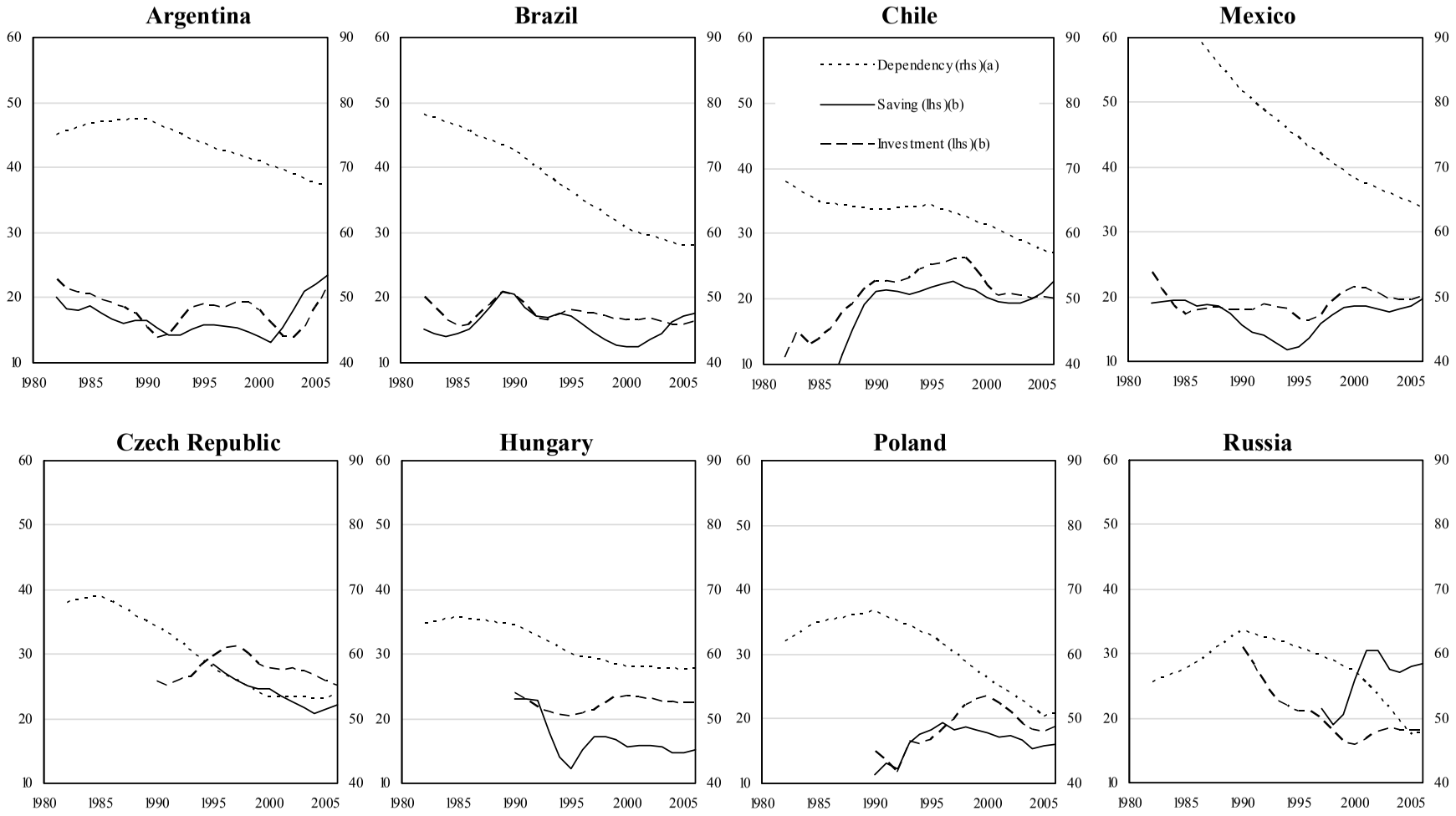
**Saving, Investment and Dependency Ratios**
*(percent)*




(a) Population less than 15 years of age plus population 60 years or older / population 15-59 years old. (b) Relative to GDP, three-year moving averages.
Source: IMF; United Nations, *World Population Prospects*.

**Figure 9 (continued)**

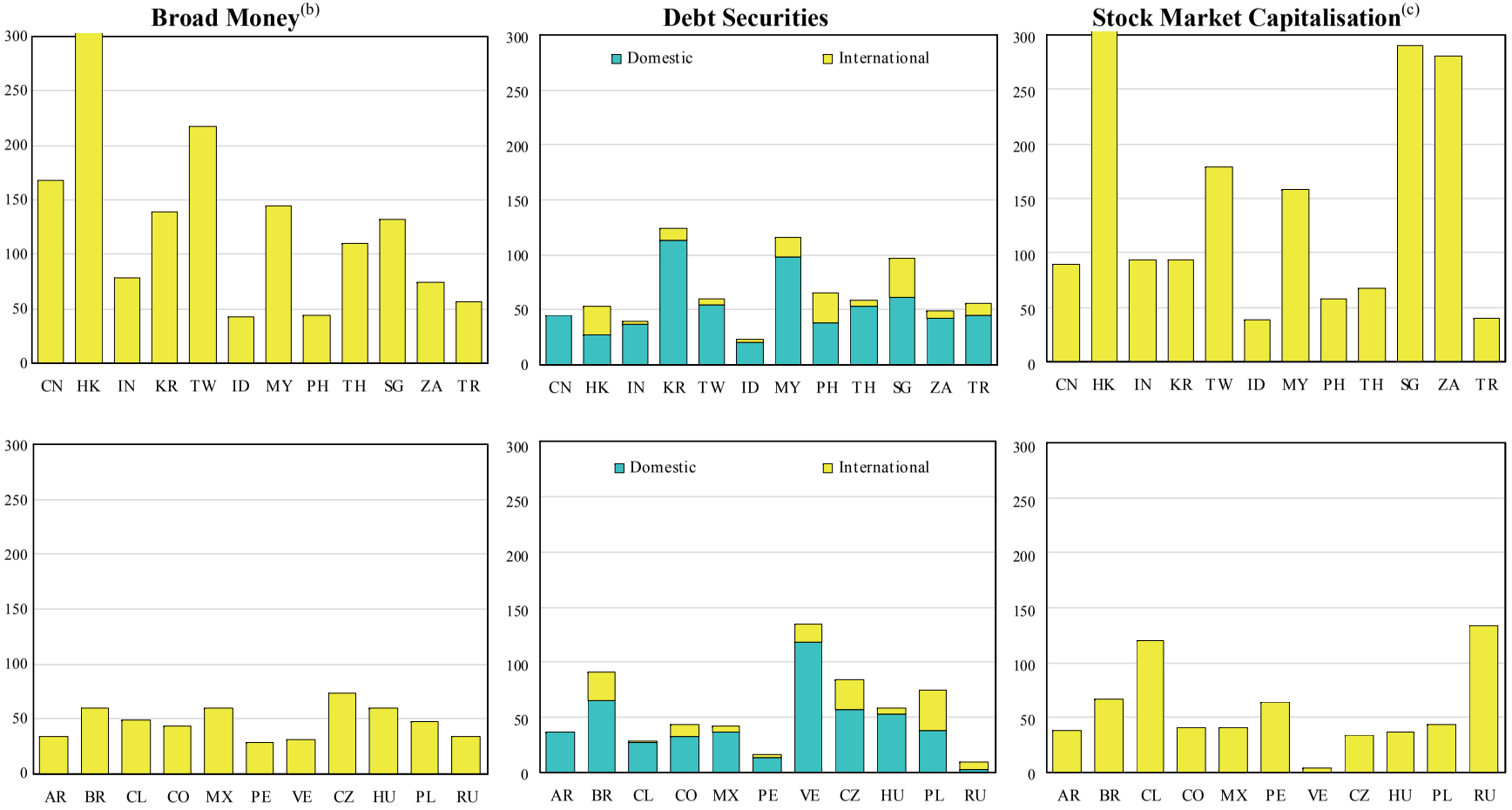
**Saving, Investment and Dependency Ratios**
*(percent)*




(a) Population less than 15 years of age plus population 60 years or older / population 15-59 years old. (b) Relative to GDP, three-year moving averages.
Source: IMF; United Nations, *World Population Prospects*.

**Figure 10**

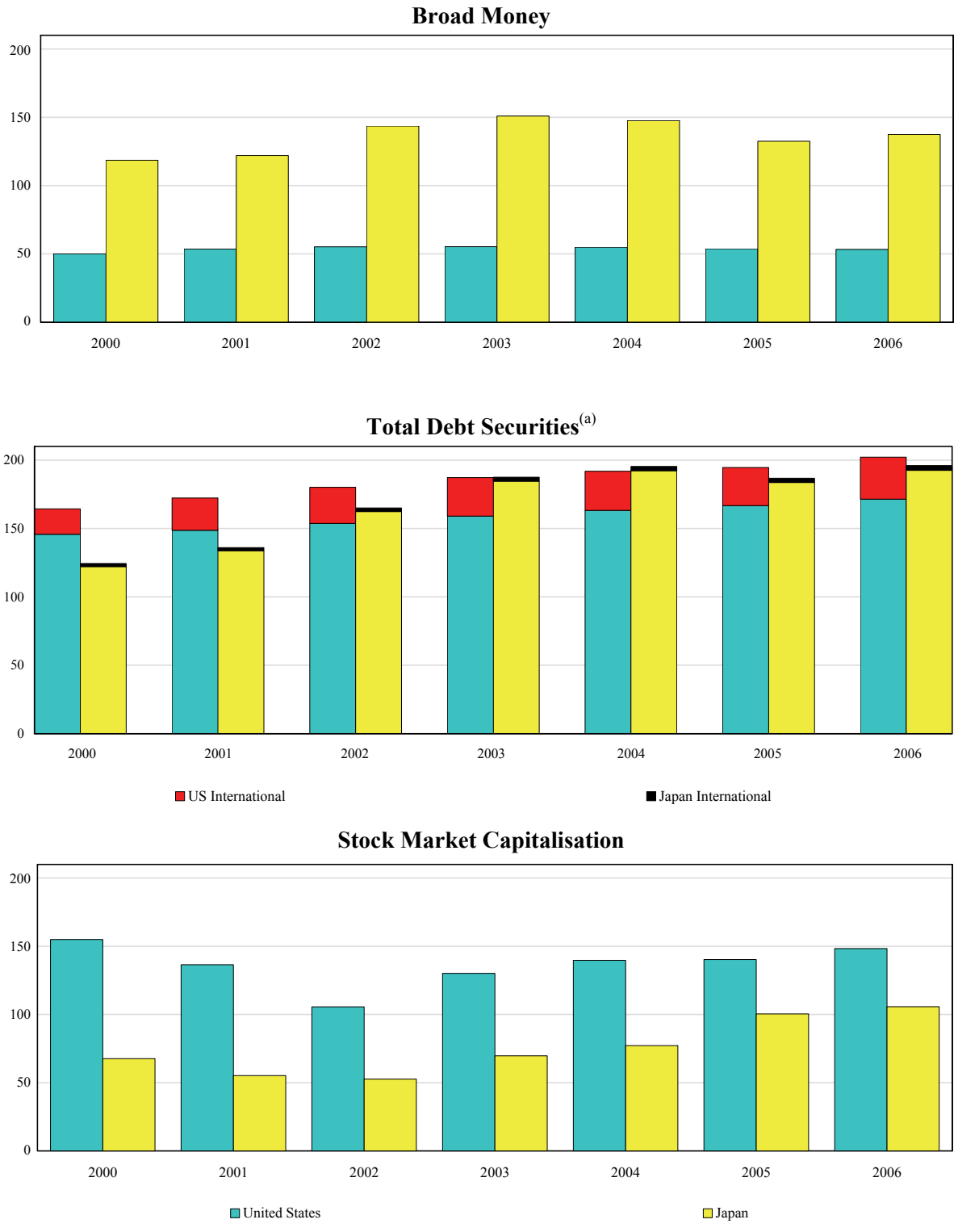
**Size of Financial Market**[a]
*(percent of GDP)*




AR=Argentina; BR=Brazil; CL=Chile; CN=China; CO=Colombia; CZ=Czech Republic; HK=Hong Kong SAR; HU=Hungary; ID=Indonesia; IN=India; KR=Korea; MX=Mexico; MY=Malaysia; PE=Peru; PH=Philippines; PL=Poland; RU=Russia; SG=Singapore; TH=Thailand; TR=Turkey; TW=Taiwan (China); VE=Venezuela; ZA=South Africa.
[a] End-2006 figures. [b] 345% for Hong Kong SAR. [c] 904% for Hong Kong SAR.
Source: IMF; Standard & Poor's; BIS.

**Figure 11**

**Size of financial market**
*(percent of GDP)*

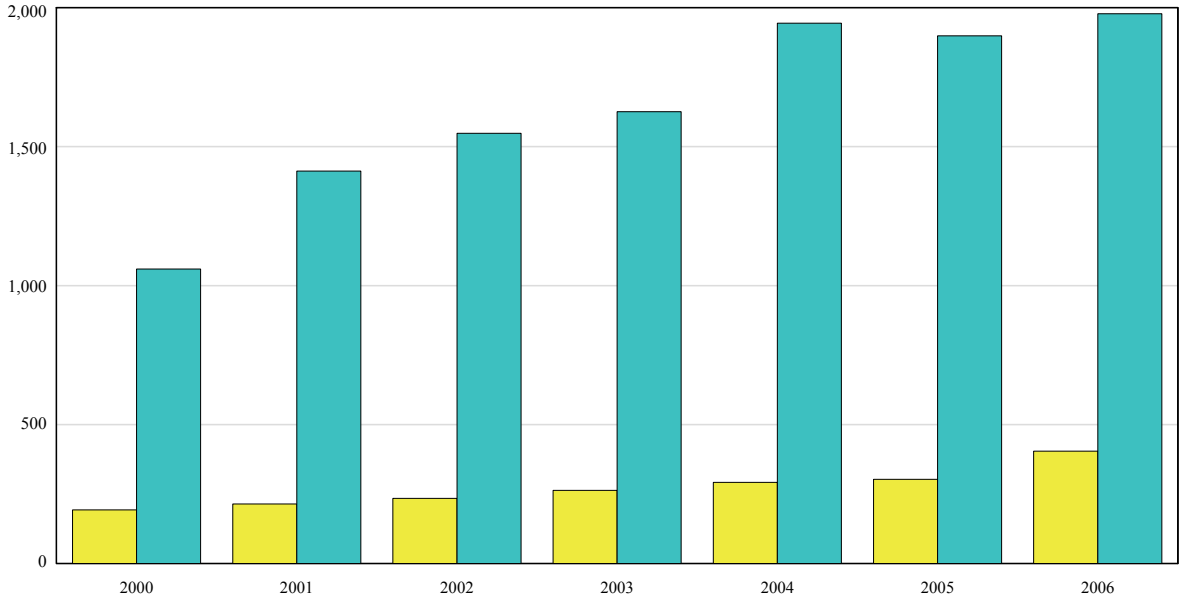



(a) Covers domestic and international debt securities.
Source: IMF; World Federation of Exchanges; BIS.

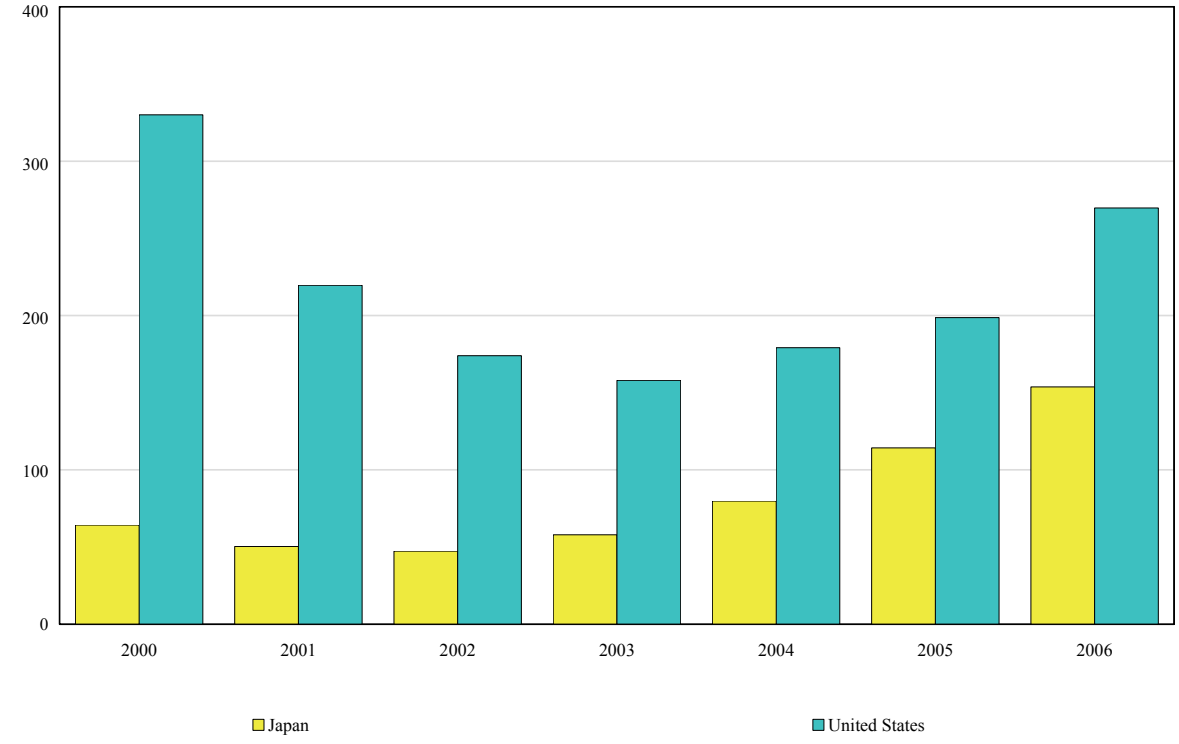
**Figure 12**

**Liquidity Indicator**[(a)]
*(percent of GDP)*

**Debt Trading Volume**




**Stock Market Turnover**




[(a)] Estimates of the annual value of secondary transactions in equities and bonds.
Source: National data.

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# REFORMING THE PENSION REFORMS: THE RECENT INITIATIVES AND ACTIONS ON PENSIONS IN ARGENTINA AND CHILE

*Rafael Rofman,*[*] *Eduardo Fajnzylber*[**] *and German Herrera*[***]

*This paper describes the recent reforms of pension policies adopted by Argentina and Chile. The structural reforms in the 1980s and 90s were targeted on improving the long term fiscal sustainability of the system and their institutional design, while transferring part of the economic and social risks from the State to participants. However, in recent years authorities in both countries coincided on identifying insufficient coverage among the elderly and adequacy of benefits as the most critical problems. As a result of differences in political economy and institutional constraints, responses were different. In Chile, a long and participatory process resulted in a large reform that focuses on impacts on the medium term, through a carefully calibrated adjustment. In Argentina, instead, reforms were adopted through a large number of successive normative corrections, with little public debate about their implications, and immediate impacts on coverage and fiscal demands.*

## 1 Introduction

Argentina and Chile, two of the pioneering countries in Latin American pension reform trends of the 1980s and 1990s, have recently embarked in a new wave of revisions and adjustments of their pension systems. The motivation, process and results of these reforms are not similar, although they share some characteristics. This paper describes the most relevant components of these reforms, explaining why and how they were introduced, discussing their likely impacts and remaining challenges.

While the systems in both countries as of the early 2000s were not identical, they shared a number of characteristics. Chile was the first country in the region to introduce a structural reform to its pension system, creating a fully funded, privately managed scheme in the early 1980s. This system covered salaried workers on a compulsory basis, and independent workers could voluntarily join. While the system was designed as a defined contribution scheme, retirees had the right to receive a minimum benefit as long as they had contributed at least 20 years to the system. The minimum was financed with general revenue funds, and had a clear redistributive effect.

In Argentina, the 1993 reform introduced a similar funded scheme, although it did not fully eliminated the pay-as-you-go, defined benefit component. All workers (including independent workers) were required to participate, and their contributions would finance a multipilar scheme. At retirement, the benefit would include a defined contribution component, but also a defined benefit flat amount, that would act as a universal basic transfer received by all retirees with at least 30 years of contributions. Furthermore, Argentine workers were given the choice to opt out of the funded scheme, and continue to participate in a fully PAYG scheme. In a sense, the Argentina reform was considered at the time to be an improvement over Chile's experience. The design and

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approval process (Argentina's reforms went through a long debate in Congress, with many reforms introduced by Senators and Deputies, while in Chile it was introduced through a "Decree Law" approved by General Pinochet), and several aspects of the new system were thought to be better designed and more sustainable.[1]

Sharing some design characteristics, the systems in Argentina and Chile also had some basic problems in common. Lower than expected coverage, administrative costs that were considered too high by some analysts and authorities, too much uncertainty for participants, and equity issues were perceived as the main problems of pension systems on both sides of the Andes. Some of these problems originated in the macroeconomic and labor market performance of both countries, others from design aspects.

Many authors, analysts, and policy makers wrote and discussed about these problems in the last decade or so. While some remedial actions and small reforms were taken, deep changes were postponed, mostly due to macroeconomic and political restrictions. However, the stronger fiscal situation of both countries in recent years, and a changing political climate that brought up concerns about the effectiveness of these programs to provide adequate income security for the elderly created conditions for a new wave or reforms.

The reforms enacted in Argentina and Chile in the last couple of years recognize similar origins (the concerns about coverage, equity, and efficiency of the systems, as well as a renew interest in defining the role of the State in the system) but measures and processes were very different. These differences seem to originate mostly on political and institutional disparities. In Chile, there was a strong consensus about the adequacy of the basic design of the pension system, and efforts were focused on improving it through a process that could guarantee political sustainability and fiscal predictability. In Argentina, on the other hand, the basic design of the pension system introduced in the 1990s was under strong criticism, and many of the existing problems were blamed on it. Also, the reform processes were different, possibly reflecting these differences in approach. While in Chile there was a wide public debate, with ample participation, lengthy analyses, and a slow construction of an almost universal consensus, in Argentina reforms were enacted through decrees or through laws that were briefly analyzed by Congress with little or no dissent about its contents and goals.

As a consequence of these differences, the expected results of recent reforms are also different. The paper discusses the impacts that these reforms are expected to have on coverage, benefits, fiscal accounts, and the operational and financial operation of the systems.

Interestingly, the reform processes in both countries were conducted in a relatively isolated manner from other social policy and fiscal debates. While there are many differences between the two countries, as discussed in this paper, both reforms share two clear aspects: they increased the coverage of pension systems among the elderly, at a fiscal cost. Discussions on whether increasing old age coverage was a priority for the social policies (as opposed, for example, to larger spending in education, health, or children's benefits) were mostly absent. Similarly, there was little if any debate regarding the implicit costs of these reforms in terms of requiring additional fiscal resources (that will eventually come from new taxes or reallocation of current expenditures). While these debates exceed the context of this paper, they are evidently relevant and should be considered within a wider analysis.

This paper presents a short description of the pension systems in each country as of the early 2000s, to then describe the stated motivations for reform and the main changes introduced in the

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[1] For example, Arenas de Mesa and Bertranou (1996) indicated that the Argentinean model has "*(a)… more inter- and intra-generational solidarity; (b) relatively lower transition costs to be covered by the State; (c) higher coverage of self-employed workers; (d) a more comprehensive regulatory framework; and (d) less gender inequality*".

systems since 2005, to finally identify some pending challenges. The fourth section discusses in more detail the political process, considering how and why differences in the political process between these two neighboring countries may result in important differences in outcomes. Finally, section five presents the conclusions.

## 2 The reforms in Argentina

Argentina's pension system is one of the oldest in the world, as it started to develop in the early years of the twentieth century. While the first programs providing income to elderly and retirees originated in colonial times, it was only in 1905 when a large program, covering railroad workers, was created. A slow process followed this, as new occupational pension systems, usually designed as funded schemes, were introduced. In the late 1940s a strong push by the new Peronist government resulted in a quick expansion of coverage, and a few years later nearly all workers in Argentina, including salaried and self employed, were covered by relatively generous, partially funded schemes.

An important reform in the late 1960s consolidated the different schemes into three programs, and gave the National Government authority to manage them. The financial scheme was explicitly defined as a pay-as-you-go scheme, and most parameters, including contribution rates, vesting period, minimum retirement age, and replacement rates were unified. This scheme ran into financial problems as its parameters became unsustainable in a context of growing unemployment and informality, and by the late 1980s it was clear that a new reform would be necessary.

In 1993, amidst serious concerns about the medium term fiscal sustainability of the system, looking for tools to energize the local capital markets and expecting that private management would make the system more transparent and efficient, a structural reform was introduced.

In this chapter, we discuss the situation of the system as of the mid-2000s, considering the design of the system, its performance, and the social and political context. We then describe the main reforms introduced in recent times, discuss their expected impacts, and identify some of the pending challenges that authorities will confront in the future.

### *2.1 The situation as of 2005*

#### *2.1.1 Quick description of the system*

After the 1993 reform, Argentina's pension system became a multipilar scheme, with funded and unfunded components, private and public participation in its management, and a combination of defined benefit and defined contribution model to determine the benefits paid to retirees.

The changes introduced almost 15 years ago were, by no means, a "definitive" reform. Since the original law was passed in October 1993, nearly eight hundred fifty new regulations about the pension system were approved, including thirty four laws and one hundred and thirty five decrees. While many of these norms were adopted to implement or supplement the system, there was a clear tendency to introduce short term corrections to the system.

As designed in 1993, the pension system in Argentina includes two basic pillars. First, contributions from employers (at 16 per cent of salaries) would be used to finance a flat benefit of approximately 28 per cent of average salaries to all retirees that satisfy the minimum age and vesting requirements. The second pillar would consist on a defined contribution scheme, where workers make personal contributions of 11 per cent of their salaries and receive benefits after retirement.

The law established that there were two options for the second pillar. By default, workers would be enrolled in a funded scheme, managed by privately owned, commercial companies. Contributions (net of fees and insurance costs) would accumulate until retirement, when workers could get their benefit in the form of an annuity or as a scheduled withdrawal from their individual accounts. The second option was a smaller PAYG scheme, where workers would get a benefit proportional to their pre-retirement wage and the number of contributions to the new scheme. This benefit would be entirely managed by the Government' Social Security agency. Workers could chose to join this scheme when entering the labor force, and were free to switch to the funded scheme at any time, but it was not possible to move from the funded to the PAYG scheme.

In addition, a transitional benefit was established to compensate workers who had contributed to the system before the reform but would retire later. This benefit was also proportional to the pre-retirement salary and the number of years with contributions to the old system, and was subject to the same indexation rules as the other PAYG benefits.

A minimum retirement age of 65 years (60 for women) was established. Also, at least 30 years of contributions were required to receive any of the government financed benefits. These requirements meant increases of five years in minimum age and ten years in contributions, as compared to the previous law. To avoid sharp impacts on individuals close to retirement, the new minimums were to be implemented progressively, in a period of nearly 15 years after the reform.

Nearly all formal workers in Argentina were expected to participate in this new system. The three national pension schemes created in the 1960s were merged and all private workers, civil servants, and self employed would become part of this new system. Furthermore, a number of "special" regimes, designed over the year to provide a more favorable treatment to groups of workers that were supposed to be in a disadvantageous situation, were eliminated. The list of this regimes included school teachers, academic researchers, diplomats, railroad workers, judiciary employees, etc. Only one exception was maintained at the national level: the military and security forces, who continued to have their own, independent schemes. Also, provinces continued to manage independent systems covering provincial and municipal civil servants, and had the right to authorize the operation of occupational funds to cover some professional activities, such as lawyers, engineers, accountants, etc. Between 1994 and 1997 almost half the provinces transferred their systems to the national scheme, but others have continued to run their own programs to this date.

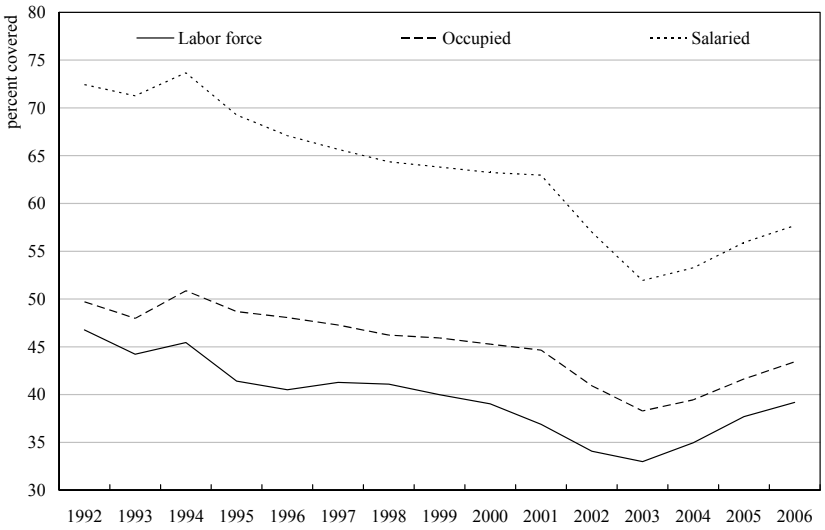
Finally, a non-contributory pension system provides basic income to poor elderly. The program, originally introduced in the 1940s, offers a flat monthly transfer to individuals aged 70 and more with no other income sources. This benefit is part of a set of seven non-contributory pension schemes, which also cover some poor disabled individuals, mothers with seven or more children, veterans of the Malvinas war, relatives of victims of the military dictatorship of 1976-83, and other groups. After the 1993 reform, these programs were formally transferred to the Social Development Secretariat, although payments continued to be managed by ANSES. The number of beneficiaries of these pensions has been limited, at around 40 thousand for old age in the late 1990s, and benefits were approximately 66 per cent of the minimum pension.[2]

On the institutional design, the PAYG components would continue to be managed by the National Social Security Administration ("ANSES"), while the funded scheme would be managed by commercial firms, mostly owned by banks and insurance companies. One managing company was fully owned by the "Banco Nación", a state owned bank, but still operated as a profit business. These companies would compete for affiliates, under a strictly regulated marketing system. They

[2] For a detailed discussion of the non-contributory pension system in Argentina, see Bertranou and Grushka (2002)

**Figure 1**

**Argentina: Pension Coverage of Active Workers, 1992-2006**




Note: Household surveys in Argentina inquire about pension coverage of salaried workers only. Thus, the coverage rate of occupied workers is somehow underestimated, as all self-employed workers appear as uncovered.
Source: Rofman and Lucchetti (2007).

were supervised by an autonomous Superintendency, which operated under the control of the Ministry of Labor and Social Security.

### *2.1.2 Recent trends*

After the 1993 reform, the pension system's performance in Argentina was closely linked to macro trends. On coverage, contributors slightly grew in the early years, but the declining situation in the labor market had a strong negative impact. Benefit levels for retirees were slowly growing during the 1990s, when there was no indexation of existing benefits but new beneficiaries received higher transfers, to then suffer a sharp loss in real values with the 2001-02 crisis and start a recovery afterwards. The fiscal situation reflected the benefit trends, since the average benefit is the strongest determinant of the financial balance of the public system. Finally, the evolution of the financial situation and performance of the funded scheme evolved unevenly, with sharp changes due to the crisis and normative adjustments.

Argentina has been one of the countries in the region with highest pension coverage throughout its history. This situation began to decline as unemployment and informality grew since the 1980s. Figure 1 shows that the percentage of the labor force covered by the system declined from over 45 per cent in the early 1990s to below 40 per cent by the year 2000 and then to nearly 30 per cent with the crisis.[3] Part of this decline was caused by rising unemployment, but the impact of the weakening economic situation on compliance was also important. By considering the coverage of workers occupied (either as salaried or self employed), it becomes clear that the trend was important among them as well, since coverage declined nearly 10 percentage points during the decade. The effect was significant among those salaried (that is, excluding the self employed), showing that it affected all sectors of the economy.

Coverage began to improve after the worst of the crisis and, by 2006, the levels have recovered to those of the late1990s. However, these trends did not impact all social groups in the same way. Figure 2 shows the evolution of coverage among occupied workers in the first quintile of income per capita and that of workers in the highest quintile. It is clear that the decline in the 1990s and even the crisis had little effect on the richest groups of the population, while, on

[3] Coverage of active workers in Figure 1 and other parts of this paper refer to the ratio of contributors to the pension system in a given month and the labor force, occupied workers or salaried workers at the same time, as measured by a household survey.

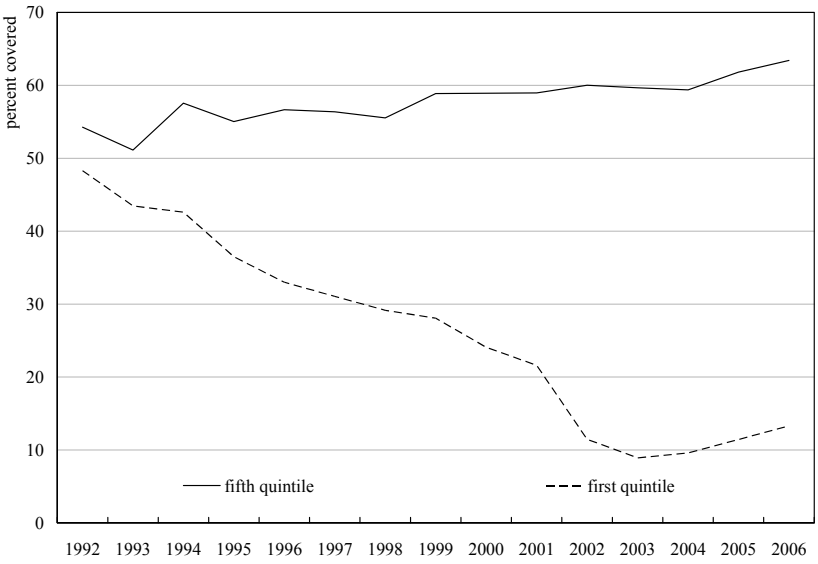
the other hand, it was catastrophic for the poor and most vulnerable. This group showed a dramatic drop of 40 percentage points in coverage between 1992 and 2003, and the recovery since them amounted to barely five points.

Part of the sharp decline in 2002 was caused by the introduction of the workfare program "Heads of households", which provided income transfers to nearly 2 million individuals that were previously unemployed, informal or inactive. This produced a quick growth on the labor force participation rates of the poorest groups, but did not necessarily increased their pension coverage, as the workfare participants do not contribute to the pension system.

While coverage of active workers fell during the 1990s due to unemployment and informality, this drop had a limited impact on coverage among the elderly. Due the basic design of any contributory pension scheme, changes in participation of active workers have very little effect on old age coverage in the short term, as most beneficiaries have been

**Figure 2**

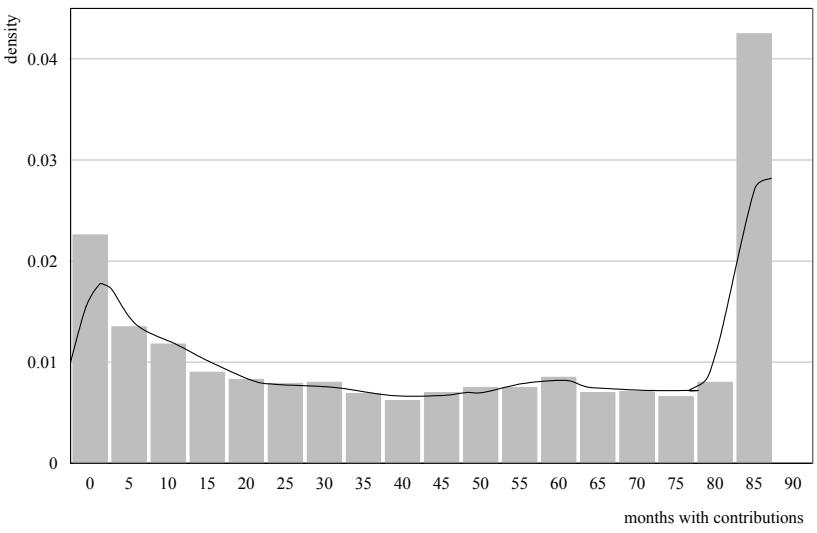
**Argentina: Pension Coverage of Occupied Workers, by Income Quintile, 1992-2006**




Source: Rofman and Lucchetti (2007).

**Figure 3**

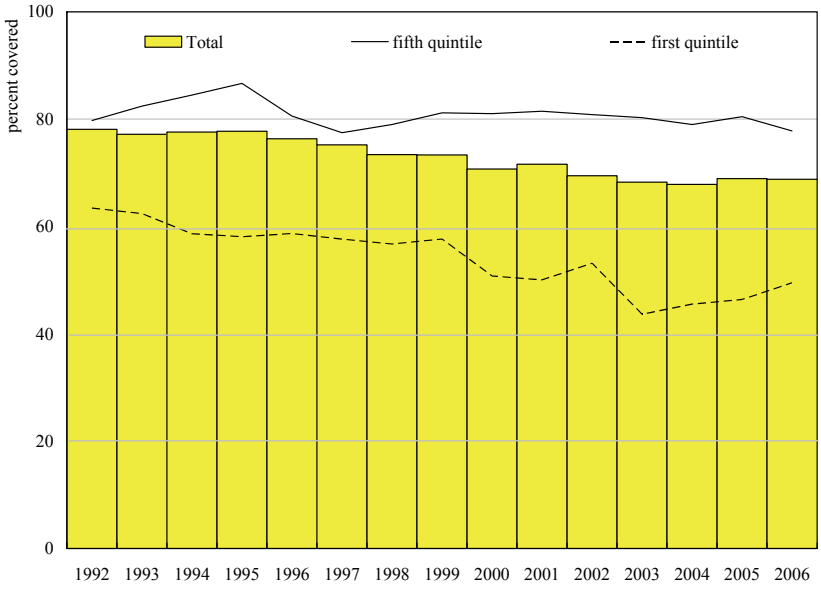
**Argentina: Distribution of Contribution Densities**




Source: Farrall *et al.* (2003).

**Figure 4**

**Argentina: Pension Coverage among the Elderly (65+)**
**Total and by Income Quintile, 1992-2006**




Source: Rofman and Lucchetti (2007).

retired for years and many new retirees completed their vesting period long before the reforms or economic conditions changes.

As relevant as coverage in any given month, contributions densities of full career workers determine whether they will be able to retire once they reach the minimum age or not. Datasets on density are more difficult to build and analyze, as records of contributions for long periods are necessary but not always available. An analysis for Argentina was prepared by a team at the Social Security Secretariat in 2002, considering the contribution densities in the previous decade for workers with at least one contribution. Analyzing that data, the team showed that there is a wide dispersion in densities. While some workers present an almost full compliance record, many others have incomplete contribution histories, which might eventually result in their exclusion from pension benefits.

On the other hand, short term changes in coverage among the elderly were linked to the legislation reforms. By increasing the vesting period to 30 years, in a context of declining labor markets, the reform excluded many workers from the social security system. Administrative data from ANSES shows that the flow of new beneficiaries dramatically dropped after the reform: while in 1992-93 ANSES was granting an average of 8900 new benefits per month, five years later this figure had dropped to around 3600 cases. This decline had an impact on the total number of beneficiaries. Retirees under the national system went from 2.1 million in late 1992 to 1.6 million in 2005.

The decline in total number of retirees can be seen when considering the coverage rates of the population aged 65 and more. In 1992, there were nearly 80 beneficiaries per 100 individuals in Argentina. This figure slowly declined to 68 per cent by 2003. The decline was not similarly distributed across the income distribution: while retirees of the first quintile maintained coverage rates of more than 80 per cent during the full period, those of the poorest group lost significant ground, going from 63 per cent in 1992 to twenty percentage points less by 2003. A small recovery since 2003 was probably caused by a flexibilization in access restrictions to the non-contributory pensions program. Between 2003 and 2006 the number of beneficiaries of this program grew from 40 thousands to almost 90 thousand, due to the relaxation of entry restrictions.[4]

[4] Data from the website of Comisión Nacional de Pensiones Asistenciales.

While coverage of the elderly slowly declined during most of the 1990s, the value of benefits in real terms grew by more than 3.5 per cent per year between 1994 and the end of 2001. Interestingly, no general increases of benefits were granted during this period, but the combination of ad-hoc adjustments of individual benefits (caused by judicial decisions) and the higher level of new benefits had an important impact. On the other hand, the minimum benefit for retirees, established at $150 in the early years of the decade, was not modified. As a result, the minimum benefit went from representing nearly 60 per cent of the average in 1994 to below 50 per cent in early 2002, and the proportion of beneficiaries receiving the minimum benefit went from nearly 40 per cent in 1994 to approximately 16 per cent in 2001.[5]

Beginning in 2002, the Government implemented an aggressive policy to increase the minimum benefit, to compensate for inflation and also to increase its real value. After a sharp drop in 2002 due to the inflationary impact of the crisis and the peso devaluation, the minimum had recovered its previous real value by mid 2003 and, by late 2005, the real value of the minimum benefit was 60 per cent higher than four years before. Meanwhile corrections for other benefits were very limited. As a consequence, by late 2005 the minimum represented 85 per cent of the average benefit. This trend continued in 2006 and 2007 and, by June 2007, the ratio of the minimum to the average benefit had reached 90 per cent.

The rapid increase in minimum benefits after 2002 increased the average, but many retirees have not recovered their benefits purchasing power of the 1990s. The core problem behind this has been the absence of an automatic indexation system for benefits, as all corrections are made on a discretionary basis. While Argentina's constitution indicates that pensions must be adjustable, the legislation in place since 1995 established that there would be no automatic indexation of any variable or parameter in the system. This restriction only applied to benefits from the PAYG scheme (including those of beneficiaries retired before the reform), as benefits from the funded scheme were adjusted through the returns of invested assets. The lack of indexation not only affected benefits of those already retired, but it also impacted benefits at retirement. The multipilar system established in 1993-94 granted benefits from several components. First, the basic, flat benefit known as "PBU" was designed to represent approximately 28 per cent of current average wages. Since this benefit was not revised after 1995, its value has declined, especially in recent years as salaries increased. As of late 2007, PBU represented less than 15 per cent of the average wages. On the other hand, benefits from the second pillar PAYG scheme (known as "PAP") and from the transitional component (known as "PC") were defined as a proportion of the "base income", the average wages of the last ten years of work before retirement. Since these wages were not indexed, an inflationary process might have an impact on them. In the early years of the new system, workers saw their base income affected by the inflation registered in 1989-1991, but these effect declined as time passed. However, the new inflationary process that began in 2002 had again an impact on these components.

Figure 5 shows the trend in pension spending since the early 1980s. As these data come from budget accounts, it includes all pension expenditures, including non-contributory, special regimes (such as the military), etc. The sustained growth between the mid 1980s and early 1990s explains the government efforts to introduce a reform, which had a clear impact as total spending stopped growing in 1993, and became stable at 7.5-8 per cent of GDP during most of the decade. This stability was the combined result of a growing average benefit, shown in Figure 4, and a declining coverage, shown in Figure 3.

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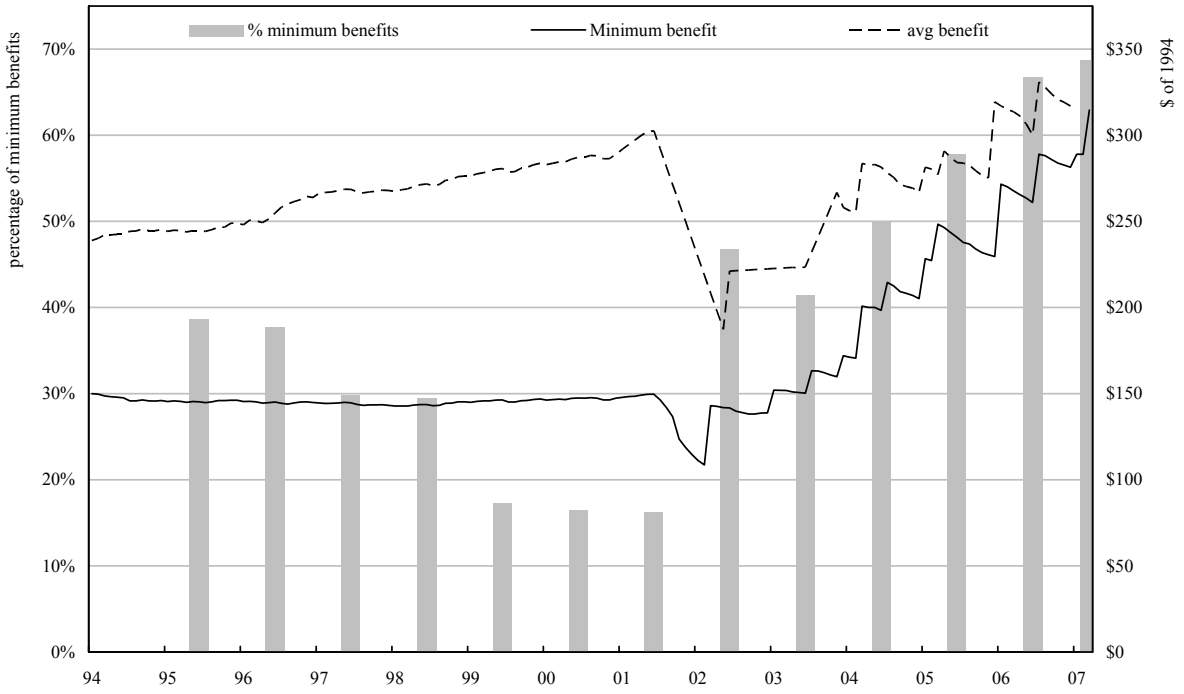
[5] Beginning in 1992, additional transfers were granted to older beneficiaries earning the minimum benefit to bring its value to $200. The number of beneficiaries included in this provision grew during the nineties, reaching 750,000, or nearly all beneficiaries at the minimum.

**Figure 5**

**Argentina: Average and Minimum Benefits, in Real Terms, and Percentage of Beneficiaries Earning the Minimum, 1994-2007**




Source: Moreno (2008).

The figure also shows the sharp decline in spending produced by the 2002 crisis. As average benefits suffered a drop of nearly 40 per cent in that year, the slow recovery in real terms (together with the rapid growth of GDP since 2003) explain that, by 2006, total spending in pensions was still 20 per cent less than before the crisis. However, expenditures at the national level presented a sharp increase in 2007, as a consequence of the recent reforms.

### *2.1.3 The political environment: Motivations for the reform*

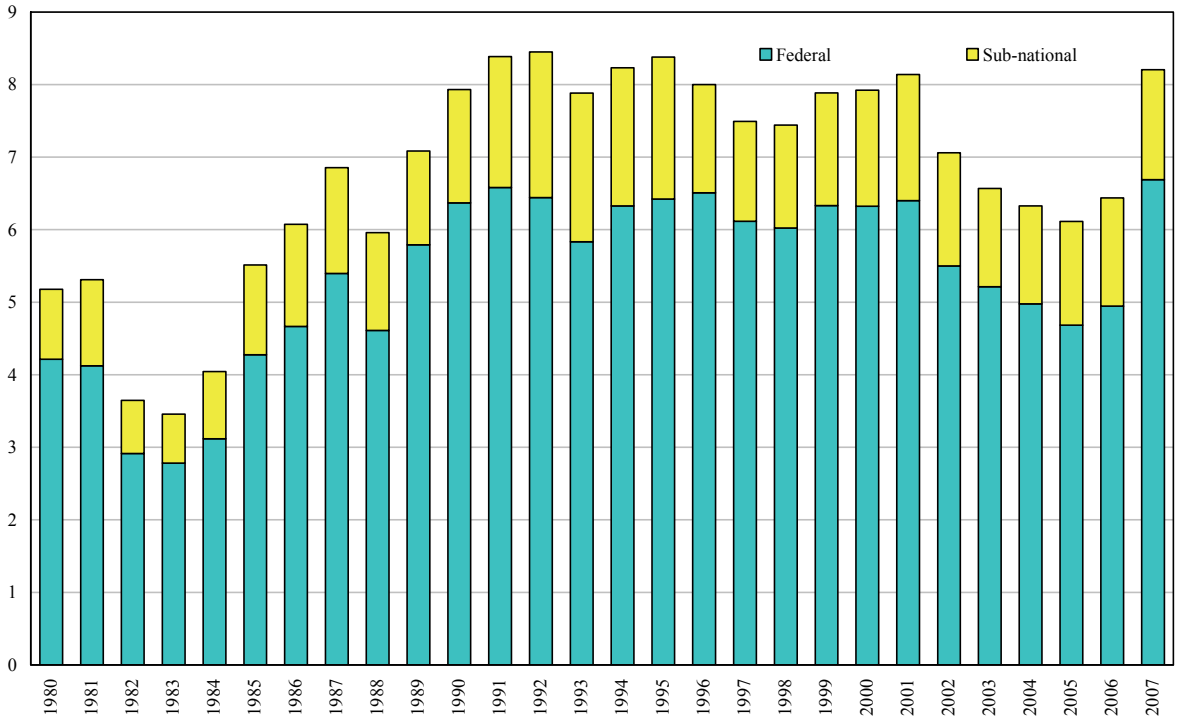
Argentina' successive governments have been aware of the need to review its pension system for nearly a decade now. After the 1993 reform, authorities were not fully satisfied with the new model and pushed forward for new revisions, first through a law called "Pension solidarity law", that eliminated indexation in the system, and then through other legislation to review aspects of the funded scheme.

In 2000 a report published by the Ministry of Social Development (Secretaria de la Tercera Edad, 2000) indicated that the most critical problem of the pension system in Argentina was the declining coverage among active workers and the elderly. Later that year, a system reform that would provide coverage to elderly with less than the minimum vesting period was enacted through a decree, but never implemented.

In 2002, the Social Security Secretary organized, through a consultative process with experts, representatives of interest groups, and government officials, the preparation of a "white

**Figure 6**

**Argentina: Pension Expenditures by Government Level, 1980-2006**
*(percent of GDP)*




Source: MECON (2007) and Goldschmit (2008).

book" (SSS, 2002), that would define the medium term strategy for the pension policy. More public and private debates followed these efforts, and legislators introduced several pieces of draft legislation to Congress, but no action was taken.

The recent reforms in Argentina appear to have been the result of a closed-door process, where a few policymakers defined the path to follow in successive and not always coordinated steps, and little if any participation of sector authorities. At the normative level, there were five main actions taken since 2005 that resulted in the system design and performance as of the end of 2008.

First, authorities decided to reinstate the special pension scheme for teachers, which had been eliminated (although this had been, in turn, successfully challenged in court). This decision was important regarding this particular group (which comprised approximately 5 per cent of contributors to the system) but also as a precedent. The decree issued by the government established that the old special system for teachers, diplomats, members of the judiciary and other small groups that had been eliminated in 1994 were valid and, consequently all contributions to the funded scheme by these workers had to be transferred back to the public system.

The second, and most important, reform was enacted through a series of laws and decrees, as it resulted in a massive increase in the number of beneficiaries of the system. The legal system in Argentina allowed independent workers, since 1995, to pay contributions owed before the 1993 reform in installments, through a scheme known as "moratoria". A new law, passed in December 2003, included in this provision contributions corresponding to the new system, and set relatively

generous financial terms. Later on, as part of a law passed in December 2004 to allow some workers to apply for an early retirement scheme, it was established that independent workers applying to the "moratoria" could retire immediately, and pay the debt while receiving pension benefits. In other words, this law enacted, implicitly, a scheme to pay reduced benefits to individuals who had not contributed enough in the past.[6]

The institutional process that resulted in this major reform was also interesting; as the last law was a project originated in Congress, and was discussed and approved within one day, in December 16, 2004. The new law did not catch the attention of the press, or even authorities, as no public announcement of the new system was made. Only a year later, after a decree enacted in November 2005[7] regulated the process the program began to operate.

A third step was taken by the end of January 2007, when the government announced its intention to reform the pension system. On February 1st a draft law was sent by the President to Congress and, after short discussions, it was approved on February 27th. The focus of this reform was to revise the balance between the funded and unfunded schemes in the multipilar model. The message of the Executive Branch to Congress made explicit eight goals in this reform, as an indirect way to explain its motivation. These were:

i) to improve coverage,
ii) to guarantee citizen' freedom of choice between the funded and unfunded schemes,
iii) to improve the equity and transparency of the system,
iv) to increase the replacement rate of the system,
v) to ensure a genuine financing of the system,
vi) to reduce the administrative costs of the privately managed pension funds,
vii) to deepen the role of the State,
viii) to guarantee a minimum benefit to all beneficiaries, without distinction between the two schemes.

The fourth measure was taken in July 2008, when authorities submitted draft legislation to Congress to introduce an automatic indexation rule for benefits in the PAYG scheme. This law, approved and enacted in October 2008, established that all benefits in the PAYG scheme would be adjusted following a combined index, that includes wages and earmarked taxes growth.

Finally, a fifth measure was announced in late October 2008, and enacted as law in early December 2008. This law eliminated the funded scheme, transferring all contributors, beneficiaries, and assets to the PAYG program. The debate in Congress was short, as the law received support from different political sectors, and became effective as of December 1st, 2008.

### *2.2 The reforms*

If considered as a group, the reforms enacted in the pension system in Argentina in the last few years aimed at changing the system coverage and adequacy of benefits, its fiscal parameters, the role of the State and the private sector in its management and some regulations of the operational and investment regimes of the funded scheme. This section describes in more detail each of them, and indicates, when possible, the expected impacts they might have in the short and medium term. Table 1 summarizes the main reforms, and the following subsections discuss some of their most relevant aspects.

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6 The three laws referred in this paragraph are 24476, 25865 and 25994.

7 Decree 1454/2005.

**Table 1**

**Main Aspects of the 2005-07 Argentina Pension Reforms**

| Topic | Reform | Description |
|---|---|---|
| Coverage: Distribution of workers among schemes | Special retirement schemes were reinstated | Teachers, diplomats, researchers and judiciary employees can retire with 82 per cent of reference wages, and different age or vesting periods. Their current and accumulated past contributions are compulsory directed to the PAYG scheme |
| | **Affiliates to funded scheme allowed to switch back to PAYG** | Workers with less than 10 years to retirement and low balances in their accounts switched by default back to the PAYG scheme<br>All other workers allowed to switch, once every five years |
| | **Default scheme choice to PAYG** | New workers are enrolled by default into the PAYG scheme, unless they explicitly join a pension fund. |
| Coverage: Elderly access | Access to Non-contribut. Pensions | Quotas limiting the number of Non-contributory pensions were eliminated. |
| | Moratoria | Individuals with minimum retirement age allowed to recognized debt for past contributions as self-employed to complete vesting period and retire immediately. |
| | Early retirement | Individuals with less than five years to retirement age and complete vesting period can retire with reduced benefits (50 per cent of penalty, until the statutory age of retirement) |
| Benefit level/adequacy | No indexation scheme | Benefits in the PAYG scheme continue to have no automatic indexation scheme. |
| | Discretional increases with focus on the minimum | Authorities continued the policy initiated in 2003 to increase the minimum benefit, and smaller increases were given to other beneficiaries |
| | **Benefits from new PAYG scheme increased** | Retiring workers with contributions to the new PAYG scheme will receive higher benefits<br>(from 0.85 per cent of base salary per year to 1.5 per cent) |
| | *Benefit indexation* | Benefits from the PAYG scheme will be adjusted twice a year, considering wage and earmarked taxes evolution |
| Funded Scheme: Administrative costs, insurance, and investment | **Change in cost definition and maximum** | Pension Fund managers no longer responsible for cost of disability and survivors insurance<br>Maximum administrative cost set at 1 per cent of taxable wage |
| | **Consolidation of system, pooling all risks** | Elimination of insurance companies' role.<br>New scheme based on collective self-insurance of all participants in pension funds |
| | **"Productive and infrastructure projects" allowed** | New regulation establishes that pension fund assets can be invested on this new type of asset. A minimum investment of 5 per cent of total assets is required, departing from previous practice when no minimums were used |
| Multi-pillar scheme | ***Funded scheme closed*** | The funded scheme will be closed as of January 1st, 2009, and all contributors, beneficiaries, and assets, will be transferred to the PAYG pillar |

Note: Reforms in bold are part of Law 26222. Reforms in italics are part of Law 26417. Reforms in italics bold are part of Law 26425. Others are the result of lower level regulations (decrees and resolutions).

### *2.2.1 Coverage*

#### *2.2.1.1 Enrollment reforms for active workers*

Two aspects of the system were modified in recent times with regards to coverage. First, active workers were moved from the second pillar funded scheme to the PAYG scheme, through both voluntary and compulsory procedures. At the same time, changes in requirements to obtain a retirement benefits had an immediate impact on the number of beneficiaries, although these were temporary. On the adequacy aspect, actions (and inactions) regarding benefit levels also had an important impact.

The first element of the trend to switch contributors from the funded to the PAYG schemes was the reinstatement of special schemes for teachers, researchers, diplomats, and judiciary employees. These schemes had been eliminated by a decree in 1994, and it had been repeatedly (and successfully) challenged in court. Beginning in 2001 with the diplomats' scheme, the authorities progressively reinstated the schemes, and by March 2005 the four programs were active. In May 2007 it was decided that all workers of these schemes would have to direct their contributions to the public system. Approximately 174,000 contributors,[8] 1.5 per cent of the total number participating in the funded scheme, were transferred to the PAYG through this process in May 2007.[9]

A second group of active workers transferred to the PAYG scheme was composed by those aged more than 50 years (women) or 55 (men) with less than AR$20,000 in their individual accounts. Law 26222 established that these workers would be switched to the PAYG scheme unless they make an explicit request to remain in a pension fund. Nearly 1.1 million affiliates were transferred through this process between July 2007 and March 2008, approximately 10 per cent of the total number of affiliates (unfortunately, there is no official data available indicating how many of these were regular contributors). This same law allowed all workers to switch between the schemes once every five years, opening the first period until December 2007. In those months, almost 1.3 million affiliates switched from the funded to the PAYG schemes.

These three measures implied that nearly 2.5 million affiliates, or 21 per cent of the affiliates to pension funds by the end of 2006, were switched to the PAYG scheme by early 2008. Many of them may have had highly irregular contribution histories, but unfortunately there is no official data to verify how many were regular contributors.

An additional reform implemented through law 26222 was about enrolment of new workers. The original 1993 law established that new workers had to enroll in a pension fund or explicitly join the PAYG, with a default option for the funded scheme. Most workers (between 80 and 90 per cent) were assigned to pension funds through this mechanism. The new law reversed the default option, and established that, unless an explicit choice is made, new workers will now be enrolled in the PAYG scheme.

A final reform in this area was introduced by Law 26425, in December 2008. This law eliminated the funded scheme, forcing all contributors to switch back to the PAYG as of January 1st, 2009. The switch included beneficiaries, unless they were receiving benefits through an annuity, and accumulated assets were also transferred to the public system, which will manage them in the future.

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8 SAFJP (2007).

9 While 174,000 workers were transferred in May 2007, the actual number of contributors to these programs was apparently lower, but many were transferred by mistake. The final number of workers enrolled in these special programs has not been officially reported.

*2.2.1.2 Coverage reforms for the elderly*

Interestingly, none of the reforms that directly affect coverage of the elderly were part of the three main reform laws, approved between February 2007 and December 2008. On the other hand, it could be easily argued that this group includes the most important changes to the system. Three major reforms were implemented in recent years: (i) a relaxation of restrictions to access non-contributory benefits, (ii) the "moratoria" program, that allowed many elderly with insufficient or no contributions to retire immediately, and (iii) an early retirement program.

Argentina has had non-contributory benefits for many years, as part of its old age income security scheme. During most of the 1990s, these benefits were limited both in terms of access (as they were rationed and qualified applicants had to join a waiting list to receive the benefit) and adequacy. As coverage of the formal pension system among the elderly declined, the pressure to review this scheme and make it more accessible increased.

In March 2003 the National Government created the "Plan Mayores" ("Elderly Plan"), a program that, as part of the workfare scheme "Heads of Households" that was providing basic income to nearly 2 million households, would provide a basic income to individuals older than 70 years old and no other sources of income. This program began to slowly enroll beneficiaries in the poorest provinces of the country.

A few months later, in August 2003, the restriction in the number of non-contributory pensions was eliminated, and new beneficiaries were admitted to the program. This resulted in a sustained increase in the number of beneficiaries, which had more than doubled by 2006. Monthly benefits were also adjusted, by 2003 they had recovered to the pre-crisis levels and, three years later, they were approximately twice the real value of 2001.

The second, in chronological order, but most important change was the introduction of the "moratoria" program. This program allowed all individuals with the minimum retirement age to apply for a benefit, after recognizing a past debt to the system. As discussed in the previous section, this program was created by a combination of successive laws and decrees, but was never formally launched or announced. While the core law of this scheme was approved in December 2004, there were barely any new benefits under this scheme until May 2007, when the number of new beneficiaries reached 50,000. After that, a rapid acceleration of the application and processing trends resulted in a total of nearly 1.7 million new beneficiaries by late 2007, a dramatic change in the long term trends. Figure 7 shows how the number of beneficiaries of pension and survivors benefits had a rising trend since the early 1970s until the early 1990s, when the reform broke the tendency and the number began to decline. This declining trend continued until the early 2000s (with an exception in 1996-97, when beneficiaries from 10 provincial schemes were incorporated into the national scheme), but then had a sharp increase as the moratoria was implemented in 2006-07.

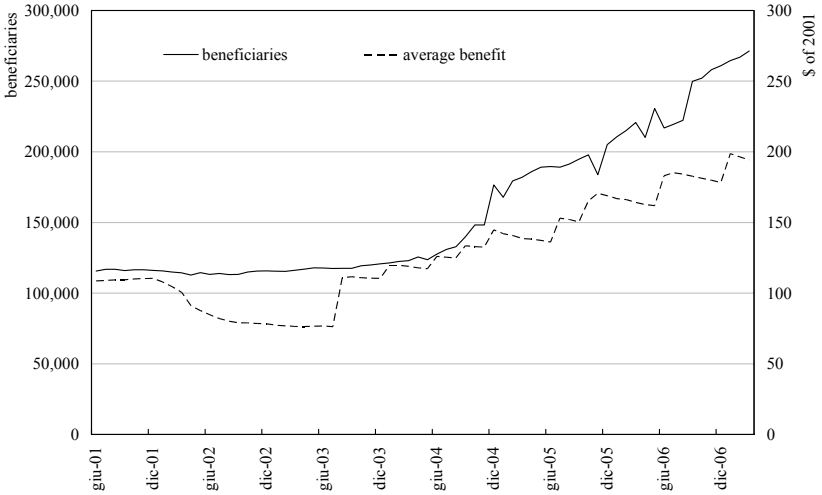
While data to assess the impact of this increase on overall old age income support coverage is not available, it is reasonable to expect that the immediate effect must have been a sharp increase in coverage. Estimating this figure is difficult, since there was no provision in the moratoria program precluding individuals already receiving a benefit (especially in the case of survivors' benefits) to apply, and an important number of duplication of benefits may have resulted from this. Citing administrative data and authors' estimations, Bodou *et al.* (2007) indicated that total coverage of the elderly in 2007 was around 85 per cent, up from 69 per cent observed in 2006.

The third reform affecting coverage of the elderly was the introduction of an early retirement scheme, in December 2004. This program allowed workers who had reached the minimum vesting requirement, but were at most five years younger than the minimum retirement age, to retire earlier,

with a reduced benefit. The program was designed to target individuals with long working careers that lost their jobs during the 2001-02 crisis and were having problems to return to the labor force. While there is no official data available on the number of new beneficiaries under this program, an indirect estimation indicates that there should be no more than 15,000 beneficiaries under this program.

**Figure 7**

**Argentina: Non-contributory Pensions: Beneficiaries and Real Value, 2001-07**




Source: ANSES, 2007.

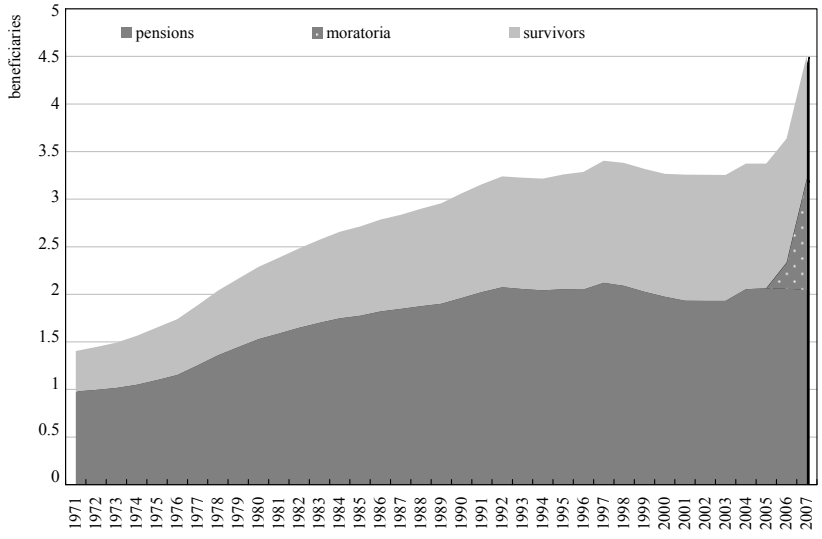
### *2.2.2 Benefit level and adequacy*

With regards to benefit levels and adequacy, authorities implemented actions in three areas in recent years. The first area refers to the decisions taken to increase the minimum and other benefits, the second is about changes in the expected benefits for affiliates to the PAYG scheme, and the third is the introduction, after 13 years, of an automatic indexation system for benefits paid by the PAYG scheme.

The main policy regarding benefit levels in recent years was the sustained increase of the minimum benefits and, more recently, some discretionary adjustments in other benefits. Figure 4 showed how

**Figure 8**

**Argentina: National Pension System: Number of Beneficiaries of Pensions, Survivors Benefits and Moratoria Program, 1971-2007**
*(millions)*




Source: Moreno, 2007.

minimum benefits continued to grow, in real terms, through 2006 and 2007. By the end of this year, this benefit was four times the value corresponding to six years before, in nominal terms. Meanwhile, inflation between 2001 and 2007 was slightly over 100 per cent, resulting in a real increase of almost 100 per cent. Other benefits were also increased, but at a much lower rate, resulting in a rapid compression of the benefits pyramid, weakening the contributory nature of the system.

Several provisions in Law 26222 should result in changes of benefit levels in the future. First, the new law changed the benefits to be paid to those who in the PAYG second pillar scheme – known as "PAP" for its Spanish acronym – increasing the benefits of this component by 76 per cent.[10] While this change has limited effect in the short term (the PAP component of new pensioners will be small for most individuals), it could be more important in the future. Second, as workers with less than 10 years to retirement age and low balances were transferred, their expected benefits will also change. Had they stayed at the funded scheme, they would probably receive no benefit from the PAYG system, as they would never reach the minimum 30 years of contributions, and would get back, in the form of a scheduled withdrawn, their individual account balances once they reach the retirement age. As they move to the PAYG scheme, they would still not qualify for the standard benefits, nor would they get their account balances, and they will probably have to wait until they are seventy years old to apply for an old age pension (a benefit they could request without switching to the PAYG scheme).

Finally, and regarding indexation, after years of political and legal controversy the Government introduced an automatic scheme in 2008. As Argentina's Constitution establishes that pensions should be "mobile", thousands of lawsuit have been won by beneficiaries in the last thirteen years, after a 1995 reform eliminated the automatic indexation scheme. As a result of one of these lawsuits, in August 2006 the Supreme Court, in an uncommon departure from its tradition of considering each case individually, unanimously ruled that the National Government (including the Executive Branch and Congress) should define an automatic indexation system for pension benefits within a "reasonable" time. Unexpectedly, the draft law send by the Government to Congress in February 2007 (which then became Law 26.222) did not include any reference to this topic. On the other hand, the 2008 National Budget Law, approved on December 2007 established that the Executive Branch should prepare new legislation regarding the indexation of benefits.

Unexpectedly, in July 2008 authorities announced that they were submitting draft legislation to congress to introduce a new indexation system. This new system established two semi-annual adjustments, where all benefits of the PAYG scheme will be increased following changes in a combined index, which considers both wages and social security collection. The formula to be used was included in Law 26417, and while it has some technical problems,[11] it is supposed to combine changes in wages (including formal and informal workers) and in taxes earmarked for social security, in equal proportions, provided that this index cannot grow more than 3 per cent faster than total social security collection. It will be first applied in March 2009, using data from the second semester of 2008, and then every six months. The law indicates that, in the future, the same index will be used to adjust reference wages to calculate the initial benefit of retiring workers.

### *2.2.3 Administrative costs and insurance in the funded scheme:*

Law 26222 defined two important changes in the way the costs of the system are accounted,

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[10] According to the law approved in 1993 and applied until 2008, retiring workers received 0.85 per cent of their base salary (the average of the last 10 years), per year of contributions to the new PAYG scheme. The new law increased this percentage to 1.5 per cent.

[11] These problems include a confusion between annual and semi annual periods. If applied literally, the law indicates that the semi-annual increase in benefits will be calculated considering annual increases in tax collection.

financed, and charged. On one hand, the law eliminated the original 1993 provision that made pension fund managing companies responsible of paying disability and survivors' benefits, and required them to buy an insurance to cover these costs. Under the new scheme, a special reserve will be build with contributions from the pension funds (thus reducing the individual account balances) and benefits will be paid from these reserves. Hence, managing companies will not longer be responsible of financing them. On the other hand, a maximum administrative fee was established, at 1 per cent of taxable wages. This level was slightly lower than the average registered before the reform, when the fees, net of insurance costs, were around 1.2 per cent of taxable wages.

The reform in the insurance model eliminated the role of external insurance companies in financing survivors' and disability benefits, as the funded scheme will now self insure. The new system does not accumulate reserves. Instead, beneficiaries of disability and survivors benefits will receive a lump sum payment (which will have to be converted into an annuity or a scheduled withdrawal) from the pension fund, and adjustments across the different funds will be done on a regular basis to ensure that costs are equally supported by all participants. Benefits will continued to be paid in the form of annuities, provided by a separate set of insurance companies, or through scheduled withdrawals, paid directly by the pension funds.

These reforms were short-lived, as Lay 26425 eliminated the funded scheme, and, consequently, made these regulations redundant.

#### *2.2.4 Investment of pension funds assets:*

The final area or reforms included in this discussion is the regulation of the pension fund investment portfolios. Law 26222 created a new category of investments, called "productive and infrastructure projects". The new regulation requires a minimum investment of 5 per cent of the fund in this category (a departure from previous and international practice, where there are no minimum investments) and a maximum of 20 per cent. While this seems to be a minor reform, its implications could be significant in the future, depending on what type of instruments are considered as part of this new category.

On the other hand, the implementation of laws 26222 (which transferred assets of a number of contributors to the funded scheme to ANSES) and 26425 (which transferred all contributors and their assets to ANSES) created a large portfolio of financial assets to be managed by the public social security agency. A decree approved in mid 2007 had created a "Sustainability guarantee fund", where ANSES would deposit all surplus assets not used to pay benefits. This fund would be managed by ANSES, with support from the Ministry of Finance. Law 26425 established that all transferred assets would be added to this fund as well, and created some additional regulations, including a new overseeing congressional committee, and a council with representatives from the government, workers associations, retirees associations, and business associations. Regulations regarding investment policies were not fully detailed in the law.

### *2.3 Expected fiscal impacts*

As a consequence of the policy making process adopted for these reforms, there have been no formal assessments of their fiscal impacts, either in the short or medium term. None of these policies was adopted citing fiscal concerns or need, nor were these concerns present in public debates or presentations. As of late 2008, no public institution has published a document discussing the potential fiscal implications of these reforms, and public statements made by officials and policy makers have been very broad and unspecific regarding the fiscal impacts.

Among the different policies, the changes of affiliation from the funded scheme to the PAYG and the moratoria seem to be the two most relevant in fiscal terms. The changes in affiliation had an immediate impact on revenues for the public system, in the case of the workers from the special schemes and those close to retirement, as the balances of their individual accounts were transferred. This one time transfer of funds to the public system amounted to AR$8.35 billion, nearly 20 per cent of the annual expenditures in benefits by the public system, in 2007 and early 2008, and a second transfer of approximately AR$85 billion, by the end of 2008. Additionally, the future flow of contributions of these workers and those who chose to switch should represent additional revenue for the public system, for approximately AR$15 to AR$20 billion per year.

On the other hand, the cost of the moratoria program should be close to AR$11 billion in the short term, although this figure should decline in the future as access to the program was closed for most workers.[12] The national government spent, in 2007, nearly 1.75 percentage points of GDP more than one year before, an increase that can be attributed mostly to the moratoria. For 2008, the national budget estimates that pension expenditures will be nearly twice those of 2006, in a context were prices have grown at 10-20 per cent and GDP at 8 per cent per year. As a result of these increases, expenditures in social security in Argentina will probably reach historical record levels in 2008, at over 9 per cent of GDP.

Building a model to project medium and long term fiscal trends for the pension system in Argentina is a difficult task, mostly because several variables, such as the real value of average and minimum benefits are unknown and will be defined in a discretional way. The fiscal impact of moratoria should decline over time, as beneficiaries die, and unless new opportunities to join the program are offered in the future, its effect should tend to disappear in 15-20 years. On the other hand, the positive effect of the switch of workers should be more stable, as new workers joining the labor force will be enrolled in the PAYG scheme. However, benefits paid to these workers might be actuarially unbalanced, which could eventually result in negative impacts.

### *2.4 Pending challenges*

The most critical pending challenge that the pension system has in Argentina after the recent reforms is, by far, its predictability. This problem arises from some specific issues, (such as the implementation challenges of the recently approved laws, or the uncertainty about investment policies for the new publicly managed pension fund), but also from an evident weakness on the institutional processes related to the design and regulation of the system. A second core challenge is about coverage. While the "moratoria" program included most elderly in the pension system, this was supposed to be an exceptional measure, and no long term solution to the question of informality has been implemented. A third problem is the still existing fragmentation between the national system and provincial or professional schemes, and the inequities, inefficiencies and fiscal problems created by this situation.

The lack of a transparent and reliable indexation scheme to adjust all variables in the system (including all PAYG benefits, minimum benefits, maximum taxable wages, reference wages, etc.) resulted in countless lawsuits and case-by-case responses in the last two decades. The new legislation might solve this for the future, but since it did not include any provisions regarding past indexation of benefits or reference wages, there is a significant space for further legal disputes. Furthermore, the compulsory switch of all workers contributing to the funded scheme to the PAYG system might result in additional lawsuits, if some of them consider their property rights affected by this decision.

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[12] The program remains open only for workers that can claim contributions made before 1994.

The institutional problem is equally relevant. Formally, pension policy in Argentina is designed by the Social Security Secretariat, at the Ministry of Labor, Employment, and Social Security. However, the role of the Secretariat has been diminished by the high level of autonomy of the Social Security Administration (supposedly, an executing agency) and, until recently, the Superintendency of Pension Funds. Furthermore, the roles of all these institutions have been weakened by an increased centralization of the decision making process, with little inputs from the technical sectors.

The second challenge is about coverage. While no definite data is available, it was estimated that the moratoria program resulted in an increase of coverage among the elderly, which might have reached 85 per cent. This improvement appears to have been achieved at a high cost, as many of the new benefits granted under the new program went to those who were already receiving a pension benefit. Still, two important questions remain. First, if this figure is correct, it is not clear whether the remaining 15 per cent represent those who are relatively better off and thus decided not to apply for benefits, or, on the contrary, they are so excluded from the system that weren't able to apply for this program. If that were the case for most of them, then it would be important to find ways to reach these individuals and include them in the system.[13] Second, the prevalence of high informality rates among current workers indicate that, in the future, retiring cohorts will find the same problem that those who obtained a benefit thanks to the moratoria. However, since access to this program is now limited to those who can claim contributions made before 1994, many of those currently working as informal workers will not be able to obtain a benefit in the future.

The response to this problem in the future could be to introduce new moratoria laws (although this approach would generate negative incentives for those who contribute to the pension system); to adopt a more structural approach, defining and integrated model that includes non-contributory benefits for those with no contribution histories, proportional benefits for those with some contributions and full benefits for those with complete contribution records; or to simply ignore it, forcing individuals and families to find alternative income sources on their own.

The third challenge mentioned in this section is the question of fragmentation. As defined by the Constitution, provinces have the right to set up their own pension schemes for civil servants, and to authorize the operation of occupational pension funds. While legal, the existence of multiple pension schemes in Argentina creates problems of inequities (as some provincial schemes are much more generous than the national system), and efficiency (as there are multiple problems of coordination between the different schemes). This fragmentation also has fiscal implications, because some schemes are unsustainable and require continues subsidies from provincial or national funds.

After the 1993 reform, national and provincial authorities began a process to consolidate the pension systems. Between 1994 and 1997, ten provinces transferred their schemes to the national system, thus reducing the fragmentation. However, this process was stopped at that point due to fiscal restrictions and, since then, new occupational schemes have been created throughout the country, increasing the number of independent agencies in charge of managing the programs. In this context, it is apparent that efforts to integrate the programs, either by consolidating them or introducing reforms to make the parameters of the programs consistent across jurisdictions are necessary. Also, most occupational funds are run with little or no supervision, exposing their participants (and, ultimately, the provincial and national governments) to serious financial risks.

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[13] Traditionally, non-contributory pensions in Argentina have been rationed and access was limited to some of those who applied for them. Thus, there is little experience in launching public effort to reach those excluded from the system.

## 3 The reforms in Chile

Twenty eight years after the pioneering pension reform that replaced a traditional PAYG system by one based on individual accounts, market capitalization and private management, the Chilean Congress approved in January 2008 the second largest comprehensive reform to its pension system.

In this chapter, we describe the social and political context that gave rise to this second generation reform, we provide a detailed overview of its main contents and we identify some of the pending challenges.

### *3.1 The situation as of 2005*

#### *3.1.1 Quick description of the system*

The current Chilean pension system can be decomposed into three main pillars: a poverty prevention pillar, a contributory pillar and a voluntary pillar.

The poverty prevention pillar, before the 2008 reform, was based on two components: a means-tested assistance pension (the PASIS) and the Minimum Pension Guarantee (MPG) for individuals who contributed for at least 20 years to the individual capitalization scheme, but that were not able to finance a minimum amount for their retirement. Together, these two programs corresponded to the main government programs aimed at avoiding old age poverty, and were financed by general revenue.[14]

The contributory pillar was drastically reformed in 1980. The previous system was based on a number of PAYG schemes, that provided defined benefits calculated as a proportion of the wages received during the last period of working life. Theses schemes were running increasing deficits, caused by large imbalances between the benefits that were promised and the contributions that were made into the system. In 1980, the military government created a unique national scheme that was based on individual accounts where each worker's savings are deposited and invested in financial instruments by professionals firms, the Pension Fund Administrators (the AFP system).[15] These firms can freely set an administrative fee in exchange for the different services they provide (collection, record-keeping, investment, benefit calculation and payment, and customer service) and individuals can switch at any time between AFPs.

Individuals are not allowed to withdraw funds from their individual accounts until they retire, which can happen at any point after the legal retirement age (65 years for men and 60 for women) or before that (early retirement) if they have accumulated enough funds in their account and they receive a minimum replacement rate. When the individual retires, he or she can choose between buying an annuity from an insurance company or receiving a programmed withdrawal stream from the AFP. In both cases, benefits are actuarially calculated as a function of the individuals savings accumulated over the lifetime, the potential beneficiaries and (age- and gender-specific) life expectancy.[16]

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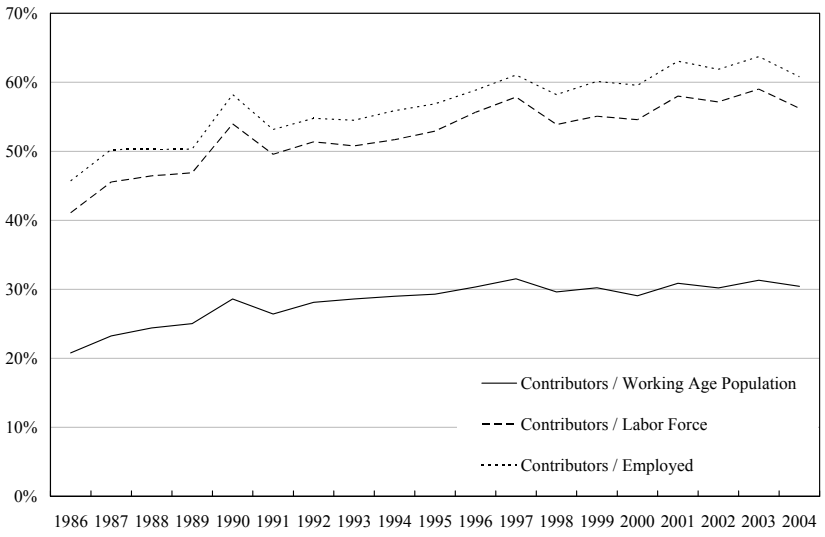
[14] One could argue that there is another important component of the old-age social protection network: free and guaranteed access to the public health system. However, this is not discussed in this paper as it concentrates on the pension system.

[15] Only the armed forces, military and police, remained in their previous PAYG schemes.

[16] A detailed description of the current AFP system can be found in Berstein (2007), available in the English section of www.safp.cl. A number of articles have been written about the impact the 1980 Chilean pension reform may have had on social security coverage, financial development, national savings and economic performance. For instance, see Corbo & Schmidt-Hebbel (2003), World Bank (1994) and Holzmann *et al.* (2005).

**Figure 9**

**Historic Contributory Coverage in Chile**




Source: Figure 1, Berstein, Larrain and Pino (2006).

To complement the compulsory savings made into the contributory scheme, tax incentives are provided for individuals who make additional voluntary savings in a special set of financial products: voluntary savings accounts managed by the AFPs, mutual funds offered by banks, insurance-plus-savings products provided by insurance companies, etc. The scheme is set so that the part of the individual's income that is allocated into these special products is exempt from income taxes during the years the deposits were made. Interest income from these savings is also tax-exempt, but pensions financed by these savings pay regular income taxes when they are received by the worker. Individuals are allowed to withdraw funds before retirement, but with a penalty, and in addition to the income taxes that ought to be paid at the time of this withdrawal.

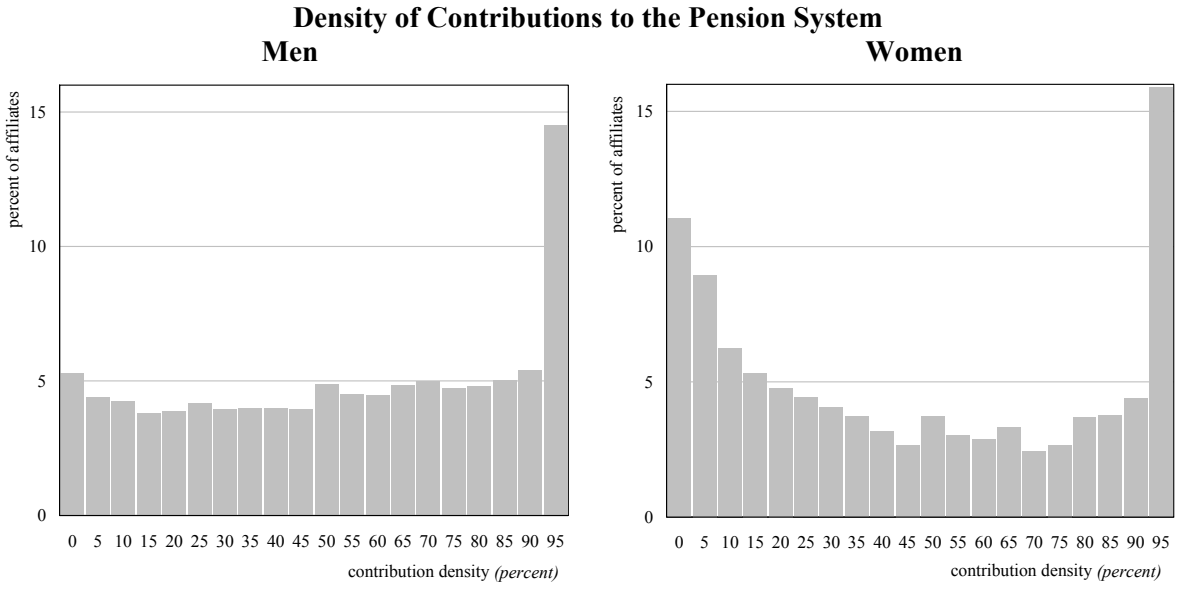
### *3.1.2 Recent trends in pension coverage*

As the Chilean pension system has been largely based on contributions from formal salaried workers, contributory coverage is one of the most important determinants of pension coverage. Since the early system of the 1930, between 60 and 70 per cent of the labor force has been enrolled in the pension systems in Chile (Arenas de Mesa, 2000). The indicator shows some variance, depending on the economic cycles and labor markets conditions. After the 1981 reform, available data provides information about actual contributors, and not just enrolled workers. The ratio of contributors to labor force, as shown in Figure 9, has slowly increased in the last two decades.

It has been argued, however, that more important than contributory coverage is the density of contributions of workers, *i.e.*, the fraction of working life during which a person makes contributions to social security. Figure 10 presents the distribution of this measure for Chilean men and women, making evident the high degree of heterogeneity in contribution histories: from individuals who contribute all of their available time to individuals who barely contribute during their lifetime and all the possibilities in between. This heterogeneity is particularly strong among women, who show a strongly bimodal distribution, with significant mass in the two extremes (0 and 100 per cent).[17]

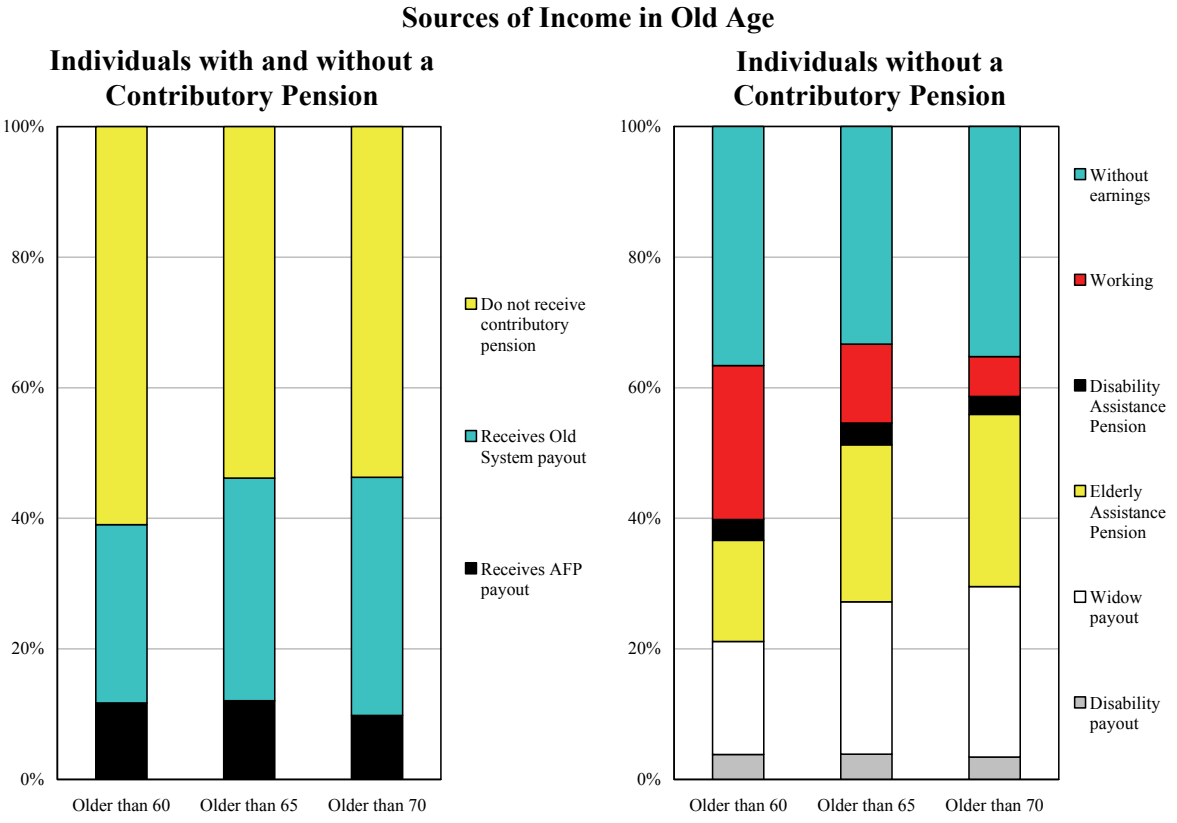
[17] The estimation of contribution densities was prepared considering actual data for 24,000 workers, active between ages 16 and 59.

**Figure 10**




Source: Figure 2, Berstein, Larrain and Pino (2006).

**Figure 11**




Source: Figure 5, Berstein, Larrain and Pino (2006).

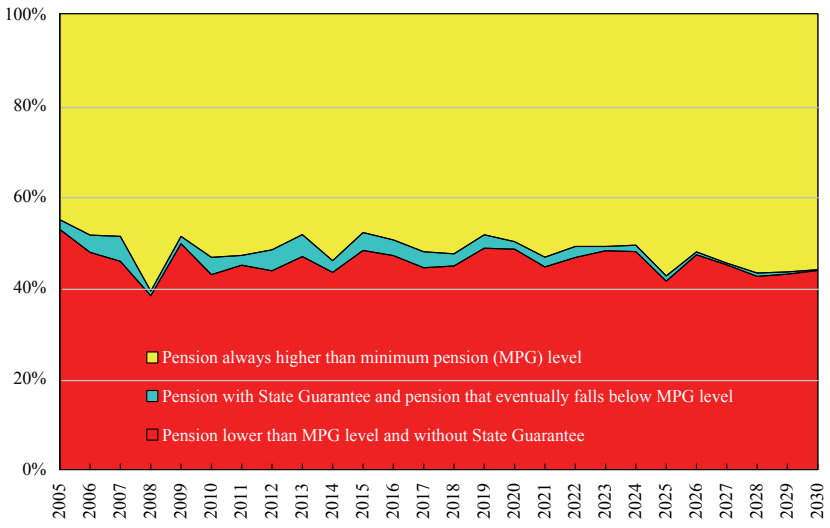
Finally, Figure 11 shows the distribution of old age coverage in the Chilean population. Approximately half of the population over 70 receives a benefit from a contributory scheme (currently, most of this coverage is provided by pensions from the PAYG regimes but their importance is decreasing every year as the AFP system matures). The bottom graph shows the different sources of income for those individuals who do not receive a direct benefit from a contributory scheme: assistance pensions, widow pensions and disability payments provide some form of coverage for close to 60 per cent of this group.

### *3.1.3 The political environment: Motivations for the reform*

A number of factors may have contributed to the adoption by presidential candidate Michelle Bachelet, of pension reform as one of the main campaign promises for the 2005 election. Since Chile's return to democracy, a center-left coalition had won three consecutives elections taking in each case, at least one important reform to the policies or institutions created during Pinochet's 17 year ruling period: President Aylwin's period (1990-1994) was centered on creating a stable political environment for a successful return to democracy; President Frei's period (1994-2000) concentrated its efforts on education and infrastructure reforms and President Lagos' (2000-06) main achievements were a reform to the private health insurance system created by Pinochet and the creation of a privately run unemployment insurance scheme based on individual accounts. Pension reform, especially a reform to the non-contributory component was clearly one of the pending debts of the governing coalition. This demand for a coverage enhancing reform was partly justified by the first coverage studies that were published in 2005 and 2006, suggesting that large fractions of the population were not going to be able to finance a minimum pension and would not qualify for the minimum pension guarantee (that required 20 years of contributions).[18] Figure 12 shows the results of one of these projections, in terms of the projected level of coverage for the affiliates to the Chilean pension system (before the current reform).

**Figure 12**

**Pension Projections for the Chilean Pensions System**
*(before the reform)*



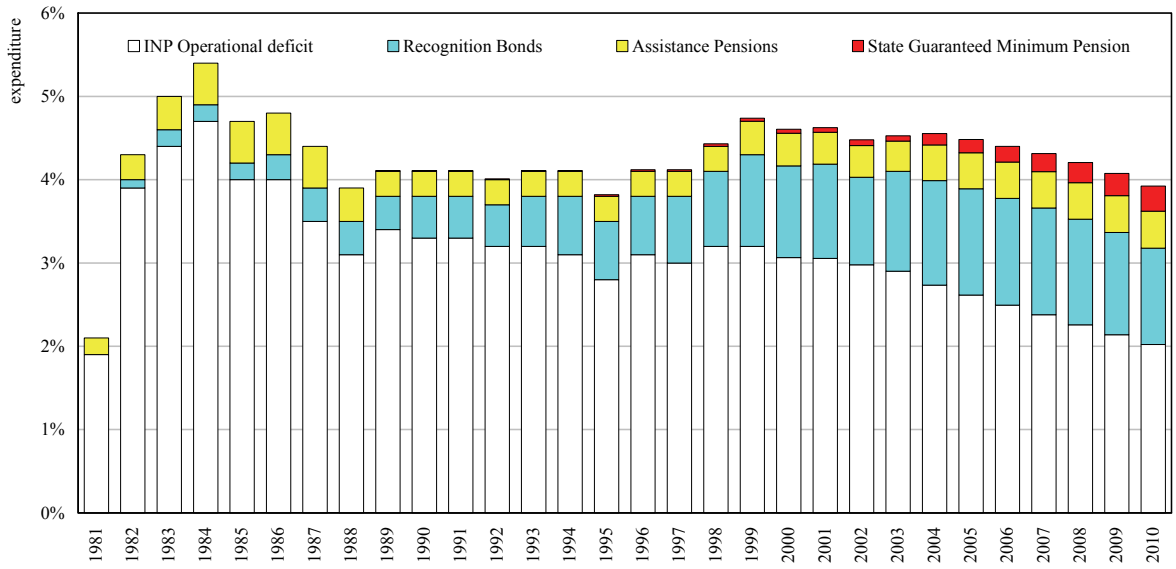

Source: Figure 7, Berstein, Larrain and Pino (2006).

A second important factor that must have been considered in the decision to undergo a concentrated and the combination of extraordinary profits over

[18] See Berstein, Larrain and Pino (2005) and Arenas de Mesa *et al.* (2006).

**Figure 13**

**Pension-related Fiscal Expenditure in Chile**
*(percent of GDP)*




Source: ECLAC (2006).

strong pension reform is the fiscal space that was being created by the gradual reduction in the transition costs generated by the original pension reform of 1980. As Figure 13 shows, both the operational deficit associated with the phased-out PAYG system and the recognition bond obligations made to workers who switched to the new system were, by 2005, starting to decline. This represented an opportunity to introduce a broad social safety net for old age.

Finally, a certain consensus was reached that the AFP industry was becoming increasingly assets with lack of entry over a long period were symptoms that price competition was not working properly in this particular market. These were certainly some of the factors in President Bachelet's decision to take pension reform as her main contribution to the social and economic development of the country.

### *3.2 The 2008 Chilean Pension Reform*

In March 2006, newly elected President Michelle Bachelet appointed a presidential committee of 15 professionals, experts in the different areas related to the pension system, to draw a report with reform recommendations for the pension system.[19] Two years later, a comprehensive bill was approved by Congress, representing the most significant reorganization since the original 1980 reform that created the AFP pension scheme. The scheme was essentially maintained in its original form but significant improvements are introduced to increase the coverage of the poverty prevention pillar, to improve gender equality in the pension system, to intensify the scope of competition in the AFP industry, and to introduce a more flexible investment regime for the AFPs.

[19] See Consejo Asesor Presidencial para la Reforma Previsional (2006).

In this section, we review the main elements of the reform (summarized in Table 2), its expected impacts and fiscal sustainability. We conclude the section with some of the expected challenges to be addressed in the future.

### *3.2.1 Description of the reforms*

#### *3.2.1.1 Measures to increase extension and quality of coverage in the pension system*

The individual nature of the AFP system creates a direct link between the frequency, timing and amount of the contributions made by an individual and the benefits he/she obtains. Pensions tend to be smaller when individuals face long periods without contributions, caused by occupational choices or informality, make a late entry into the formal labor market or make contributions that are not proportional to their actual income. Furthermore, actuarial calculations imply that life expectancy increases require higher savings to allow for reasonable replacement rates, either in the form of higher voluntary savings, extended working lives or reduced pension periods. The Chilean 2008 reform addresses these concerns in a number of ways: replacing the poverty prevention pillar with a strong New Solidarity Pillar, making participation compulsory for a large group of self employed workers, facilitating the creation of employer-sponsored voluntary savings plans, creating direct incentives for voluntary savings from low and middle income workers, and a number of measures that improve gender equality in the system, which will be discussed in the next section.

*The New Solidarity Pillar (NSP)*

Previous to the reform, poverty in old age was partially addressed by two main programs: the minimum pension guarantee, that provided a floor for pensions for individuals who contributed for at least 20 years, and the Assistance Pensions program (PASIS) for poor individuals with no pension entitlements.[20]

The 2008 reform replaces these programs with a unique scheme that guarantees that all individuals in the 60 per cent less affluent fraction of the population will have a guaranteed basic pension, regardless of their contribution history.[21] This new program provides old age and disability subsidies, financed by general revenues of the State.

Individuals with no contributions are entitled to an old-age Basic Solidarity Pension (PBS), once they reach 65 years of age, and fulfill the affluence and residence requirements.[22] Individuals who made contributions but will receive a pension below a certain threshold are entitled to a

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[20] As of March 2008, the minimum pension guarantee is equivalent to US$222 (US$242 after age 70 and $257 after age 75) and the PASIS program provides old age, disability or mental deficiency benefits equivalent to US$110 before age 70, US$117 after age 70 and US$128 after age 75 (all US$ figures based on an exchange rate of 435.10 pesos per dollar, existing as of March 12, 2008, the day the reform was officially promulgated). For an analysis of this poverty prevention pillar and alternative designs, see Fajnzylber (2006).

[21] The scheme will be introduced gradually: in the first year, beginning in July 2008, the Basic Solidarity Pension will be equivalent to US$137 and restricted to the 40 per cent less affluent population. This benefit will increase to approximately US$172 in July 2009, and cover up to the 45 per cent poorest individuals. The final schedule of benefits will be in place in July 2012, covering up to the 60 per cent poorest individuals.

[22] The affluence test is a form of means-testing applied to determine that a person does not belong to the 40 per cent richest fraction of the population (60 per cent in the first year). Initial implementation (2 years) will be based on the *Ficha de Protección Social*, a means-testing instrument that calculates the vulnerability of the members belonging to a household, based on information about their capacity to generate income, self-reported earnings, administrative data on pensions and need adjustments based on age and disability status. More information about the instrument can be found in www.fichaproteccionsocial.cl. The residence test requires that individuals must have resided in Chile for at least 20 years since the age of 20, and at least 3 in the 5 years prior to requesting the benefit.

**Table 2**

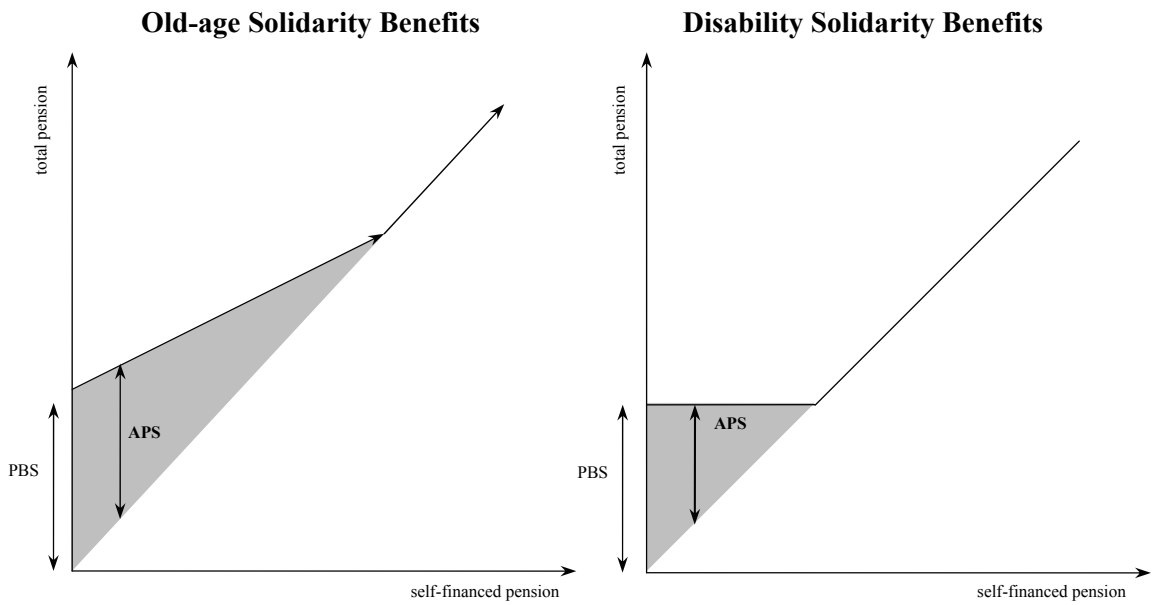
**Main Aspects of the 2008 Chilean Pension Reform**

| Topic | Reform | Description |
|---|---|---|
| Coverage through poverty- prevention pillar | Creation of a New Solidarity Pillar | * Provides a Basic Solidarity Pension (PBS) to individuals with no pension earnings, belonging to the 60 per cent poorest individuals in the population<br>* Provides a Pension Solidarity Complement (APS) to individuals who were able to finance a small pension |
| Coverage/adequacy through contributory pillar | Compulsory contributions from self-employed workers | * After a transition period, self employed workers in certain tax categories will be required to make contributions into the AFP system, through their annual income tax statement |
| | Subsidy to contributions from low income young workers | * The first 24 contributions of low income workers aged between 18 and 35 will be partly subsidized by the State and an additional contribution will also be financed for these contributions |
| | Additional contribution for women | * Women and men will be charged the same fee for the disability and survivorship insurance but men have higher risk rates. The difference will be deposited in women's account |
| | Additional tools for the supervision of contribution payment | * Circumstances where employers stop making contributions without formal reporting will be automatically considered as "declared but not paid"<br>* Employers who will be allowed 3 additional days if they file contributions electronically |
| Coverage/adequacy through voluntary pillar | Legal framework for Collective Voluntary Savings Plans | * Provides tax incentives for firms to set up collective plans where workers contributions are matched, to some extent, by the employer, subject to a minimum vesting period |
| | Tax incentives for middle income workers | * Allow for tax exemptions either at the time of contribution or at the time of withdrawal<br>* There is a bonus set by the State to low-income individuals who make voluntary contributions on an individual or collective basis |
| Gender equity in the pension system | Bonus for every live birth | * The State will either deposit a bonus in the woman' account or increase the amount of the PBS in the annuity-equivalent for every live birth or adopted child. The amount of the bonus is equivalent to 18 months of contributions at the minimum wage rate, plus the average rate of return of the pension system between the birth of the child and the moment the woman turns 65 |
| | Savings redistribution in case of divorce or annulment | * The judge can order, as a means of economic compensation, to redistribute savings between the two accounts, up to 50 per cent of the funds that were accumulated during the period they were married |
| | Symmetric treatment of men and women in the pension system | * Women can now leave, in case of death, pensions to their surviving spouse<br>* Separate contracts for men and women are set for the disability and survivorship insurance |

| Topic | Reform | Description |
|---|---|---|
| Increase price competition in the AFP industry | Competitive bidding for new members | The Superintendency of Pensions will set, every 2 years, a bidding process: The AFP who offers the lowest fee will automatically receive all new participants in the system for a period of 24 months. This fee applies to all members of AFP |
| | Incentives for separation of AFP functions though outsourcing | * AFPs are now allowed to outsource most of their functions<br>* Tax disadvantages of outsourcing are eliminated |
| | Separation of disability and survivorship insurance | All AFPs must set up, together, a bidding process to obtain disability and survivorship insurance. Today, each AFP hires its own policy |
| | Simplification of fee structure | Facilitates cost comparison by allowing only one type of fee (as a fixed percentage of taxable income) |
| | New actors in the industry | * Insurance companies are allowed to create an AFP subsidiary but maintaining the sole purpose nature of the regulation |
| Investment regime | More flexible investment limits | * Only structural limits are fixed by law: other limits are set by secondary regulation, with advice from an Investment Technical Committee<br>* This increased flexibility is accompanied by greater responsibility from the AFP, who must now set up special Board Committees for investments and conflicts of interest and explicit investment policies<br>* Eventually, investment limits may be replaced by risk measurement and control |
| | Higher limit for foreign investment | The maximum investment limit can be increased to up to 80 per cent of the value of the Pension Fund. The Central Bank will set it within a 30-80 per cent range |
| Participation, Information and education | Creation of an AFP Users' Committee | * Representatives of workers, retirees and administrators will make evaluations and propose improvements |
| | Creation of Pension Education Fund | * Financed by State transfers and private donations<br>* Funds will be invested in promotion or education campaigns, selected through a competitive process |
| | Creation of Pension Advisors | * Individuals who offer independent advice on the different choices faced by workers, and that are paid from the individual's fund, with a lifetime maximum |
| Social security institutional framework | Creation of new institutions | * The Social Security Institute is created to manage the New Solidarity Pillar (NSP), as well as remaining participants in old regime<br>* Integral Pension Assistance Centers (CAPRIs) are created throughout the country to receive applications to the NSP<br>* Superintendency of Pensions replaces the current Superintendency of AFPs, with a broad oversight over private and public participants<br>* The Pension Advice Committee is created to assist the Labor and Finance Ministries in issues related to the NSP |

**Figure 14**

**Subsidies and Final Pensions under the New Solidarity Pillar**




Pension Solidarity Complement (APS), with the same affluence and residence requirements.[23] The disability program provides benefits under similar conditions, but for individuals between the ages of 18 and 64. Once disabled individuals reach the age of 65, they are eligible for old-age solidarity benefits.

The schedule of subsidies is best described in Figure 14, which presents solidarity subsidies and total pensions, as a function of self-financed entitlements.

It is worth noticing two particular elements of this design: the strong integration between the contributory system and the solidarity pillar and the concern for contributory incentives that this integration raises. Integration allows guaranteeing that everybody in the first three quintiles will receive a pension equivalent to, at least, the PBS. If the benefit had been established with a cap (as in the disability case), there would be strong disincentives to contribute for low income individuals, as their retirement income would not increase with the number or amount of contributions. With the chosen design, old-age total pensions are monotonically increasing with self financed savings, *i.e.* every dollar saved always increases retirement income, but not by a full dollar.

This is certainly the most important component of the 2008 reform, both in terms of extension of coverage and assurance that every old person in Chile will have access to some form of protection. Current projections show that this program alone will drastically reduce income inequality in the years to come. The main challenge is, of course, the ability to develop sound fiscal policy to be able to finance the additional cost of the reform over the next decades, during which the country will be exposed to a significant increase in its demographic dependency ratio. This challenge will be partially compensated by the gradual reduction in the fiscal pressure generated by the transition from the PAYG system to the AFP scheme. Since the 1980 reform, the government

[23] The Pension Solidarity Complement will be first paid to those whose contribution financed benefits are below US$161 and belong to the poorest 40 per cent of the population in July 2008, to progressively grow until 2012, when the benefit will reach those receiving less than US$586 on contribution financed pensions and belong to the poorest 60 per cent.

has been financing the fiscal deficits generated by the previous regime (deprived of most of its contribution revenue) and the obligations contracted with the workers who switched to the new system. These obligations are now starting to phase-out leaving fiscal space to finance the new pillar.

*Compulsory contributions from self-employed workers*

Benefits from the New Solidarity Pillar will be paid to eligible individuals, regardless of the reason that originated the lack of contributions. In particular, self-employed workers are not required to make social security contributions for their old age. Consistent with the extension of coverage brought by the introduction of the NSP, the reform requires all self employed workers who receive income subject to income tax to make social security contributions on their annual earnings.[24] The introduction of this requirement will be gradual, starting with an information period of 3 years, followed by a period of 3 years during which workers will be required to make contribution unless explicit manifestation not to do so (the default option will be to participate in the system). During this interim period, the fraction of taxable earnings subject to this requirement will be increased, from 40 per cent during the first year, to 70 per cent during the second and to 100 per cent during the third year. Starting in 2015, compulsory participation will be fully implemented.

The main challenge involved in this reform will be the ability of authorities to enforce its application. Experience in other countries in the region has shown that self employed workers tend to have much lower level of compliance than wage earners. While the situation in Chile seems to be better than in neighboring countries (as shown by the high levels of compliance with income tax regulations), this will still be a difficult process. On the other side, this component of the reform is only targeted to self-employed workers subject to regular income tax regulations, leaving outside most informal sectors of the economy: agricultural workers and fishermen, small-scale producers and retailers, etc.

*Collective Voluntary Savings Plans (APVC) and incentives for low and middle income workers*

As in many other countries, voluntary savings for old age can benefit from tax exemptions in Chile. This type of savings is known as a Voluntary Pension Savings plan (in Spanish, an APV plan). This type of savings can be done through a special account in one of the AFP, through special mutual funds offered by banks or other financial institutions and through life insurance-plus-savings contracts. By construction, this type of exemption mostly attracts voluntary savings from high income individuals, as these are subject to the highest marginal income tax rates. For most low and middle income workers, who are not even subject to income tax, regular tax exemptions provide no incentive to participate.

The reform makes two attempts to increase voluntary savings from dependent workers in general, but especially for those who do not benefit from regular tax exemptions. On the one hand, it creates the figure of Collective Voluntary Savings Plans (known is Spanish as APVC plans), a scheme that provides tax incentives for firms who provide matching-contributions plans for their

[24] More precisely, these workers will have to contribute approximately 12.5 per cent (10 per cent savings plus 2.5 per cent corresponding to administrative fees and the disability and insurance premium) of their annual taxable earnings. Taxable earnings for self employed workers are equivalent to 80 per cent of the annual earnings received under that status. There is a minimum contribution amount equivalent to the contribution rate applied to one minimum salary, and a maximum level, equivalent to the contribution rate applied to the maximum taxable earnings for social security that applies to dependent workers. This new requirement also includes making contributions to a public or private health insurance program.

workers.[25] On the other hand, the reform provides two additional incentives for individual voluntary savings: i) workers can choose between tax exemptions when contributions are made or tax exemptions when they are withdrawn, and ii) workers can benefit from a State-financed 15 per cent bonus on voluntary contributions (individual or collective) that are used to increase retirement benefits or apply for early retirement, with an annual maximum.

Following the experience of developed countries, there is enormous growth potential in the amount of old age wealth that can be accumulated through voluntary savings schemes. The creation of APVC plans is particularly interesting as a new form of non-pecuniary compensation that can be used by employers to attract and retain good workers, increasing the incentives for on-the-job training, while at the same time improving the amount of old age savings from middle income workers. It remains to be seen if tax incentives are enough to induce firms to create these plans and seize the opportunity to move towards this modern form of compensation.

*Subsidized social security contributions for young workers*

One particular aspect of defined contribution systems is that, due to the effect of compound interest over a long period, early contributions can have a great impact on final pensions. For this reason, and the interest to decrease youth unemployment, a special subsidy is created to pay for part of the social security bill of employers who hire workers between the ages of 18 and 35. More specifically, employers will be subsidized in an amount equivalent to 50 per cent of the pension cost (contribution included commission) of a minimum wage worker, for the first 24 contributions of young workers earning less than 1.5 minimum wages.

Additionally, a State-financed bonus equivalent to the hiring subsidy will be directly deposited in the worker's individual account, for the first 24 contributions between the ages of 18 and 35 that were made for a covered wage below 1.5 minimum wages.

*Additional tools for the supervision of contribution payment*

A key role for increasing contributory coverage is placed on the tools available to enforce employer's obligations to make contributions on behalf of their workers. Before the reform, when an employer stopped making contributions for a particular worker, it was difficult to verify whether the employment relationship had stopped or whether the employer was no complying with the law.

The Reform introduces a legal change under which circumstances where employers stop making contributions without formal reporting will be automatically considered as "declared but not paid". The AFPs will then be responsible for verify compliance and pursue all legal resources to make the employer pay for the absent contributions, if necessary.

Another recurrent source of verification problems is the use of paper declarations from the part of employers. These are often associated with collection mistakes and delays in accreditation of the contributions. It also makes difficult to prosecute faulty employers. The reform introduced an incentive to the use of more efficient filing mechanisms by allowing employers 3 additional days for fulfilling the legal requirement if they file contributions electronically.[26]

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[25] APVC follow the same principle of 401K plans in the United Status or other defined contribution occupational plans in other countries. Employers can establish savings contracts with any institution that provides APV individual plans (AFP, banks, mutual funds, and insurance companies), make matching contributions as a function of worker's contributions, and establish vesting periods. Conditions must be the same for all workers and, under no circumstances, can employers restrict benefits to certain groups.

[26] Obligation will remain on the 10th of every month for contributions not filed electronically.

#### *3.2.1.2 Measures to improve gender equality in the pension system*

Special attention was given in the reform to introduce measures that could increase gender equality between men and women. In general, women tend to i) have long periods without contributions, usually associated with caring duties over children or other dependent relatives, ii) be hired in low remunerated occupations (relative to men with similar educational background), iii) retire earlier and iv) live longer.[27] All these elements, combined in a pension system that provides no gender redistribution during the retirement phase, create significant differences in the benefit distributions of men and women.

On the other hand, retirement and disability benefits under the AFP scheme inherited many of the asymmetric design elements of previous regimes: women cannot provide survivorship benefits to their husbands (or the fathers of their children), unless they are disabled. This means that they are entitled to lower benefits from the workers´ disability and survivorship insurance program while paying the same premium. At the same time, pension formulas do not have to reserve funds for husbands in case they outlive their wives, a regulation that increases women's benefits. In addition, mortality tables used to calculate benefits under a programmed withdrawal schedule are gender specific (which is consistent with this self-insured option) and insurance companies are allowed to make differentiated offers to men and women.

*Introduction of the New Solidarity Pillar*

To address these differences, the reform considers a number of measures. The main one is certainly the introduction of the New Solidarity Pillar, which, by design, will be more beneficial for women, as they are more likely to never have contributed or done so with less frequency than men. In addition, benefits are gender neutral, therefore benefiting women because their higher longevity.

*State financed Bonus to mothers for every child born or adopted*

The reform introduces a subsidized bonus to mothers, for every child born or adopted. The subsidy is equivalent to the contribution of a full time minimum wage worker for 18 months, and receives an annual rate of return (equivalent to the net average return of AFP's Fund C) from the day of birth until the mother reaches the age of 65. This benefit is subject to the residency requirement but is not means tested.

Since Chile is among the countries with the longest maternity leave regulations in the region (18 weeks) and at the same time with one of the lowest female labor force participation rates, the introduction of this bonus is extremely important to achieve decent retirement income, particularly among low income workers. But beyond the financial benefit, the measure is extremely valued by the population, as a form of social recognition to the (non-remunerated) activity of giving birth and taking care of children during their first months of life.

*Economic compensation in case of divorce or annulment*

In addition, the reform introduces the legal concept of pension related economic compensation in case of divorce or annulment. Under this figure, a judge can instruct, if required, the transference of retirement funds between individual accounts, as a form of economic compensation to the part that presents a loss during the period they were married. This transference

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[27] Minimum retirement age is 60 for women and 65 for men. The report from the Presidential Committee for Pension Reform suggested increasing female retirement age to 65 but this recommendation was not included in the reform bill sent to Congress.

cannot exceed 50 per cent of the resources accumulated in the account of the contributing part, during the period the two persons were married.

*Separation of disability and survivorship insurance contracts between men and women and transference of the difference in premia to the low-cost group individual accounts*

The premium that is charged to participants in the AFP system for the disability and survivorship insurance (SIS) was, before the reform, the same for men and women, despite the fact that these are less likely to become disabled and do not generate survivorship benefits to their spouses, unless they are disabled. To avoid this cross-subsidy, the reform requires AFPs to obtain separate insurance contracts for men and women, to charge affiliates for the higher of the new premia (most likely the men's contract) and deposit the difference for the other group in the savings account of the less risky group (most likely, women). As a result, women's final contribution to their pension funds will be slightly higher than the 10 per cent prescribed in the law. This can be seen as a way to maintain a unique insurance cost for all participants, while increasing the amount of savings available to women at the time of retirement.

*Widower pensions*

As mentioned earlier, one of the main gender asymmetries prevailing in the pension system is the impossibility of generating survivorship pensions to widowers, unless they are disabled. As part of the reform, the requirement of reserving part of the accumulated funds at retirement for paying survivorship pensions and the coverage under the survivorship insurance are now applicable to both men and women. In the first case – retirement calculation – the inclusion of widowers will actuarially decrease the pension of the retiring woman in exchange for the additional benefit. In the second case, the additional coverage will be financed by a unique insurance premium corresponding to all women in the system, therefore eliminating the current cross-subsidies from insured women to insured men.

The measures described in this subsection account for most of what can be done to improve pension equality between men and women through pension system design.[28] Clearly, however, most of the pension inequality is associated with cultural factors governing the distribution of labor at the household level and the labor market distortions that occur through occupation or wage discrimination. These factors cannot be appropriately addressed through pension reforms.

### *3.2.1.3 Measures to increase competition in the AFP industry*[29]

One of the main pillars of the reform introduced in 1980, was the introduction of competition between AFPs, as the central disciplining mechanism to ensure good performance, good quality of service, at a low cost. As participants could freely move between pension managers, expensive or underperforming AFPs would be punished by market forces. Reality has shown that competition in an industry where the service provided is compulsory and extremely complex for the average consumer and where benefits are only perceived in the long term, does not always take the form that was intended. In fact, during the 1990s, competition was strong, but based on an expensive system of sales personnel and presents for transferring from one AFP to another. This inefficient

[28] Some have argued that one further measure that could greatly improve women's pensions was not included in the reform: the equalization of retirement age at 65. In a defined contribution context, however, it is not clear whether this is a significant improvement in women's welfare, as the increase in retirement income is directly compensated by the delayed retirement age, with no additional wealth being saved or transferred to women.

[29] For a comprehensive analysis of these measures, see Reyes (2008).

period of high cost marketing competition was replaced by a short period of mergers and acquisitions that resulted in the current state of affairs, characterized by a concentrated industry (6 firms manage funds equivalent to 60 per cent of GDP), high returns on assets and no entry in the last 9 years.[30]

The interpretation of this phenomenon is both related to demand considerations (the low elasticity of demand caused by the characteristics of the product and the limited product or price differentiation between providers) and supply considerations associated with a number of regulations that affect the industrial structure of the market. AFPs are required to provide a number of services: collection of contributions, record keeping, investment, customer service, as well as benefits calculation and payment. This creates in practice a multiple barrier to entry. This problem is exacerbated by regulations that limit the scope and benefits of outsourcing some of these activities: AFPs are not allowed to outsource record keeping or customer service and they are not allowed to provide services other than those stipulated by law. In addition, they do not collect value added tax (VAT) from the fees they charge to participants but they must pay VAT on the services contracted from outside providers, therefore generating a significant cost to outsourcing.

*Competitive bidding process for new members*

The reform addresses these issues affecting both the demand and supply side.[31] On the demand side, elasticity is substantially increased by the introduction of competitive bidding process for new members. All new participants in the pension system will be automatically enrolled in the AFP that offered the lowest commission during the last bidding process. These affiliates will be required to stay in that AFP for a minimum period.[32] The winning AFP will therefore receive a constant inflow of participants for a period of two years, without having to incur in marketing or sales force costs. This measure creates an attractive starting point for potential new entrants, as incumbent firms cannot charge a different commission to different groups of participants (current affiliates or new workers).

*Fee structure*

Another explanation for the low sensitivity of demand, especially to the fees charged, is the complexity of comparison between firms that can charge multiple fees (some are constant in absolute terms and some are a fixed fraction of covered earnings). In an attempt to facilitate price comparison between AFPs, the commission structure was simplified by the reform to the point where AFPs can only charge a unique commission, expressed as a fixed proportion of covered earnings.

*Requiring or facilitating the outsourcing of certain functions of the AFP*

On the supply side, a number of measures tend to facilitate outsourcing of certain functions of the AFP. The range of services that can be outsourced is extensively broadened, and the AFPs receive a tax credit for the VAT paid to subcontractors.

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30 See Valdes and Marinovic (2005) for a detailed accounting procedure of the return on assets exhibited by AFPs.

31 The reform bill sent to congress included a measure to allow local banks to enter the AFP industry by creating subsidiary firms. This measure was not approved by opposition parties, arguably to avoid the creation of a public AFP, as a subsidiary of the Banco del Estado de Chile.

32 The affiliate can transfer to another manager if the winning AFP does not comply with the regulation or is consistently underperforming other administrators in a way that cannot be compensated by the difference in commissions.

One of these services, the disability and survivorship insurance (SIS) is now required to be contracted by the AFP system as a whole, instead of the previous situation under which each AFP had to take its own insurance and these contracts were designed in a way that most of the risk was born by the AFP itself.[33] This created a strong incentive to compete in the ability to attract low risk individuals only, in detriment of good portfolio investment, cost reductions or quality of service. By requiring a system-wide insurance contract, the risk is effectively born by insurance companies and the incentive to out-select riskier individuals is eliminated. The design of the insurance bidding process will be subject to detailed regulation issued by the Superintendency of Pensions and the Superintendency of Insurance and Securities. By law, insurance coverage will have to be auctioned separately for men and women, and randomly assigned groups could be created and assigned to different firms to avoid excessive concentration of risks.

This measure implies an important change in the way the disability and survivorship insurance system is managed. While its mandatory separation will greatly reduce barriers to entry into the AFP industry, some have argued that it will greatly reduce their incentive to contain fraud, potentially causing an important increase in the insurance cost of the service. This is not a minor issue, considering that this component accounts for about 1 per cent of covered earnings in the economy and careful consideration should be taken to maintain appropriate controls in the system.

*Permission for Insurance Companies to create AFP subsidiaries*

Looking to increase contestability in the AFP industry, insurance companies are now allowed to create subsidiaries as Pension Fund Administrators, subject to the regulation established in the Decree Law 3.500. These subsidiaries must strictly follow the sole purpose requirement for any AFP, *i.e.*, it can only offer the services and products stipulated by law. Furthermore, the insurance company cannot its subordinate services or products to joining or staying in the AFP subsidiary or offer improved conditions for individuals in such circumstances.

### *3.2.1.4 Flexibilization of the AFP investment regime*

To limit the absolute exposure of investment portfolios, the original regulation included a complex set of quantitative limits: limits by issuer, by emission, by asset class (including limits to variable income), by source of funds (domestic or foreign), etc. Most of these limits were written in the law that regulated the system, with little scope for interpretation or flexibility. The reform transferred most of these limits from the law into secondary regulations and a created a special investment council (the Investment Technical Council) whose function is to make recommendations regarding the investment policies and regulations of the Pension Funds.[34]

Increased flexibility will be accompanied by increased transparency requirements in terms of explicit investment policies, as well as public policies to deal with conflicts of interests. The reformed law includes the possibility to establish limits based on portfolio risk measures instead of quantitative limits by assets classes.

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[33] Insurance contracts included ex-post adjustments that were equivalent to a risk transfer between the insurance company and the AFP, leaving insurance coverage only for extreme events.

[34] Only the main structural limits remained in the law, subject to a general upper bound, under which the Central Bank has the authority to set the actual limitation: A variable income limit for each type of fund; An overall foreign investment limit (which could reach up to 80 per cent of the funds) which can substituted by specific limits for each type of fund; fund specific limitations to the amount of uncovered investment made in foreign currency; and finally, a limit to investment in financial instruments issued by institutions with less than 3 years of operation.

### *3.2.2 Expected impacts*

The reform described in this section is certainly one of the most comprehensive efforts undertaken in the region to both complement the contributive pillar with a strong poverty-prevention component and introduce a number of innovative solutions to improve, after 27 years, a second pillar based on individual capitalization accounts and market provision.

The introduction of the New Solidarity Pillar will greatly reduce income uncertainty in old age, by providing minimum coverage for everybody who does not have other means of financing. This will also reduce income inequality both among adults and in the population as a whole. In fact, it is not uncommon to see older individuals living in the same household with relatives. The new benefits will therefore improve the situation of the individuals, together with the families they live with.

The extension of coverage provided by the poverty-prevention pillar should be complemented by the increased contributions made by young and self-employed workers, as well as the additional voluntary savings that should be raised through collective voluntary savings arrangements. The experience in other countries, particularly developed ones, show the great potential that this type of firm related coverage can imply for a large segment of the population.

It is also expected that the measures taken to improve the industrial organization of the industry should reduce costs and facilitate entry of new competitors, by providing new firms access to a large critical mass of new workers without having to incur in marketing costs and by providing incentives for the external provision of certain activities. The separation of the disability and survivorship insurances will greatly reduce the uncertainty associated with having to provide this service for a firm that is just entering the market.

### *3.2.3 Fiscal sustainability of the reform*

As the benefits from the New Solidarity Pillar were designed as entitlements to the population, the reform implies a significant commitment from the State to future generations of pensioners. While detailed information about the medium and long term impacts of the reform is limited, available data indicates that they might be relevant. The reform bill was accompanied by a financial statement, including estimations of fiscal costs from 2008 until 2025 (Table 3). This table presents the expected impacts of all provisions incorporated in the reform law, including some that might not be considered part of the pension reform in strict sense. In any case, the projections indicate that the fiscal cost of the reform should be below 0.5 per cent of GDP in the first few years, to reach almost one per cent of GDP by 2025.

Financing of the reform was designed to maintain fiscal discipline and a rigorous application of fiscal policy based on structural surpluses. The main sources of financing are the following:

- the Pension Reserve Fund (created in 2006, and funded with fiscal surpluses),
- reduction of fiscal liabilities originated in the transition from the PAYG to the fully funded system: reduction of the operational deficit of the National Pension Institute[35] and the interest accrued from recognition bonds issued by the State to workers from the previous system who switched to the new one,
- resources originated in reallocations, expenditure efficiency and economic growth,

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[35] The INP is the institution in charge of administering the PAYG regimes that are still in place for workers who decided to stay in their previous schemes. With the reform, pension related activities of the INP are transferred to a new institution, the *Instituto de Previsión Social*, responsible for the administration of benefits under the New Solidarity Pillar.

**Table 3**

**Fiscal Cost of the Pension Reform**
*(million of Chilean pesos of 2007)*

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 - Solidarity Pension System | 38,898 | 177,225 | 322,283 | 432,019 | 565,631 | 656,718 | 701,641 | 751,587 | 804,330 | 860,079 | 1,415,454 |
| 2 - New Institutional framework | 6,413 | 3,914 | 2,243 | 2,467 | 2,547 | 1,048 | 1,043 | 1,034 | 863 | 851 | 2,552 |
| 3 - Bonus to women for every child | 0 | 7,049 | 14,946 | 23,537 | 33,054 | 44,596 | 49,121 | 53,181 | 57,558 | 62,310 | 109,847 |
| 4 - Subsidy to young workers | 6,657 | 27,853 | 28,979 | 44,989 | 61,835 | 63,502 | 64,977 | 66,256 | 67,158 | 67,639 | 75,592 |
| 5 - Family allowance for independent workers | 0 | 0 | 0 | 4,937 | 10,270 | 12,815 | 15,541 | 18,455 | 21,566 | 24,882 | 49,926 |
| 6 - Voluntary savings plans (individual and collective) | 6,450 | 26,243 | 27,004 | 27,734 | 28,467 | 29,195 | 29,910 | 30,604 | 31,272 | 31,919 | 36,491 |
| 7 - Fund for pension education | 689 | 1,378 | 1,432 | 1,437 | 1,469 | 1,503 | 1,539 | 1,597 | 1,615 | 1,656 | 2,072 |
| 8 - Contribution for insurance of public servants | 0 | 21,060 | 42,660 | 42,696 | 42,732 | 42,767 | 42,803 | 42,839 | 42,875 | 42,911 | 43,200 |
| 9 - Worker's compensation for self-employed workers | 381 | 392 | 403 | 413 | 424 | 434 | 444 | 453 | 462 | 470 | 478 |
| 10 - Deduction of VAT on outsourced services by AFPs | 775 | 3,133 | 3,164 | 3,196 | 3,228 | 3,260 | 3,293 | 3,326 | 3359 | 3,392 | 3,673 |
| **TOTAL** | **60,263** | **268,247** | **443,114** | **583,425** | **749,657** | **855,838** | **910,312** | **969,332** | **1,031,058** | **1,096,109** | **1,739,285** |
| *percent of GDP*[(1)] | *0.07%* | *0.30%* | *0.47%* | *0.60%* | *0.73%* | *0.80%* | *0.81%* | *0.83%* | *0.84%* | *0.86%* | *0.96%* |

[(1)] Percentages of GDP estimated considering Chile's Central Bank estimation for 2007 and projections for 2008 and 2009, and 4.5 per cent medium-term growth.
Source: Dirección de Presupuestos (2008).

- during the first few years (the transition period), part of the interest earned on financial assets owned by the State.

### *3.3 Pending challenges*

The most important aspect of the reform described in this section is that, rather than replacing the AFP system created in 1980, it improves it by integrating a State-financed poverty prevention pillar, extending the voluntary pillar to middle income workers and introducing a number of measures to increase coverage and competition in the AFP industry. It is the result of a two year long participatory process, preceded by extensive research and evaluation efforts.

A number of challenges remain to be addressed in the years to come, both regarding the implementation of this reform and longer term aspects. In the first group, the progressive implementation of the new solidarity pillar will probably face risks. On one hand, the actual number of potential beneficiaries is not clearly known, as it partially depends on future trends of wages, compliance, and pension fund returns. Also, organizing the new institutions, setting up the conditions to fully integrate the self employed workers into the system, and organizing the systems to identify beneficiaries of the new solidarity benefits and make the payments will demand a serious commitment by the government.

On longer term challenges, not necessarily addressed by recent reforms, the most important seems to be shared by most middle and high income countries in the planet: the uncertain increase in life expectancy and medical costs in old age. With the technological progress of the last decades came dramatic increases in life expectancy, based on ever more sophisticated medications and equipment. We currently have a reasonable idea of how long the current pensioners are going to live but little is known about life expectancy of the individuals who are just entering the labor market. It is quite possible that the current 10 per cent contribution rate will be insufficient to fund adequate benefits for this increased life expectancy and it is not clear that generational differences will allow workers to remain on the labor market long enough to compensate. Most of the burden will be put in the ability of individuals to foresee these shortcomings and increase their voluntary savings but, if pension systems were created to avoid myopia, it is not obvious that this reaction will have the adequate timing and strength. More efforts must be put in place to improve predictions over this uncertain future and the necessary – often unpopular – measures must be taken to increase contribution rates or retirement age.

## 4 Institutions and policy making processes

### *4.1 Motivations for focusing on the policy-making processes*

Up to this point this paper has described the design and performance of the pension system in Argentina and Chile, and it has examined with some detail the reforms recently adopted by both countries. This section will no longer concentrate on the specific content of these reforms, but rather it will introduce a discussion on the institutional and political patterns under which those policy changes have been accomplished. In this sense, this section focuses on the importance of policy-making processes and their influence on the features of policies and, more specifically, on pension policy.

Why is it relevant to discuss this in a paper regarding pension reform? To state it briefly, it is because the workings of the political institutions and the characteristics of policy-making processes play a role in pensions as they do in other areas of complex public policy. In general terms, looking at the characteristics of political processes gives recognition to the influence of those processes on

public policies; in other words, public policies require policy-making capacity to be effective. More specifically, several significant features of public policies depend on the ability to strike and enforce intertemporal political and social agreements. The dissimilar capability of achieving these agreements will affect some critical attributes of policies, such as their stability, adaptability, sustained credibility, and coordination and coherence. In this manner, whether the workings of the policy-making process tend to facilitate or discourage cooperative outcomes in the political transactions game becomes a central question (Spiller, Stein and Tommasi, 2003).

As will be discussed afterward, there are some particulars of pension policy which seem to aggravate the possible consequences stemming from the lack of adequate policy-making capacity and cooperative political environments. In the context of the market-oriented reforms in Latin America, the discussion concerning pension policy was frequently articulated around the "public vs. private" controversy, as if that choice on its own could solve all the complexity involved in this policy. Focusing on the institutional determinants behind pension policy highlights the potential influence of some permanent characteristics of the policy-making process that are beyond the "big title" of public system or private system.[36]

As stated previously, the different characteristics of the policy-making processes play a significant role in the performance of public policies. However, while measuring social outcomes from public policies is relatively simple, measuring institutional features is much more difficult. More over, in the case of pension policy, even if these institutional indicators were readily available, showing a clear causal effect between them and the policy outcomes would still be very complex, partly because many of these outcomes can be fully observed over several decades after the adoption of policies, and partly because other primary determinants – such as a long term economic growth, labor market performance, or overall fiscal development – may have stronger short term impacts.[37]

Section 4.2 advances with an exploratory approach, analyzing in what way political institutions and policy-making processes could matter for pension policy performance. After that, in Section 4.3, some general attributes of the policies and the policy-making process of Argentina and Chile are explored; even if it is a very limited account, it will illustrate some key features of the institutional and political patterns in both countries. Section 4.4 presents some aspects of the recent pension policy-making processes in Argentina and Chile. But before moving on, we will briefly attempt to make two concepts more clear: intertemporal political cooperation and the characteristics of policy-making process.

Policies (at least complex policies, such as pensions) can be visualized as dynamic processes that involve multiple actors through their life cycle. This concept of policy (and consequently of policy reform) goes up against the more stereotypical one-shot policy implementation account, which implicitly assumes some kind of magical moment of special politics in order to produce effective policy results (Tommasi, 2004). In a dynamic approach to the concept of policy, the recurring specific responses required from political, social, and economic agents have to be considered. Therefore one must contemplate the various forms of regular interaction required among them. Only if this interaction is supported by positive beliefs in the workings of the

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[36] In the context of the shift toward pension private administration that took place in Latin America during the '90s, it was frequently argued that "privatization" would eliminate political risk (defined as the risk of any type of wrong use of funds or inadequate interference in pension system by the government). However, with the reforms in place, it was quite evident that things were more complicated (see Kay 2003) for an analysis of Argentine case). As in other areas of policy reform, the weakness of oversimplified messages dealing with problems of high institutional and political complexity came out into the light; these problems inevitably require political cooperation on a regular basis. In other terms, it seems to be clear that it is not possible to get the government out of the pension system (Barr 2002).

[37] For simplicity, since this is a paper concerning pensions and not political or institutional theory, we mention here the role of central economic concepts, such as growth and labor market performance, as if they were totally free from any institutional or political influence.

policy-making game as well as some attributes of the policy itself (such as its credibility and expected durability), can it become a "cooperative" interaction. At the same time, the policy-making game is conditioned by the workings of a set of political institutions (such as Congress, the party system, and the judiciary). These institutions, in turn, rely on some more basic institutional features of historical nature (Spiller and Tommasi, 2003, broader develop this causality).

Concentrating on the characteristics of policy-making process leads to scrutinizing the connection between the kind of transactions that political actors are able to undertake and the possibilities provided by the institutional environment. The dynamic behavior of political actors (in accordance with the dynamic approach to policies that was emphasized before) will primarily depend on the actors' preferences. But, at the same time, their behavior will depend on their incentives, the constraints they face, and on the expectations they have regarding the actions of other players. Therefore, to delineate some characteristics of the different policy-making scenes, it is important to analyze who the key actors are that participate in the process, their powers, their preferences and incentives, their time horizons, the arenas in which they interact, and the nature of the transactions they undertake.

In political environments that encourage intertemporal agreements, public policies will tend to be more consistent, less sensitive to political shocks, and more adaptable to changing economic and social conditions. In contrast, in settings that hinder cooperation, policies will be either too unstable (subject to political swings) or too inflexible (unable to adapt to socioeconomic shocks) and they will tend to be poorly coordinated (IDB, 2006).

### *4.2 The specifics of pension policy and its political implications*

Pension policy has some particular characteristics that make the process of designing and implementing it prone to trouble – and much more so in countries with limited institutional capacity for credible commitment.

Measured by the proportion of public expenditure it usually represents, pension policy is now the largest component of social policy in most developed economies. By the year 2000, pensions represented an average of 12.5 per cent of the EU members' GDP (Eurostat, 2002). That same year, the U.S. spending on pensions explained a third of the whole federal government expenditure (U.S. Census Bureau, 2004). Even if they do not reach the magnitude of the more developed world, pension expenditures in several Latin American countries are very substantial as well, and they have shown persistent growth during the last few decades. As it is well-known, there is a demographic determinant behind these expenditure patterns. As populations age, the elderly represent a growing proportion of the population, creating heavier demands on the working-age population, and so, pension policy becomes a more complex subject to deal with.

Secondly, pension policy has been characterized by a multiplicity of goals, which exhibit some inherent degree of trade-off. Policymakers who design pension systems have to simultaneously provide the best possible benefits to the largest possible number of beneficiaries at the lowest possible cost (Rofman, 2003). In more theoretical terms, even the proper definition of pension policy seems to be a frequent subject of disagreement. Nobody denies that it is in itself an explicit distributive policy; however, there is no such consensus concerning what constitutes the main matter of redistribution, in which way this redistribution has to be accomplished, and among whom the policy is supposed to redistribute. In practice, the distributive function that most pension schemes usually perform is multifaceted, meaning it operates simultaneously on different levels. Probably, the most recognized of these levels is the redistribution of monetary income, which in turn works through multiple stages: intertemporally from an individual point of view, between generations and, most often, intra-generationally. But the design of the pension system also

determines the distribution of rights (access to the system) and a set of risks (demographic, economic, financial, labor market). It has been suggested that pension systems also play a key role in the redistribution of jobs; in an overview of some empirical facts released by 89 pension systems in the mid '90s, Mulligan and Sala-i-Martín (1999) found that three-fourths of them explicitly encouraged retirement in order to be eligible for a pension benefit (including compulsory clauses in half of the cases).

Finally, there is an aspect of pension policy that is unique. It should be taken into account that any pension system, in being a mechanism for distributing rights over the future social output, is inevitably based on some kind of promise (Barr, 2002). The temporal compromise that underlies this promise is absolutely exceptional. From an individual perspective, we are facing the longest time-cycle a single public policy can possibly run. Novice formal workers in their twenties are having money taken from them, in exchange for the promise that the money will be returned in around 40 years. As it is easy to visualize, this cycle fits perfectly with our previous reference to the set of risks pension policy has to manage; there are so many things that could go wrong along those 40 years, that it is no wonder that pension systems are such hot political problems in almost any country.

In short, we are dealing with a policy that i) handles huge relative amounts of money, wherein ii) implicitly resides a sort of "agreement" of outstanding durability, and that iii) must arbitrate several distributive dilemmas of an atypical degree of complexity. In this sense, pension policy (much more than any spot-transactional policy) seems to be particularly suitable in reflecting the significance of having good capacity to perform intertemporal agreements.

But it should be highlighted that the political challenge behind pension policy goes beyond the fulfillment of some specific and well-defined long-term promise. In being such a complex distributional issue, the concrete form adopted by the pension arrangement needs to be politically and socially reshaped over time. Thus, the real challenges reside in having appropriate political configurations to articulate, channel, and control that dynamic process. These political configurations can exhibit a broader or more restricted "institutional density": they can display a different degree of inclusion of relevant actors; they can offer dissimilar time-horizons for these actors (longer time horizons make it easier to enter into the intertemporal agreements necessary to sustain effective policies); they can exhibit either more adequate or more deficient political arenas for interaction; they can assume or exclude more representative and democratic mechanisms of articulating interests; and they can contemplate more or less credible enforcement technologies (such as an independent judiciary, or a strong bureaucracy to which certain public policies can be delegated).

### *4.3 A general picture of the main political characteristics in Argentina and Chile*

This sub-section introduces some generic characteristics of policies in Argentina and Chile and presents some aspects of their policy-making processes that are significant to pension policy. The purpose here is not to demonstrate but simply to illustrate a fact widely accepted in literature – that both countries show different characteristics in their policy-making processes as well as dissimilar abilities to generate and sustain cooperative political games.

What probably constitutes the most notable aspect in differentiating public policy in Argentina and Chile is its degree of stability, reflected both in particular policy areas as well as in the core of their economic strategies. Both from international data sets and from comparative studies, it is quite visible that in the last decades their economic models have exhibited a different degree of constancy. After a comparable pro-market turn realized in the mid-'70s, Chile continued to follow that path while Argentina appeared much more volatile in its central economic decisions.

The unpredictability of economic policy in Argentina has been found to produce high uncertainty costs from economic agents. The greater the volatility of the most important variables, the greater the propensity of the economy to create systematic disequilibria. An economy with such characteristics induces some microeconomic behaviors that would otherwise be absent and, as a result, the harmful influence of macro determinants on micro-structure will be much more permanent and visible (Fanelli and Frenkel, 1994).

At times, volatility in Argentina has impeded the enforcement of policies the country had enacted and has led to self-imposed rigid routines as a means to achieve a little political credibility. An example of this mechanism is the management of inflation. By the late '80s, this problem spun out of control driving the economy toward hyper-inflation episodes – episodes with huge social and political consequences. The new administration, after a couple of failed attempts to control inflation, established the so-called Convertibility regime. The Convertibility was an extremely strict monetary rule that kept the domestic currency tied to the dollar, taking money supply totally out of the policymaker control (with the obvious purpose of positively influencing people's expectations about monetary policy). After some years of apparent success, the rigidity and limitations of this regime became evident and the Convertibility plan blew up in late 2001 in the middle of another huge crisis, with another government leaving office prematurely. In this way, extreme rigidity ended up being a (very high) price to pay for extreme volatility.[38]

Stability is not the only aspect that differentiates policies in both countries. For instance, Stein and Tommasi (2005) have categorized eighteen Latin American countries in accordance to several other features of public policies such as their adaptability, quality of implementation, coordination, public-regardness and efficiency. In that research, as well as in several studies dealing with the measurement of the characteristics of policies in Latin America, Chile consistently ranks at the top of the scale, while Argentina is at the lowest third of the ranking.

Even if it is not possible to achieve a full understanding of any country's political process choosing single "pieces" from its institutional map, we will briefly comment on certain aspects of the policy-making in Argentina and Chile.

The anatomy of political parties, the role of Congress, and the actual influence of governors compose an intricate triangle, which differs profoundly in both countries. Chile has two well-defined major coalitions, the *Concertación* (in office since 1990) and the *Alianza*. The electoral rules highly enforce intra-coalition discipline by reducing the incentive of single parties to leave them, which in turn reduces the number of relevant political actors. In a recent study on the policy-making in Chile, its political party system (and its links with the rest of the political game) was identified as the essential foundation for political cooperation (Aninat *et al.*, 2006).[39] On the other hand, Argentina has also presented two major parties in recent decades. However, the real workings of its political party scene are much more intricate. This is related to the fact that Argentina (unlike Chile) is a federal country made up of 24 provinces with substantial constitutional powers. This difference is far from representing just a formality since the workings of Argentine federalism are extremely complex and constitute a central part of its political scenario.

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[38] As stated, inflation is a recurring source of trouble in Argentina. In 2007, in the context of rising prices, the government carried out a controversial "intervention" in the National Bureau of Statistics (INDEC) with the aim of changing the way inflation was being measured. Every top and middle official in charge of the price indexes and other related surveys was replaced and the methodological changes have not been clarified to this day by the government. This episode suffered high repercussions in the media and the credibility of INDEC data notably decreased.

[39] The authors sustain: "Repeated interaction between the parties not only makes it possible for them to make (and keep) policy deals, but it more importantly creates an incentive for the parties to maintain their ideological "brand names" with the voters – thus constraining the sort of policy changes they align themselves with". (ibid., p. 40). In Argentina, in contrast, ideological brand names of parties have been much more confusing and ambiguous. Perhaps, the most notable image of this was the "switch" performed by President Menem (who belonged to the Peronista Party) in the early '90s when, once in office, surprised everybody – particularly his voters – with a widespread pro-market reform.

Provincial governors have proved to be key political actors, not just in their local territories but in the national political game.

The political weight of Congress is also unequal in both countries. Argentine legislators face high rotation, resulting in a lower level of experience and specialization, and little incentives to become more professional (Jones *et al.*, 2002 and 2003). In consequence, Congress in Argentina has not worked as a crucial arena in policy-making process. The Chilean Congress, in contrast, has been described as unusually professional and competent by Latin American standards, becoming a place in which the relatively prolonged trajectory and expertise of legislators turn into institutional competence (Montecinos, 2003; Santiso, 2006; Aninat *et al*., 2006). A strong Congress, besides being a reservoir of technical skills, clearly becomes a privileged arena where intertemporal cooperative practices can be developed to make public policies more effective and reliable.

The workings of civil service and the judiciary could be seen as another two major institutional nodes in which both countries have shown disparities. A qualified bureaucracy can be important both in its role of implementing public policies and as an additional channel for the intertemporal enforcement of political agreements. Argentina, however, in part due to past political instability, but also to the current incentives of key political players, has not achieved such a professional bureaucracy. Civil service policies in Argentina during the last few decades have been considered erratic; the political views regarding the employment regulation regime have largely fluctuated. In contrast, since the turn to democracy, Chile has carried out civil service reforms through a more gradual and "additive" criterion, in which the different initiatives have strived to combine with their previous accomplishments – causing fewer policy swings compared to other countries experiences (Iacoviello and Zuvanic, 2005).

The judiciary, habitually recognized as a major enforcement technology overseeing a country's political system, seems to also have presented different characteristics in both countries. Iaryczower *et al.* (2002) analyze the decision-making patterns of the Argentine Supreme Court over decades and conclude that it tended to be too aligned with the executive branch, generating a loss of credibility. In a comparative study using Latinobarometer data from 1997, Malone (2003) found that Chileans generally regard their judiciary as more accessible than Argentineans, and that differences about perceptions of efficiency were minor.

Going back to the more conceptual approach used at the beginning of this section, what have been briefly described here are parts of two dissimilar institutional and political configurations that seem to foster cooperative behaviors to a very different degree. Key actors in Argentina seem to have had shorter horizons and worse incentives. Political agreements are weaker, which results in weakened incentives to work towards those agreements in the first place. In addition, the political weakness of Congress has frequently moved the center of the political scene away from the national legislature and toward other informal arenas – ones that have not been structured for the institutional enforcement of bargains (Spiller, Stein and Tommasi, 2003). On the other hand, since the return of democracy, Chile has exhibited stronger mechanisms in its policy-making process. Policy changes have been incremental and, in general, they have resulted as the outcome of a relatively intense and institutionalized political process. In sum, Chile seems to have a policy-making process that tends to facilitate cooperative outcomes in the political transactions game, a dynamic that Argentina has found more difficult to build.

### *4.4 Some concluding remarks*

This section concludes looking at some highlights of the recent pension policy-making in Argentina and Chile. The latest reforms were adopted under quite different mechanisms in both countries. Those different mechanisms seem to match closely with the divergent characteristics of

political processes that have been considered. For that reason, some previous aspects of pension policy in both countries (and the "atmosphere" surrounding pension debate) will be briefly alluded to.

Both Chile's (1980) and Argentina's (1993) original pension reforms were presented as "icons" of broader policy reform processes at their time. Chile's reform was probably the best known of the so-called "modernizations" performed by the military regime. Argentine reform was a significant piece of President Menem's wide pro-market economic policy in the '90s. In being such "icons", the reforms were surrounded by a notable communication battle between promoters and opponents, which ended up being called the "privatization" of pensions. Borzutzky (2002) argued that the pension reform publicity campaign, the most expensive in Chile's history according to the author, "stressed the issues of modernity and self-reliance involved in the new system, as opposed to the politicization, chaos, and crisis involved in the old one" (ibid., p. 217). Also in Argentina the reform was politically introduced as something "up-and-coming" in contrast to the notorious, deficient, and broken old pension system.

But the Argentine reform of 1993 did not completely eliminate the old system; the law that was finally approved, unlike the Chilean system and the President's original proposal, did not close the pay-as-you-go scheme and created a true multipilar model. This phenomenon has not been trivial in the "public" vs. "private" controversy previously mentioned. Despite the fact of its legitimate importance, this singular controversy seems to have dominated all public debates regarding pensions in Argentina. At the time the reform was introduced, authorities explicitly promoted the advantages of the newly created private system of individual accounts and encouraged people to join in, but there was no objective and well-organized informative strategy to educate workers about their choices (Isuani *et al.*, 1995).

As in other policy fields, the *Concertación* governments in Chile have opted for continuity over radical change, and they have consistently supported the new pension system. Since 1990, reforms to the pension system had been minor, mostly affecting the investment regulations. Only in recent years the question of coverage emerged as a critical problem and became the center of policy debates.

On the other hand, in Argentina the terms of the discussion concerning pension system have persistently survived and the "privatization" has been the axis where the political and public debates have frequently rotated. In fact, the main message transmitted by authorities with regards to the 2007 and 2008 reforms has been that workers would "recover" the possibility to switch from the "private" to the "public" system in 2007 (which before was not an alternative), and, in 2008, that the reunified State managed scheme would provide better benefits to retirees.

In conclusion, the processes underlying the recently passed reforms in both countries are clearly different and resulted in different systems. Pension reform has been recognized as a process that requires careful and thorough technical analysis, as well as communication strategies in order to build support and consensus (IDB 2007). In that sense, in March 2006, Chile's President created a Presidential Advisory Council on Pension Reform to review the system performance, study its most important deficits, and carry out a extensive process of public hearings which lasted 90 days. The Council – which was made up of respected specialists in the field – produced a full assessment and proposed several reforms. Subsequently, the government established a Committee of Ministers to assess the Council's recommendations, the outcome of which was a comprehensive proposal for pension reform that was submitted to Congress and approved in January 2008. On the other hand, most of the recent reforms in Argentina have had limited analysis, and were approved either by decree or by laws that Congress approved with no inputs from experts, civil society or representatives of interest groups, and with little debates among legislators.

## 5 Conclusions

Argentina and Chile are among a few countries in the region that have traditionally pioneered the implementation of reforms in social policies. The two countries are among a small group that introduced pension systems in their legislation in the early 1900s, and then advanced through different stages including more workers. In 1980, Chile pioneered again by introducing a structural reform that, among other important changes, created a privately run system of pension funds. Argentina, with some differences, followed Chile's model a decade later, when the traditional PAYG scheme was converted into a multipilar system.

The pioneering tradition continues at the end of the first decade of this Century, as both countries introduced important reforms to their pension system once more. This time, the reforms clearly shared some objectives, such as the expansion of old-age coverage and a redefinition of the role of the State in ensuring ample access to benefits. However, there were important divergences in other aspects, including the institutional organization, partially due to differences in political views and policy making processes.

The reforms in Argentina resulted in a sharper, immediate and dramatic increase in coverage and the role of the State. The number of pensions grew by 50 per cent within one year due to the introduction of a generous inclusion program, that allowed anyone past retirement age to apply for a benefit, regardless of their past contributions or even their current status as beneficiaries.[40] Also, the reforms resulted in the reversal of an important component of the 1993 system, as the system management was unified under a public agency (thus, closing down the private management industry), individual accounts eliminated and the prevailing model went back to a defined benefit scheme. However, it is important to note that these changes did not represent a return to the pre-1993 situation, as most parameters of the system (including contribution rates, retirement age, and replacement rates) were not reinstated at the old levels, and the PAYG agency will continue to receive earmarked general taxes (originally assigned to finance the transition costs). Thus, it is likely that this agency will manage a growing fund, representing more than 10 per cent of GDP as of 2008. So far, there have been no official estimates of the fiscal impact of the reforms, either in the short or medium term.

In Chile, instead, most reforms will have a gradual effect over time. The number of beneficiaries of the new "Solidarity Pillar" will be limited, but it will increase as the system is fully implemented. This is clearly the most important component of the new law, which should result in a nearly universal coverage of the pension system in the near future. Other reforms affect the operational aspects of the existing system, and the institutional structure of the supervisory and implementing governmental agencies. Also, a number of changes aimed at eliminating some inequities in the system, especially with regards to gender differences where introduced in the system.

The design and approval of these reforms followed a very different process in each country, as a consequence of the prevalent political and institutional context. The Chilean reform started when President Bachelet announced her intention, and set up a Council of experts. Two years later, after many debates, publications and analyses, the law was approved. In Argentina, most decisions were taken rather quickly at the highest level of the Government, and debates were limited and very short. These differences are probably a contributing cause for the different results and, as such, are worth of further study and analyses.

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[40] As the program advances, a restriction to limit duplication of pension benefits was introduced, but it did not include restrictions for those receiving a survivor's benefit.

The slower and stepwise approach taken by Chile's authorities will probably ensure more sustainable and better calibrated results for their reforms than in Argentina. On the other hand, the bolder, faster reforms of Argentina resulted in an immediate response to a current problem. Most elderly excluded from the system received a pension benefit within a year, improving their welfare immediately, while in Chile the process to reach all beneficiaries will be more gradual.

Clearly, neither system has reached a "final" design, as there are remaining policy challenges that authorities will need to consider in the near future, and new problems or issues will probably emerge in the future. The ability of future governments to respond adequately to these challenges will certainly define the well being of future generations of Chileans and Argentines.

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# PENSION FUNDS' CONTRIBUTION TO THE ENHANCEMENT OF AGGREGATE PRIVATE SAVING: A PANEL DATA ANALYSIS FOR EMERGING ECONOMIES

*Ernesto Rezk,[*] Mariano Irace[*] and Vanina Ricca[*]*

## 1 Introduction

As of the eighties, and later in the nineties, several countries in Latin America began to assess the convenience of substituting existing PAYG earning related pension schemes (as it happened with Chile's pioneering reforms) or adding (as in Argentina) privately managed fully funded pension systems – based on individual capitalization accounts – leaving on contributors hands' (labour and self-employed workers) the decision on the preferred system.

In some cases, the switch took place all of a sudden following bankruptcy situations faced by PAYG regimes, whose causes could be traced back to sharp inflationary processes and economic and demographic unbalances dwindling to unbearable levels the workers/retirees ratio and increasing existing pension regimes' deficits; the massive incorporation of beneficiaries (especially self-employed) through *ad hoc* plans amounting to a bail out[1] and the channeling of pension resources to general fiscal revenues, in order to deal with the important deficits originated by a growing public spending and the difficulties in tax collection and public financing, must also be accounted for at the moment of explaining the collapse of unfunded pension schemes.

Nevertheless, it needs to be acknowledged that a widespread fall in saving rates occurring by the time in many Latin American countries, must also be acknowledged as an important motivation underlying substantial changes in pension systems, as the idea prevailed that the accumulation of pension fund assets would definitely encourage aggregate savings (Bailliu and Reisen, 1997) and contribute also to enlarge domestic capital stock markets (Reisen, 1997; Raddatz and Schmukler, 2008).[2]

The economic appeal that individual capitalization schemes have upon policy makers, especially for their expected positive impact upon saving rates, must however be revised in the light of the very often ambiguous results found in the literature devoted to the analysis of several countries' recent experience. Thus, while some analysts of the micro and macroeconomic performance of pension systems conclude that fully funded pension schemes definitely contributed to enhancing private saving in countries like Chile and Singapore others find running counter evidences for Malaysia (see for instance Corsetti and Schmidt-Hebbel, 1996; Morandé, 1996 and Faruqee and Husain, 1994).

In the context of the American economy, Feldstein (1974) also analyzed the impact upon individuals' decision on saving of introducing social security systems; by resorting to a life-cycle model, his econometric estimations showed that social security funds depressed personal savings.[3] Nevertheless, Feldstein also explored the implications of using an "extended life-cycle model", allowing people to continue working after the age of 65 and in which the net impact of social security regimes upon aggregate savings fell short of being unambiguous.

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[1] Those programmes, known as "moratorias", permitted contributors to enjoy the benefits after a limited number of years of contribution (smaller than the 35 legally required).

[2] The paper by Raddatz and Schmukler is a particularly interesting one as the authors aim at shedding light on the very interesting debate of how pension funds affect capital markets development.

[3] Mainly based on the rational of a PAYG system, the idea was that the need of counting with savings for future consumption was averted by retirees' guaranteed benefits financed through previously collected social security taxes.

It is to be noticed that the existing theoretical controversy with regard to the real impact of individual capitalization upon saving rates and capital formation is related to the Life-cycle Model's nature, whose conclusions sensitively react to changes in assumptions held, but also to the type of pension system referred to. Bailliu and Reisen's paper (1997) is in this regard worth mentioning as these authors also stressed the ambiguity of pension fund assets' effect upon saving depending for instance on whether there were taxed returns or liquidity constraints, for what they concluded that the sign of the relation between pension fund assets and saving was a matter of empirical resolution.

The empirical treatment of the subject also poses interesting challenges, as shown by econometric attempts forced to deal with the problem of a scarce number of degrees of freedom, this being explained by the relatively short existence of main fully funded pension regimes in the world and the consequent recourse to statistical series yielding information only for a limited number of periods. Grouping data for a set of countries and estimating coefficients by means of a fixed effect panel data model, in order to reflect included countries' specificities, becomes therefore an alternative to sort out the mentioned difficulty.

In the light of preceding paragraphs' content, the paper aims at carrying out an analysis of pension regimes based on individual capitalization (fully funded pensions) implemented since the eighties in six Latin American countries: Argentina,[4] Chile, Colombia, Mexico, Peru and Uruguay, in order to ascertain whether they were conducive to increasing aggregate saving and substantially or somehow helped to strengthen domestic capital stock markets. In pursuing the mentioned objective an updated version of the Life-cycle Model is used to provide the econometric model's theoretical background; finally, it is expected that the econometric estimation of the effect of pension fund assets, as well as those stemming from other economic and demographic variables, upon the selected countries' saving rates, will also serve the purpose of yielding conclusions with economic policy implications on the performance of fully funded pension regimes.

The remainder of the paper is structured as follows: Section 2 provides a review of stylized facts in all the six countries; Section 3 presents a theoretical analysis of the life-cycle framework including social security; Section 4 conducts a fixed effect panel data model's econometric estimation and analysis of results; and Section 5 concludes. An Appendix is included in which main features of domestic individual capitalization regimes are outlined.

## 2 Review of stylized facts

The review of the fully funded pension regimes in all the six countries chosen, as well as the analysis of determined features of their investment portfolio structure and the evolution of some other related variables and indicators is intended to shed some light on individual capitalization' performance in the Region following something more than a decade since it came into being.[5]

A first feature deserving a comment is the relative size and evolution of pension fund assets, in terms of gross domestic product, as depicted by Figure 1.

Although an increasing path is observed in all cases, differences emerge once countries are individually considered; thus, while the ratio reached more than 50 per cent in Chile only in

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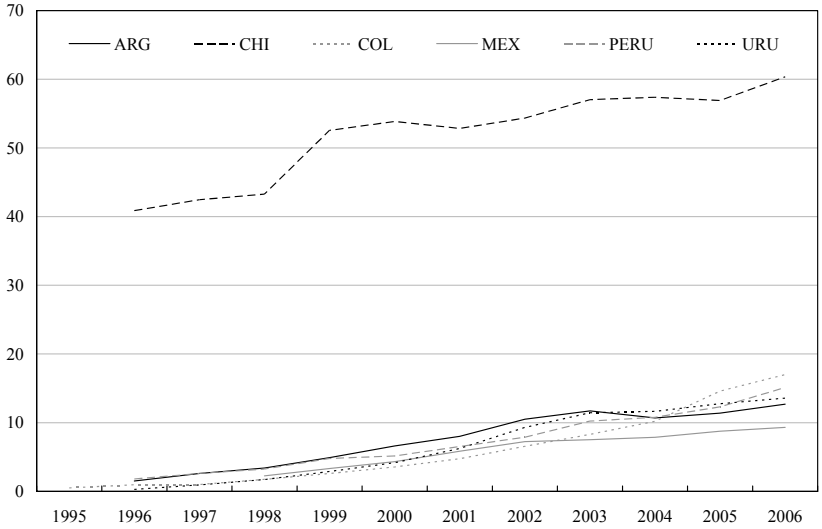
[4] As is publicly known the Argentine Congress enacted, in November 2008 and following a project received from the Executive Branch, a law that stopped the privately managed fully funded pension scheme based on individual capitalization. From that moment on, the ANSES (Social Security National Administration) already managing the PAYG regime, took over exclusive responsibility for the collection of all social security taxes and the payment of pension benefits.

[5] Except for Chile, where the system dates from 1980.

**Figure 1**

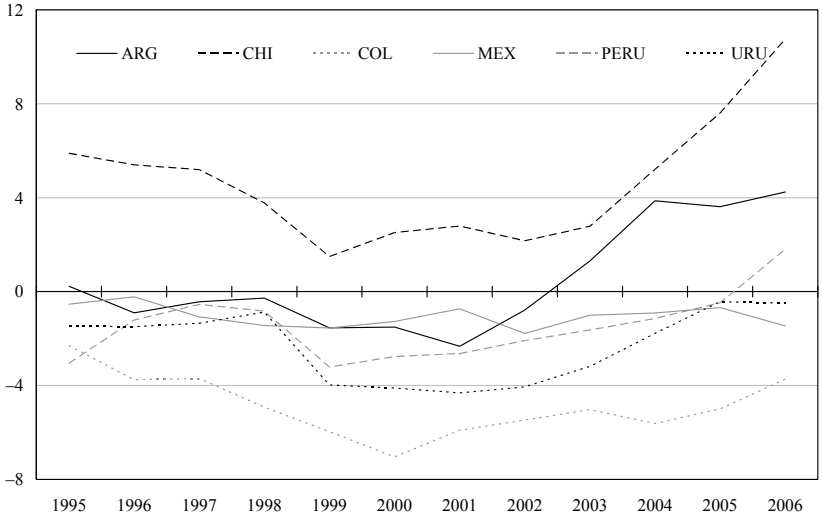
**Pension Fund Assets**
*(percent of GDP)*




Source: Data from FIAP (International Federation of Pension Fund Associations) and national series.

**Figure 2**

**Budget Surplus/deficit**
*(percent of GDP)*




Source: International Monetary Fund Financial Statistics.

Colombia, Uruguay and Argentina it climbed over 10 per cent[6] in the 1995-2006 period. Two main reasons can be accounted for in explaining differences in percentages: in the first place, individual capitalization started much earlier in Chile for what the regime exhibits more maturity;[7] in the second place, individual capitalization is mandatory in Chile and Mexico whereas PAYG regimes in Argentina, Colombia and Peru have not been eliminated and compete with the former as people are allowed to choose. Uruguay presents in turn an interesting situation as inclusion in either of the two regimes depends on individuals' scale of income or wages.[8]

An analysis of the evolution of government budget surpluses is next in order, since the model to be presented below in Section 4 suggests a negative relationship between pension fund assets and this variable. Except for Argentina and Peru, as of 2003 and 2006 respectively, Chile was the only of the six countries exhibiting an outstanding budget surplus throughout the

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6 With an average of 6.8 per cent for the remainder five countries.

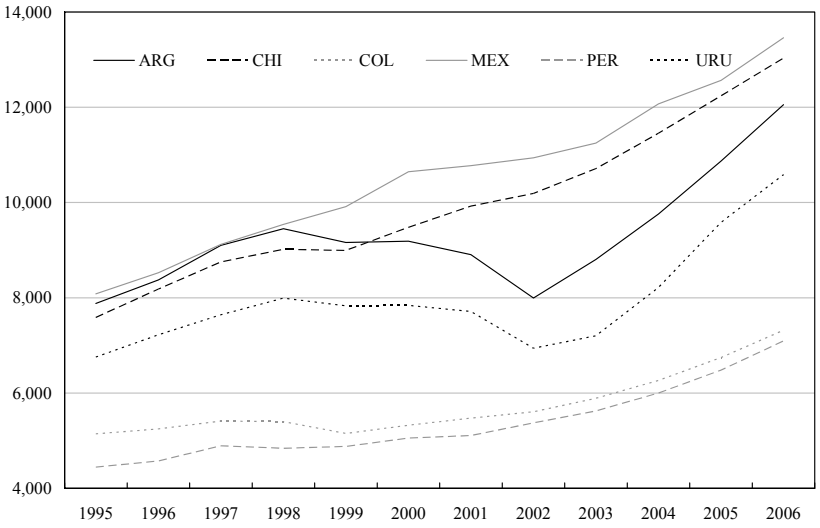
7 Nevertheless, the assets' yearly percentage growth is higher in the other five countries as suggested by Bailliu and Reisin (op.cit., p. 23) due to the fact that, by being more recent, they have greater contributors/retirees ratios.

8 People can however express their decision to be included in one of them.

period considered (Figure 2), due to a sound fiscal discipline and the setting of debt targets and stabilization funds following the effect of favourable cyclical conditions for Chilean copper exports. Contrariwise, persistent fiscal deficits were the prevailing situation in the rest of countries, save for the already mentioned exceptions.

**Figure 3**

**Income per Capita**
*(purchasing power parity)*




Source: International Monetary Fund Financial Statistics.

The mentioned disparities regarding public sector saving are somehow reflecting price behaviour in the region; thus, whereas Chile,[9] and to a lesser extent Colombia and Peru achieved a gradual reduction in their inflation levels to around an annual 3 per cent increase, Argentina (leaving behind the extreme price stability of the Convertibility period) and Uruguay, had more inflation than the rest and did not show evidence of theirs curbing the pattern of sustained price increases.

With regards to another of the variables included in the econometric model, persisting inflationary levels caused that Argentina began experiencing decreasing real interest rates (and even negative figures in 2005 and 2006); however, positive real rates of interest prevailed during the period in the rest although variability in time showed notorious differences among countries.

Two alternatives were in turn considered for assessing income per capita's performance in the six countries, variable whose importance resides in that the theoretical framework suggests a positive relationship with saving rates:[10] income per capita measured in current dollars and income per capita in purchasing power parity (seeking data to be comparable among countries); the second variant seems more appropriate for the analysis as it is to be expected that income measurement should somehow reflect individuals' average purchasing power.

As shown by Figure 3, the income per capita similarly evolved in all the six countries, although in Colombia and Peru the variable exhibited, in absolute terms, much lower levels than the rest with figures only averaging 60 per cent of the other four countries' income per capita (61 per cent in the case of Colombia and 57 per cent for Peru).

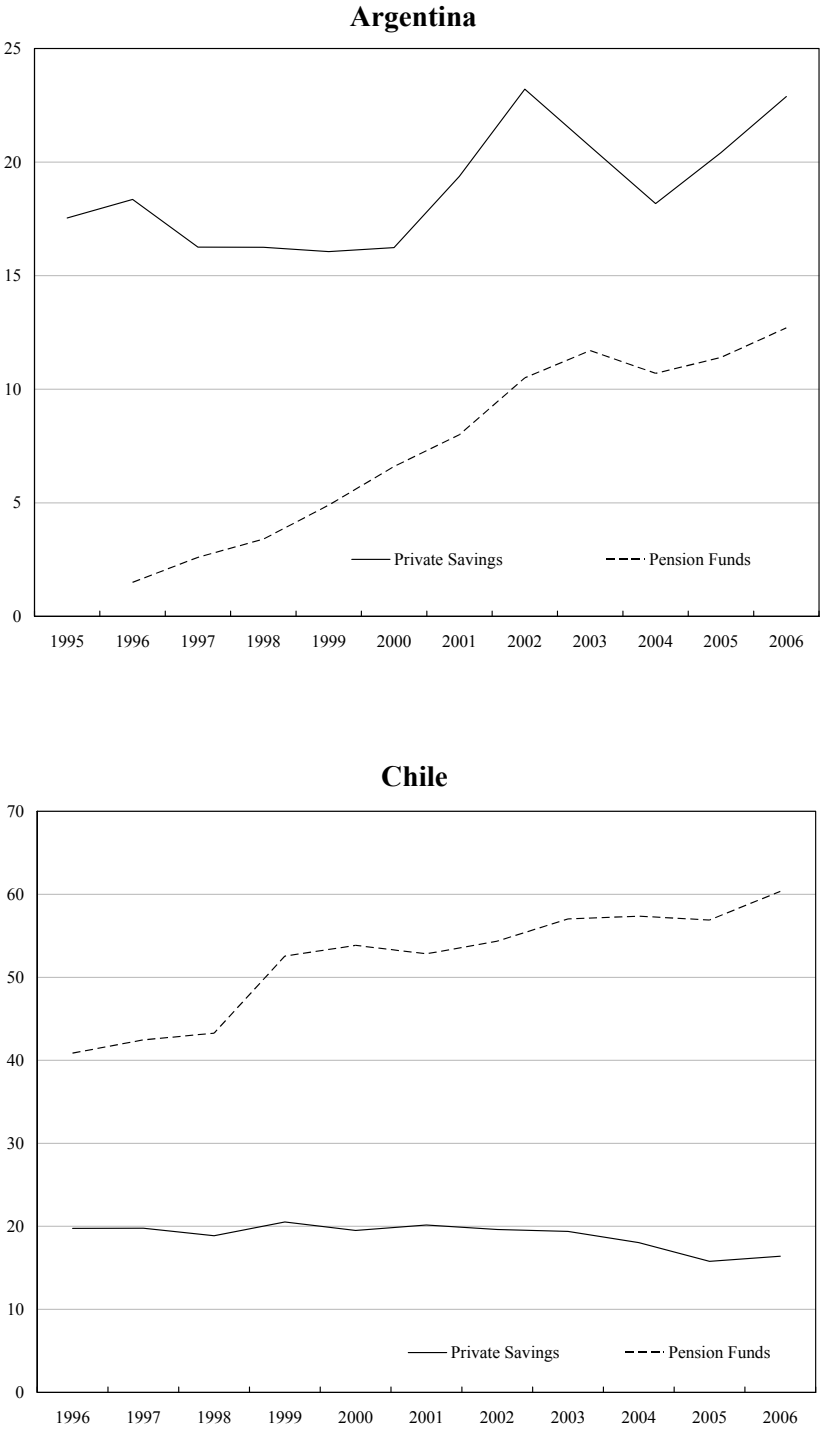
It must be borne in mind, in order to better analyze the relationship between pension fund assets and aggregate savings, that let alone Chile whose individual capitalization regime began much earlier in 1980, the implementation took place in the middle of nineties for the rest of

[9] Chile is, together with Brazil, a clear example of inflation targeting in Latin America.

[10] Without much need of emphasis higher income levels give more room to save once basic needs are taken care of.

**Figure 4**

**Pension Fund Assets and Aggregate Private Savings, by Country**
*(percent of GDP)*




Source: International Monetary Fund Financial Statistics (IMF) and national series.

countries.[11] As will be seen below, this caused an impact on the variables in two ways: the size of the fund relative to gross domestic product and the probable impact of pension funds upon private savings.

Figure 4 features the importance of when the regime was started upon the fund's relative size; thus in Chile, where the regime creation dates from 1980, pension fund assets reached 40 to 50 per cent of gross domestic product, whereas in the newer systems figures normally range from 0-3 per cent, at the beginning of the period to 10/12-15/20 per cent in 2006. It is also worth mentioning that, apart from being the first implemented regime, the mandatory and exclusivity features of the Chilean system must also be accounted for at the moment of explaining the relatively major size reached by its assets.

Figure 4 helps also to visualize the impact of pension funds upon aggregate saving, which will be later econometrically proved in Section 4. Conversely to Chile and Uruguay, where there seems to exist – *prima facie* – a negative relationship between both plots, in the

[11] Peru in 1993, Colombia in 1994, Argentina and Uruguay in 1995 and Mexico in 1997.

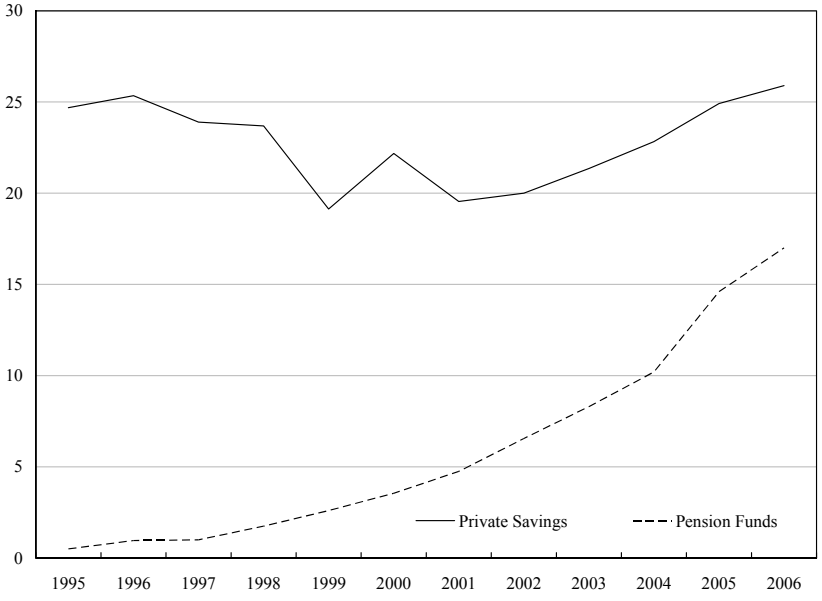
rest of countries the graph shows that pension fund assets clearly dragged aggregate savings, the effect being more visible generally as of the fifth year of the regime implementation. Argentina is in particular a worth quoting case as aggregate private saving kept stable between 1997 and 2000 although gross domestic product shrank in these years as a consequence of an industrial recession lasting until 2001; it can be inferred therefore that the sustained growth shown by pension funds somehow helped to compensate a fall in savings that would otherwise happened following the reduction of income.

As for the supposedly paradoxical Chilean case, the explanation can again be sought in that, due to the earlier regime implementation, the effect must have been stronger in the eighties when restrictions on foreign investment by the new pension funds existed.[12] In short, the stagnation and consequent small fall in aggregate savings in percent of gross domestic product must be looked at in the light of the

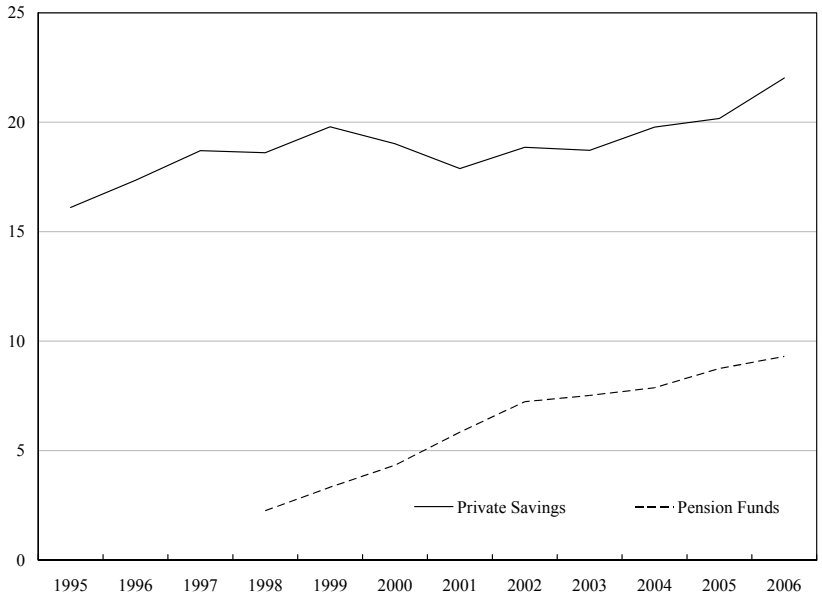
**Figure 4 (continued)**

**Pension Fund Assets and Aggregate Private Savings, by Country**
*(percent of GDP)*

**Colombia**




**Mexico**



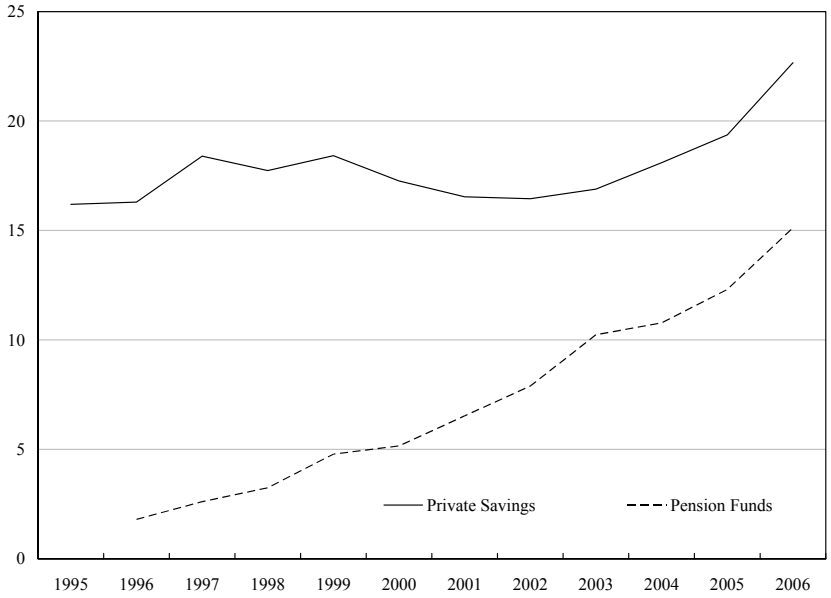

Source: International Monetary Fund Financial Statistics (IMF) and national series.

[12] While Fontaine (1996) recalled that until 1989 Chilean regulations banned any international diversification of pension funds, Reisen (1997) in turn asserted that this restriction was crucial in explaining why the Chilean domestic capital market grew in size and depth despite an internal climate of debt crisis and uncertainty.

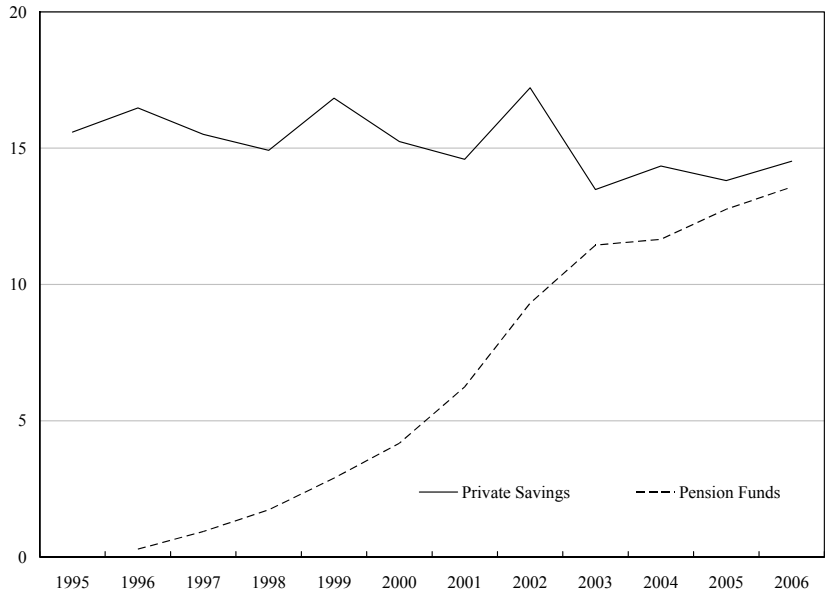
**Figure 4 (continued)**

**Pension Fund Assets and Aggregate Private Savings, by Country**
*(percent of GDP)*

**Peru**




**Uruguay**




Source: International Monetary Fund Financial Statistics (IMF) and national series.

banning lift in foreign investment, which is in turn confirmed by the figure showing the latter's incidence in portfolios.

In seeking next an explanation for the Uruguayan case, the saving plot's pattern must somehow be reflecting a feature of the implemented system which notwithstanding the fact that it is mandatory for certain wage earner groups, inclusion by default is based on the individuals' income scale.

The variations and lack of similarities in portfolio structures, as shown by Figure 5, are the best examples of differences, in many cases significant ones, that can be found in national legislation concerning how pension fund assets can be invested. In particular, and even if it is taken for granted that public bonds will always be important part of portfolios, countries often place a limit to their share in investment composition.[13] Despite this, countries have somehow managed to find shortcuts to the mentioned limitations, as it is particularly noticeable in the case of Argentina, whose legislation banned

[13] See National Legislation in the Appendix to this paper.

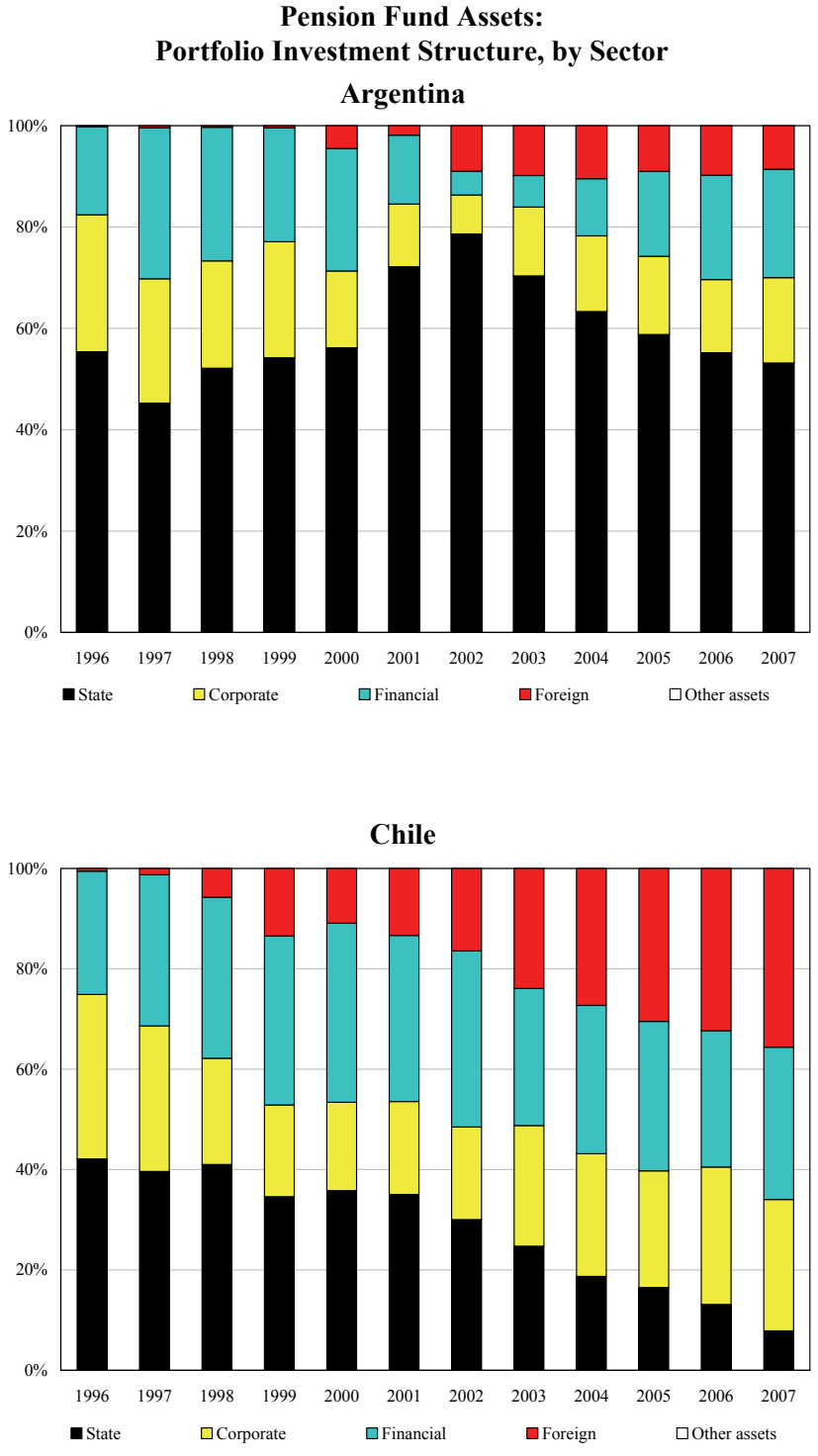
pension funds to invest in public bonds beyond 50 per cent of the whole portfolio. Fiscal matters and the restructuring of public debt must be borne in mind when the excessive government bonds' participation in pension funds is analyzed in Argentina; in particular, severe credit restrictions preventing the access to foreign and domestic financing led the authorities to resort to pension funds which became forced lenders.

As for the rest of countries, Chile and Peru exhibit public bonds' lesser shares but while in the former the evolution shows a downturn trend there is an increasing participation in the latter country. The cases of Mexico and Uruguay are also noticeable in that public bonds participation in portfolios is practically overwhelming[14] whereas Colombia reflects in turn the average situation of around 45-50 per cent.

Figure 5 permits to observe that the participation of other portfolio components also fell short of being stable, or similar among countries, throughout the period considered. In general, there has been a tendency, on the part of

**Figure 5**

**Pension Fund Assets:**
**Portfolio Investment Structure, by Sector**

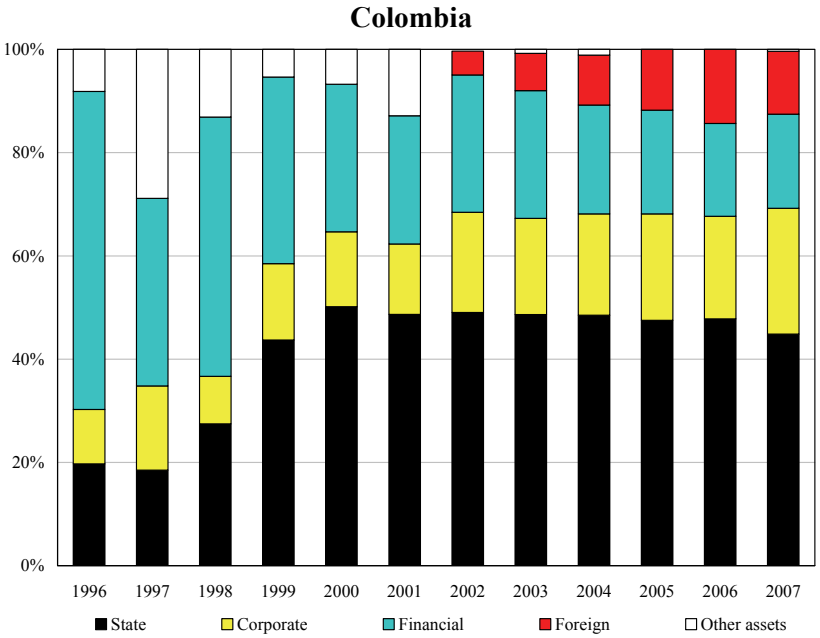


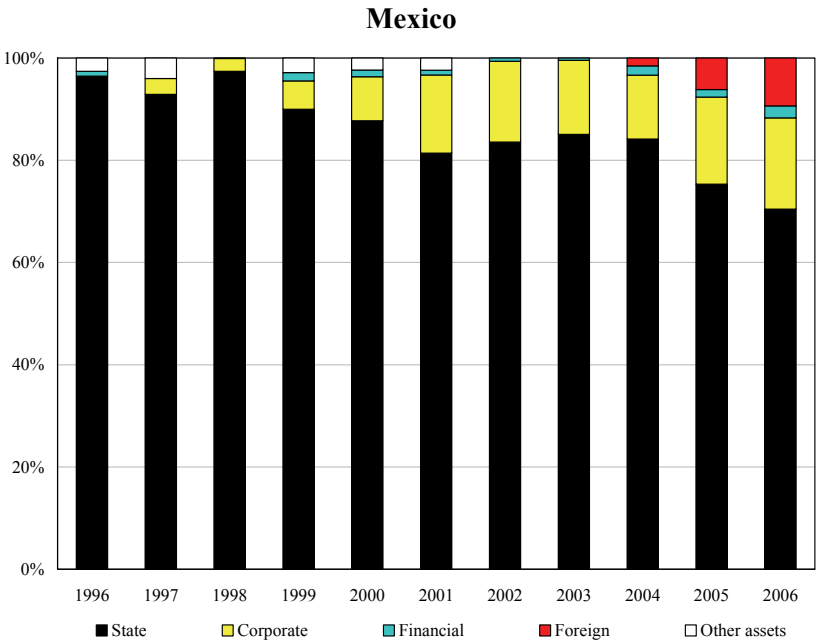

Source: FIAP (Federación Internacional de Administradoras de Fondos de Pensiones).

[14] Investment of Mexican pension funds in government bonds represented more than 90 per cent in 1997, although they later stabilized in around 70-80 per cent for the rest of the period; the opposite took place in Uruguay as the initial participation rounding 60-80 per cent climbed to 80-90 per cent by the end of the considered period.

**Figure 5 (continued)**

**Pension Fund Assets:**
**Portfolio Investment Structure, by Sector**




Source: FIAP (Federación Internacional de Administradoras de Fondos de Pensiones).

pension funds and except for Uruguay, to increase investment in foreign assets shares although at a slow rhythm and reaching a level that rounded 5 to 10 per cent of total. Chile is however the worth stressing case here as, following the end of the initial banning over pension funds' international diversification of portfolios, foreign assets started to climb reaching to date more than 35 per cent of all applications.

Financial investments by pension funds both exhibited an irregular performance among countries as well as a marked cyclical behavior in the period; except for the case of Chile where they have had a very stable share within the portfolio, with moderate variations within a 25-30 per cent interval, investment in financial assets showed marked cyclical variations in Argentina, Colombia, Peru and Uruguay whereas their participation was negligible in the case of Mexico. Similar conclusions can in general be drawn for the case of firm shares, although in this case Peru was the only country in which the latter's participation kept stable around 40 to 50 per cent of the total public fund's portfolios.

Lack of uniformity among countries is also a prevailing feature concerning the level of fees[15] perceived by pension fund groups (Graph 6), despite the fact that the evolution towards smaller figures is common to all cases; fees' decreasing paths are more notorious in Chile and Argentina than in the rest and only in Colombia stable levels prevailed in the period.

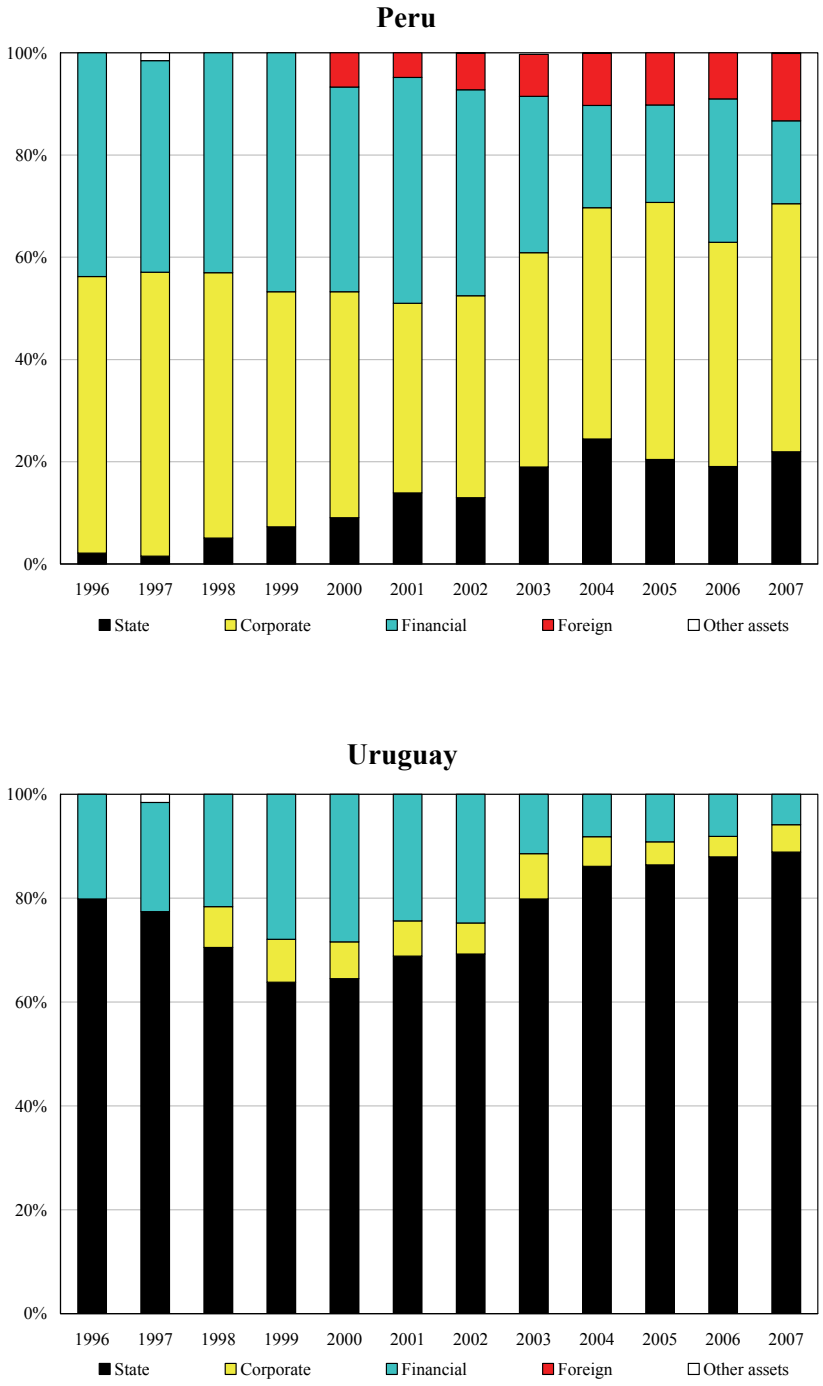
Fees' higher initial levels have normally been explained by the need to face major marketing and operational costs that firms managing pension funds incur when the system begins in a determined country. Once the regime is established, pension funds gradually start to compete to attracting new customers and the level of fees becomes thus one of items regarded by potential new entrants at the moment of choosing a pension fund.

## 3 Theoretical analysis of the life-cycle framework including social security

Theoretical backgrounds based on the

**Figure 5 (continued)**

**Pension Fund Assets:**
**Portfolio Investment Structure, by Sector**

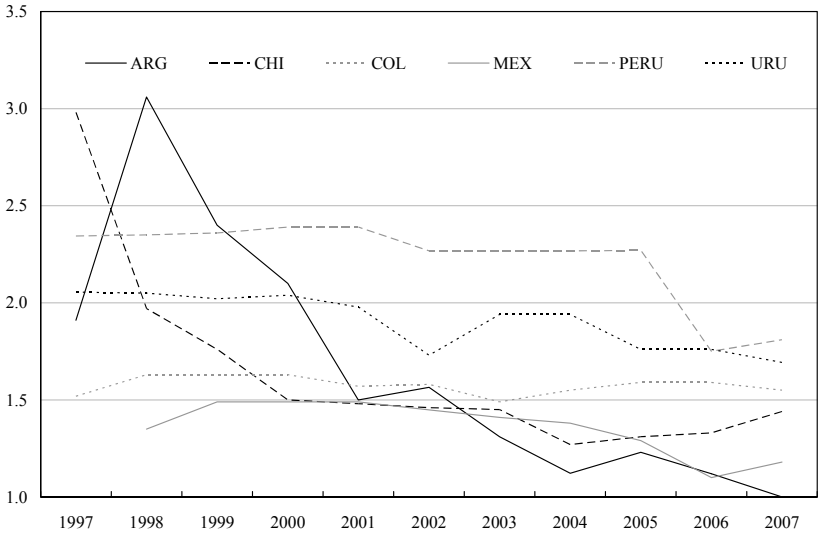



Source: FIAP (Federación Internacional de Administradoras de Fondos de Pensiones).

[15] Fees amount to a percent of the wage earned by workers and are supposed to embody the pension funds firms' operational cost expenses and benefits.

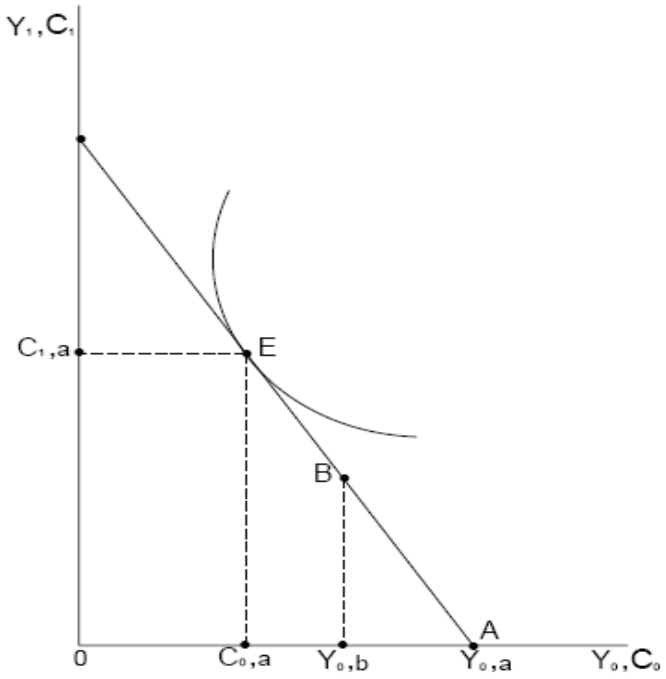
**Figure 6**

**Variabile Fees**
*(percent of wage)*




Source: FIAP (Federación Internacional de Administradoras de Fondos de Pensiones).

**Figure 7**




"life-cycle hypothesis" were generally resorted to in order to analyze the impact of social security systems upon savings. The idea, originally due to Modigliani and Brumberg and later summarized and extended in the paper by Ando and Modigliani (1963), basically states that an individual consumer's utility is a function of his own aggregate consumption in the current and future periods. As is to be expected, the approach emphasizes that individuals maximize consumption subject to their budget constraint; that is, subject to their lifetime resources, which in turn are the sum of current and discounted future earnings and current net worth.

In simple graphical terms,[16] and assuming a consumer whose life lasts two periods: a working period in which he earns wages and/or other incomes and a second one in which he retires from working and ceases having incomes, the situation is represented in Figure 7.

While $Y_0$ and $C_0$, on the horizontal axis, respectively stand for the individual's earnings and consumption in period 0, Y1 and C1 in turn

[16] This diagrammatical analysis highly relies on Feldstein (1974).

represent income and consumption in period 1. Assuming that the individual only receives earnings during his working life ($Y_{0,a}$), and that there is neither social security taxes nor pension benefits, ($C_{0,a}$) will indicate the desired level of current consumption resulting from the tangency between the utility function and the budget line; the individual's saving decision in the pre retirement period – amounting to ($Y_{0,a} - C_{0,a}$) and resulting from the rate of interest implied by the slope of the budget line and the current income and consumption – allows him to enjoy a level of consumption equal to ($C_{1,a}$) in period 1.

Figure 7 also permits to analyze how the introduction of social security regimes,[17] whose benefits are financed by collecting social security taxes, affects individual's savings. The collection of a tax immediately causes the current disposable income to reduce by the amount of the payroll tax, in this case ($Y_{0,a} - Y_{0,b}$) and savings to dwindle also to a new level equal to ($Y_{0,b} - C_{0,a}$); nevertheless, the equilibrium position indicated in E still holds as, by keeping unaltered the original budget line and its slope, benefits paid in the second period (out of capitalized taxes) will still guarantee the consumption level ($C_{1,a}$). The assertion of savings' reduction seems thus to be correct and based on the following two accounts: the reduction of disposable income and the ultrarational idea that payroll taxes are perfectly substituting the impact of private saving fall upon future consumption.

The implication that social security regimes always have a negative impact upon savings has not however gone unchallenged in the related literature, as soon as one departs from the framework of analysis provided by simpler versions of the life-cycle model. Feldstein (1974) himself quoted authors' yielding empirical evidence on that people covered by fully funded regimes save even more than those uncovered individuals, based on a "recognition effect"[18] emerging when people entering a private pension plan realize the benefits of saving for their old age (educational effect) and change their utility function, or a "goal gradient hypothesis"[19] whereby efforts are intensified the closer people are to set goals.

Nevertheless, the dual effect of social security systems upon saving levels has appropriately been analyzed by Feldstein (1974), as shown in Figure 8, whose crucial contribution was to extend the traditional life-cycle model in order to allow for endogenous retirement ages.

As can be seen, the budget line's parallel displacement AN denotes the fact that the individual decides not to retire at the age of 65 and earns also incomes in period 1;[20] the situation regarding consumption and saving will now be $C_{0,c}$ and ($Y_{0,a} - C_{0,c}$) respectively whereas E' indicates now the new equilibrium position. By assuming that a social security system is introduced, forcing the individual to retire at the age of 65, it is easily noticed that the situation reverts to point B in Figure 8 since the social security tax reduces period 0's disposable income and the compulsory retirement makes no possible to have earnings in period 1.

Since the situation indicated by B means that E is still the equilibrium position for consumption, the resulting saving level ($Y_{0,b} - C_{0,a}$) will in this case be larger than ($Y_{0,a} - C_{0,c}$) showing what Feldstein termed as the dual effect of social security; that is, when individuals retire at the age of 65, social security taxes have the unambiguous effect of reducing saving while for those working beyond 65 social security systems may induce early retirement and the effect of benefits upon savings will in this case be ambiguous.

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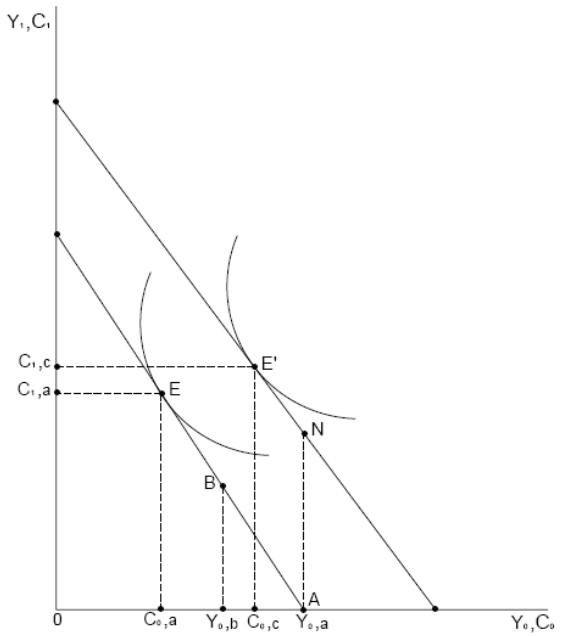
17 As will be shown, results more clearly depict the case of unfunded PAYG regimes.

18 First stated by Cagan (1965).

19 See Katona (1965, p. 4).

20 As Feldstein (1974) stressed it, N stands for the individual's initial position with incomes in the second period in addition to keeping the same earnings in period one (point A).

**Figure 8**




A very interesting theoretical analysis of the impact of voluntary and mandatory fully funded pension schemes was in turn provided by Bailliu and Reisen (op. cit.) who extended the traditional life-cycle model by allowing for the possibility of heterogeneous individuals, in terms of their saving capacity and of liquidity restraints.

By modifying Figure 7, for homogeneous individuals, a scenario with low and high income earners[21] is presented in Figure 9 in which hypotheses of limited and unlimited tax exempt pensions, and taxable and tax exempt returns, are successively considered in order to assess the impact of fully funded pension funds upon savings.

**Figure 9**

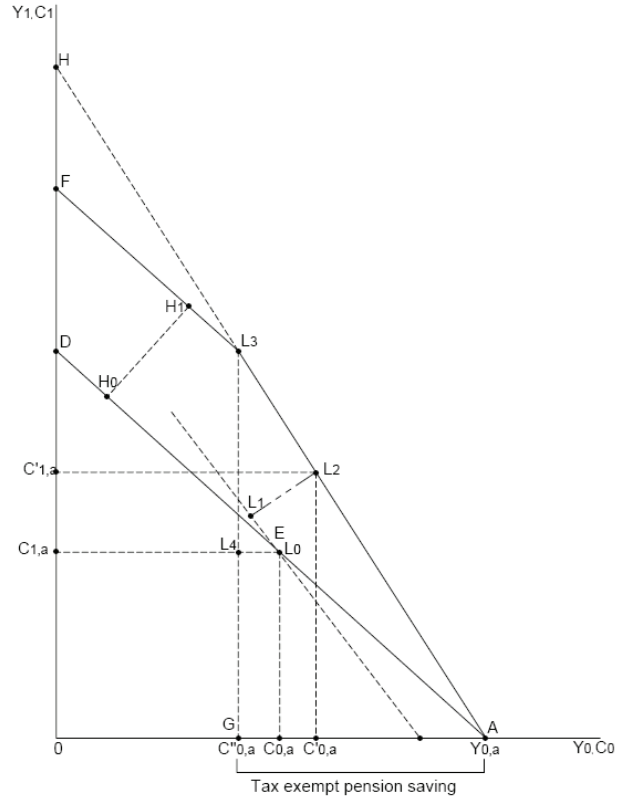



Figure 9 exhibits several modifications relative to the case shown earlier and developed by Feldstein: in the first place, while the budget line AD stands – as before – for disposable income, the new kinked line AF resulting from introducing a fully funded system with pension contributions only untaxed up to a determined amount depicts how untaxed

[21] Needless to emphasize, the implication of having heterogeneous agents is that low income persons save little or lesser than high income ones.

returns raise income more steeply for low savers ($AL_3$ line) whereas tax exempt incomes for high savers is indicated by the parallel displacement of the budget line over the section $L_3F$.

If a voluntary pension fund regime, with untaxed contributions limited up to AG, is established, low savers' final decision on consumption and saving will result from substitution and income effects: on the basis of the former one, a displacement over the broken line parallel to the new budget constraint will take place between $L_0$[22] and $L_1$, influenced by the higher rate of interest implicit in A $L_3$ whereas the income effect will be in turn responsible for the motion towards $L_2$. The outcome clearly shows that the impact of voluntary pension fund systems upon savings, when there exists a limit to low savers' untaxed contributions, falls short of being unambiguous: in the case drawn, the income effect prevailed over the substitution effect, consumption increased from $C_{0,a}$ to $C'_{0,a}$ and saving consequently shrank; should substitution effects had succeeded in stimulating savings, consumption would have ended somewhere to the left of $C_{0,a}$. As, by keeping unchanged the interest rate in the budget line relevant section, high savers' decision will only be influenced by the income effect ($H_0$ to $H_1$) and consumption and savings will increase and fall respectively for what, and given their relatively higher economic weight, the overall result will undoubtedly be a saving net fall.

Voluntary funded pension regimes hold however the chance of promoting savings when limits on untaxed contributions are abolished or not set, as indicated by the broken section $L_3H$ of the budget line; in such a case, substitution effects may influence both the behaviour of low and high savers, and prevail over income effects, making a net increase in savings a likely result.[23]

Figure 9 permits also to show Bailliu and Reisen's assertion that savings unambiguously grow when a mandatory pension fund system, with taxable returns, is resorted to as the chosen social security regime. When contributions to the fund are mandatory low savers will displace from position $L_0$ to $L_3$, if pensions are tax exempted and to $L_4$ if they are not; in either case, the new consumption level will be $C''_{0,a}$ and the saving level will be greater than the ones implied by $L_0$ or $L_2$ over the respective budget lines. In terms of total net savings, compulsory pension funds with taxable returns are a good option as the mentioned low savers' increase in savings will not be impaired by the behaviour of high savers who, in not having the influence of income effects, will choose to stay in $H_0$.

In furthering the analysis of pension funds' impact upon aggregate savings, Bailliu and Reisin (op.cit.) introduced the case in which liquidity constraints strengthen mandatory pension funds' capability of increasing private savings, as shown by Figure 10.

Figure 10 depicts a mandatory pension fund, with taxable returns, in which liquidity constraints are highlighted by the dotted line passing through $L_3$ whose slope, higher than $AL_3$, stands for low savers' borrowing costs. If the regime forces the individual to place himself at $L_4$, as indicated above when pensions are taxed, he could only move to consumption level $C'_{0,a} > C''_{0,a}$ (corresponding to position $L_2$ over the budget line) only by resorting to borrowing against pensions assets, which is precisely averted by loans' interest rates being much higher than the rate of return implicit in the budget line.[24] In sum, and as pointed out by the authors, stimulated and high private savings require liquidity constraints to remain as tight as possible.

It is here worth quoting than Bailliu-Reisin's arguments had been raised earlier by Blinder (1982) who, in analyzing the relationship between pension funds and savings, concluded that

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[22] Let it be noticed that $L_0$ corresponds with the equilibrium situation depicted by point E in Figures 1 and 2.

[23] Nevertheless, Bailliu and Reisin (op. cit.) contend that, in this case, increases in private savings will be compensated by decreases in government savings and the net result is still an unknown.

[24] It is to be noticed that only to the extent that the borrowing cost line flattens, in the direction of the budget line, income and substitution effects will reinforce one other to stimulating higher consumption.

**Figure 10**

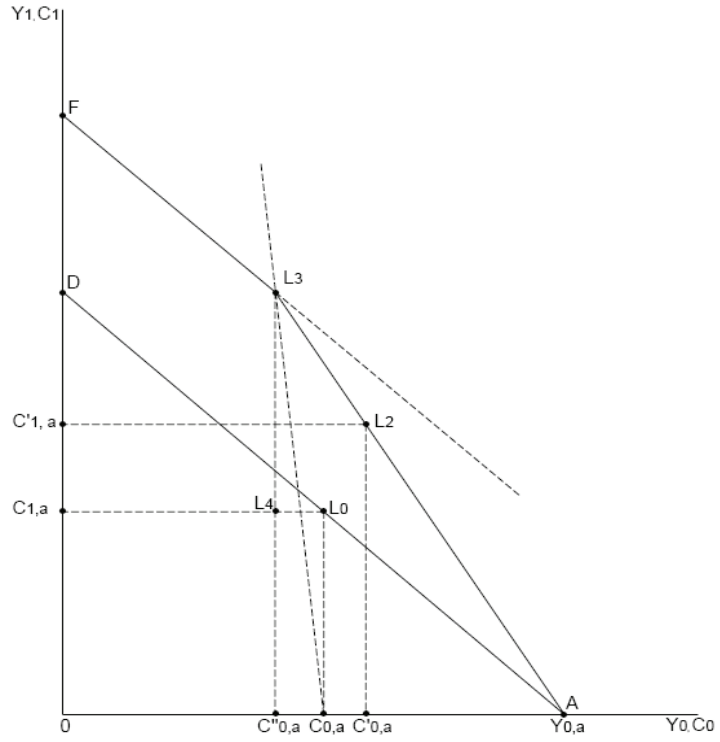
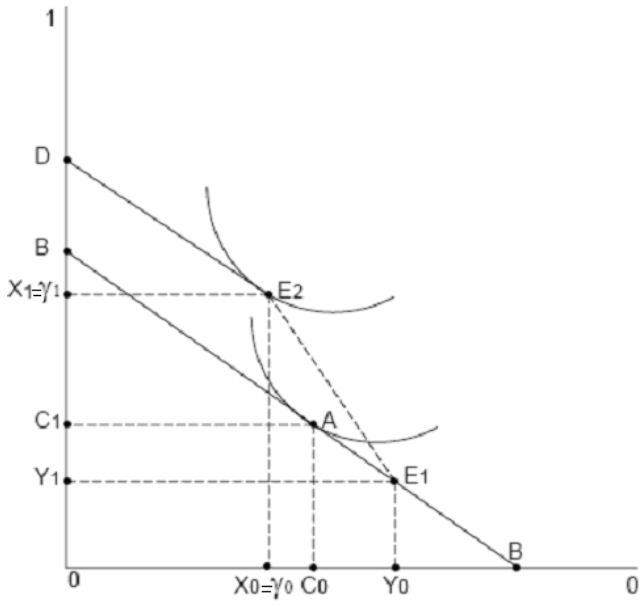



**Figure 11**




borrowing constraints would increase savings should the pensions impose binding capital markets constraints, as portrayed in Figure 11.

Thus, $E_1$ depicts the endowment point, corresponding to incomes $Y_0$ and $Y_1$ respectively whereas A indicates that – with no pensions – the optima consumption levels $C_0$ and $C_1$; a mandatory pension will lead to a corner solution like $E_2$ which will in turn force the highest saving level, as consumption falls to $\gamma_0$ in period 0 while it climbs up to $\gamma_1$ in the next period.

Blinder also made the interesting point that while expansions in private pensions, in the presence of capital market imperfections, will raise savings, social security systems of the PAYG system will likely not as – based on the Modigliani Miller Theorem's implications – saving in the latter case is solely aimed at financing consumption on retirement for what, and with no borrowing restraints, while private (funded) pension plans will not have any effect upon savings social security taxes in unfunded regimes will in fact reduce savings, as shown above with Feldstein's developments.

## 4 Fixed effect panel data model's econometric estimation and results

As mentioned in the Introduction, the relationship between aggregate private savings and pension fund assets will be assessed within the framework of a panel data model of the six countries (Argentina, Chile, Colombia, Mexico, Peru and Uruguay) and using series for the period 1995-2006. As quoted earlier, the recourse to the panel data model aims at sorting out the problem of degrees of freedom stemming from data's scarcity.[25]

The fixed effect variant was considered in place of pooled estimation as, by letting intersections to vary with each country,[26] it permits to capture countries' particular features and yet consider similar variables' coefficients or common slopes for all the cross section units. In line with this, each of the estimated regressions included country's specific individual effects captured by means of a specific dummy variable for each cross section unit or country.[27]

Since not only the impact of pension fund assets over aggregate private savings but also of other economic and demographic variables will be analyzed, the econometric specification is fully described by the ensuing equation:

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \mu_{it}$$

in which:

$Y_{it}$ stands for the dependent variable aggregate private savings, in terms of gross domestic product, for country *i* and for period *t* (PASV), and

$\beta_{1i}$ represents countries' specific intersection, whereas the explanatory variables are in turn represented by:

$X_{2it}$ pension fund assets, in terms of gross domestic product, for country *i* and for period *t* (PFS) and whose coefficient's sign is expected to be positive, indicating its stimulating effect upon savings,

$X_{3it}$ government budget surplus, in percent of gross domestic product, for country *i* and for period *t* (GOVS). As the hypothesis is being held that budget surpluses exert crowding out effects upon the private sector, the coefficient's sign for this variable is expected to be unambiguously negative,[28]

$X_{4it}$ domestic credit (loans) to the private sector, in percent of gross domestic product, for country *i* and for period *t* (PRICR). The coefficient's sign is expected to be negative as the implication holds that the more accessible credits are, the more consumption will be eased and individuals will be less worried about their future and for building precautionary savings,

$X_{5it}$ short term nominal or real active interest rate, for country *i* and for period *t* (NIR-RIR). The ambiguity of the coefficient's sign stems in this case of the possibility of substitution effects prevailing over income effects (positive sign) but also of the opposite actually holding (negative sign), as was already analyzed in Figure 3 above,[29]

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[25] Chile was the only of the six countries in which the individual capitalization system was already working in the nineties, when the rest introduced fully funded regimes.

[26] Nevertheless, intersections are invariant with respect to time.

[27] Following Greene (2007), in including constants, each dummy represents the country's differential effect relative to the base unit, in this case Argentina. In other words, the fixed effect model captures differences among units through differences in the constant.

[28] This assumption goes in line with Bailey's idea of ultrarationality between public and private saving, which is simply an application of the Modigliani-Miller theorem for the specific case of government finance. See David and Scadding, pp. 239-42.

[29] The sign will also be influenced by borrowing constraints; that is, should the interest rate be to heavy for potential borrowers, these will be discouraged from resorting to bank loans and stimulated to save (see Figure 4 above).

$X_{6it}$ dependence index standing for the ratio between depending people (inactive individuals placed outside labour markets either for not having yet reached the age, for having reached the legal age of retirement or for being unemployed) and working people (whose used proxy here is the employed economically active population) (DI). Needless to emphasize, the coefficient's sign is expected to be negative as, following the ratio increase (indicating a prevalence of inactive over active people) the economy's earned incomes and savings depress,

$X_{7it}$ per capita income level, as represented by the current per capita gross domestic product or the gross domestic product in purchasing power parity, for country *i* and for period *t* (GDP-PGDP). Given that savings are expected to increase following increases in gross domestic product, the variable's coefficient must necessary bear a positive sign, indicating a direct relationship between the dependent and this explanatory variable,

$X_{8it}$ gross domestic product's rate of growth, for country *i* and for period *t* (GDPGR). The coefficient's sign is expected to be in this case unambiguously positive as increases in this variable's rate of growth will move earners to higher income levels and to lower marginal propensities to consume[30] and, finally,

$\mu_{it}$ stands for the error term meeting the classical assumptions.

Tables 1 through 4 below include results of the diverse econometric estimations carried out, depending on whether nominal or real interest rates and per capita gross domestic product in dollars or in purchasing power parity are used for obtaining the variables' coefficients.

The modified Wald test was applied in order to detect the likely existence of heteroskedasticity in the fixed effect regression model. As known, heteroskedasticity arises when the null hypothesis stating that errors have homogeneous variances[31] is rejected. The possibility of autocorrelation was assessed by running the Wooldridge test in order to confirm or discard the null hypothesis of no autocorrelation.

Whenever heteroskedasticity or autocorrelation could not be ruled out FGLS (Feasible Generalized Least Squares) were resorted to since this method permits to use an error variance matrix in which these effects are accounted for at the moment of performing the estimations.

A first comment, regarding results yielded by econometric estimations (Tables 1 through 4) is that variables' coefficients, save for the case of the dependence index, exhibit statistical significance at the 5 or 10 per cent levels and bear the expected signs according to the underlying theoretical framework.

Econometric estimations also supplied widespread and conclusive support to the crucial assumption of the positive impact of pension fund assets upon aggregate private savings; in this regard, results confirm that the variable's coefficient is significantly different from 0 in all cases but the third variant shown, in which the explanatory power seems to be taken by the real interest rate and the per capita gross domestic product in purchasing power parity. Let it be noticed that these results run counter the ones obtained by Bailliu and Reisin (1997) who, for a sample of eleven countries, could show a positive impact of pension fund assets upon private savings only when the former were demographically adjusted instead of being presented in percentage of gross domestic product.

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[30] Bailliu and Reisen's explanation for the sign places the emphasis on the life-cycle hypothesis' implication whereby in growing economies saving by the workers will increase relative to dissaving by the retired (1997, p. 32).

[31] Homoskedasticity would in turn mean a standing null hypothesis stating that $H_0$: $\sigma_i^2 = \sigma^2 \quad \forall i$ .

**Table 1**

**Equation 1**[(a)]

Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model
$\chi^2$ (6) = 30.51 *p*-value = 0.0000

Wooldridge Test for autocorrelation in panel data
F(1, 5) = 75.425 *p*-value = 0.0003

Dependent variable: PASV
Sample: 1995-2006
Included observations: 62

Coefficients: Generalized least squares
Panels: Heteroskedastic
Correlation: Common AR(1) coefficient for all panels (0.4789)

| Variable | Coefficient | Std. Error | *t*-statistics | *p*-value |
|---|---|---|---|---|
| PFS | .1621637 | .0628633 | 2.58* | 0.010 |
| GOVS | –.2781099 | .1356909 | –2.05* | 0.040 |
| PRICR | –.0568928 | .0329231 | –1.73** | 0.084 |
| NIR | .0816378 | .0156141 | 5.23* | 0.000 |
| DI | –.0331060 | .2806352 | –0.12 | 0.906 |
| GDP | .0006660 | .0002607 | 2.56* | 0.011 |
| GDPGR | .0553130 | .0308271 | 1.79** | 0.073 |
| CHI | –1.7157470 | 3.3990870 | –0.50 | 0.614 |
| COL | 6.1097480 | 1.9959040 | 3.06 | 0.002 |
| MEX | .3817979 | 1.9959040 | 3.06 | 0.002 |
| PER | 1.731593 | 1.7559930 | 0.99 | 0.324 |
| URU | –5.645603 | 1.3236610 | –4.27 | 0.000 |
| CONSTANT | 12.630470 | 2.1332570 | 5.92** | 0.000 |

(a) The series include nominal interest rate (NIR) and gross domestic product in current dollars.
* Statistical significance at the 5 per cent level.
** Statistical significance at the 10 per cent level.

**Table 2**

**Equation 2**[(a)]

Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model
$\chi^2$ (6) = 12.81 *p*-value = 0.0461

Wooldridge Test for autocorrelation in panel data
F(1, 5) = 56.009 *p*-value = 0.0007

Dependent variable: PASV
Sample: 1995-2006
Included observations: 62

Coefficients: Generalized least squares
Panels: Heteroskedastic
Correlation: Common AR(1) coefficient for all panels (0.4694)

| Variable | Coefficient | Std. Error | *t*-statistics | *p*-value |
|---|---|---|---|---|
| PFS | .1230335 | .0620584 | 1.98* | 0.047 |
| GOVS | –.2333545 | .1390807 | –1.68** | 0.093 |
| PRICR | –.0465444 | .0326164 | –1.43 | 0.154 |
| RIR | .0725106 | .0176939 | 4.10* | 0.000 |
| DI | .0471230 | .3244887 | 0.15 | 0.885 |
| GDP | .0004358 | .0002981 | 1.46 | 0.144 |
| GDPGR | .0550942 | .0365475 | 1.51 | 0.132 |
| CHI | –1.4019280 | 3.3287210 | –0.42 | 0.674 |
| COL | 5.2789050 | 2.2901270 | 2.31 | 0.021 |
| MEX | .4185314 | 1.1587690 | 0.36 | 0.718 |
| PER | .4964914 | 2.0247090 | 0.25 | 0.806 |
| URU | –5.280247 | 1.3901730 | –3.80 | 0.000 |
| CONSTANT | 14.89972 | 2.4741820 | 6.02** | 0.000 |

(a) The series include real interest rate (RIR) and gross domestic product in current dollars.
* Statistical significance at the 5 per cent level.
** Statistical significance at the 10 per cent level.

**Table 3**

**Equation 3**[(a)]

| |
|---|
| Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model<br>$\chi^2$ (6) = 20.86 *p*-value = 0.0019<br><br>Wooldridge Test for autocorrelation in panel data<br>F(1, 5) = 44.892 *p*-value = 0.0011 |
| Dependent variable: PASV<br>Sample: 1995-2006<br>Included observations: 62<br><br>Coefficients: Generalized least squares<br>Panels: Heteroskedastic<br>Correlation: Common AR(1) coefficient for all panels (0.5237) |

| Variable | Coefficient | Std. Error | *t*-statistics | *p*-value |
|---|---|---|---|---|
| PFS | .0844234 | .0770657 | 1.10 | 0.273 |
| GOVS | –.4672454 | .1496016 | –3.12* | 0.002 |
| PRICR | –.0618667 | .0335561 | –1.84** | 0.065 |
| NIR | .0933493 | .0163286 | 5.72* | 0.000 |
| DI | .0441775 | .3054554 | 0.14 | 0.885 |
| PGDP | .0009155 | .0002773 | 3.30* | 0.001 |
| PGDPGR | .0720348 | .0478833 | 1.50 | 0.132 |
| CHI | .3771742 | 3.88799 | 0.10 | 0.923 |
| COL | 4.6743260 | 1.75403 | 2.66 | 0.008 |
| MEX | –1.9652530 | 1.113703 | –1.76 | 0.078 |
| PER | 1.2536360 | 1.491691 | 0.84 | 0.401 |
| URU | –6.6743010 | 1.383662 | –4.82 | 0.000 |
| CONSTANT | 9.3865820 | 2.521955 | 3.72** | 0.000 |

(a) The series include nominal interest rate (NIR) and gross domestic product in purchasing power parity.
* Statistical significance at the 5 per cent level.
** Statistical significance at the 10 per cent level.

**Table 4**

**Equation 4**[(a)]

Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model
$\chi^2$ (6) = 8.83 *p*-value = 0.1833

Wooldridge Test for autocorrelation in panel data
F(1, 5) = 53.594 *p*-value = 0.0007

Dependent variable: PASV
Sample: 1995-2006
Included observations: 62

FE (within) regression with AR(1) disturbances

| Variable | Coefficient | Std. Error | *t*-statistics | *p*-value |
|---|---|---|---|---|
| PFS | .2980042 | .1264246 | 2.36* | 0.023 |
| GOVS | –.3792299 | .2071593 | –1.83** | 0.074 |
| PRICR | –.0579133 | .0529605 | –1.09 | 0.280 |
| RIR | .072066 | .0275331 | 2.62* | 0.012 |
| DI | –.5128899 | .3215314 | –1.60*** | 0.118 |
| PGDP | .0007609 | .0004911 | 1.55 | 0.129 |
| PGDPGR | –.0366699 | .0608567 | –0.60 | 0.550 |
| CONSTANT | 8.290232 | 1.509061 | 5.49* | 0.000 |
| | F(7,43) = 3.45 | *p*-value = 0.0051 | | |

(a) The series include real interest rate (RIR) and gross domestic product in purchasing power parity.
* Statistical significance at the 5 per cent level.
** Statistical significance at the 10 per cent level.
*** Statistical significance at the 15 per cent level.

The decisive quoted results can however be better understood by resorting to the theoretical analysis of the preceding section, when the point was stressed that regimes' design mattered and that only mandatory individual capitalization regimes would enhance the level of savings. As shown in the Appendix, except for the particular case of Uruguay, contribution to fully funded systems is compulsory in the other five countries.[32]

In relation to the rest of explanatory variables, notwithstanding the fact that the sign of coefficients fell generally in line with what the life-cycle model (when social security is included) predicted, estimations differ as to variables' statistical significance. Thus, the estimated interest rate's coefficient was statistically significant at the 5 per cent level no matter the variant resorted to (nominal or real active interest rate);[33] this result basically features the case – described in Section 2 – in which the substitution effect prevails over the income effect and causes savings to increase. By the same token, it can also be interpreted that the variable's sign and statistical significance is highlighting the favourable impact of tight borrowing constraints upon aggregate private savings, as borrowing for consumption is notably discouraged when tight liquidity prevails.

The government surplus' negative sign also shows that the variable behaved according to the hypothesis of ultrarationality between public and private saving mentioned in the preceding theoretical section; nevertheless, differences arouse in relation to significance as in two cases it met the 5 per cent level and in the other two only the 10 per cent level.

Despite bearing the expected negative sign, estimation of PRICR's coefficient (bank credits to the private sector) yielded much less conclusive econometric results as in two cases showed to be significantly different from 0, but at 10 per cent level whereas in the other two cases results were even weaker.

Poor results were in general achieved with relation to the growth rate of per capita income as only in one case (equation 1) the coefficient was significantly different from 0 at 10 per cent level. Finally, the dependence index exhibited in general a very poor econometric performance and signs running counter the expected ones, the exception being equation 4, in which the sign is correct and the coefficient significant at 15 per cent level. The lack of significance, at conventional levels, is not at odds with Bailliu and Reisin's findings for the dependence index when the main variables are considered in terms of gross domestic product.

## 5 Conclusions

The article aimed at assessing whether fully funded pension regimes, based on individual capitalization, produced the distinctive effect of enhancing aggregate private savings and, in turn, helped somehow to strengthen domestic capital stock markets. Likewise, efforts were devoted to analysing the impact upon private savings of a group of economic and demographic variables which the related literature usually link to the performance of both defined benefit and defined contribution pension systems.

In meeting the sought objectives, the traditional life-cycle hypothesis was resorted to, in the first place, in order to explain how individuals' saving decisions were modified following the introduction of social security taxes within the framework of a PAYG regime. Next, and in line with contributions stemming from Feldstein (1974), Blinder (1982) and Bailliu and Reisen (1997),

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[32] Even in the countries in which workers and self-employed individuals can choose between PAYG and fully funded systems, as it was in Argentina until 2008, contributions were compulsory for those deciding for individual capitalization.

[33] That coefficients of both the nominal and the real active interest rate resulted significantly different from 0 raises the question of whether the explanation must be sought in that inflation was not too high in most of included countries during the period analyzed or else, that consumers – in observing the variable's nominal level – were in fact suffering from money illusion and myopia.

the theoretical approach was extended in order to include the cases of endogenous retirement age and fully funded regimes.

The impact of individual capitalization systems upon aggregate private savings was next considered within a life-cycle approach in which various hypotheses where successively upheld, such us: homogeneous and heterogeneous individuals, voluntary and compulsory contributions and loose and tight borrowing constraints. The theoretical analysis permitted to prove that only under mandatory contributions and operating liquidity restrictions private savings would unambiguously be increased by pension fund assets.

In ascertaining the validity of the paper's main hypothesis, the problem of degrees of freedom, stemming from data scarcity caused by the relatively recent implementation of most individual capitalization regimes, had to be dealt with by using a panel data model including statistical series from Argentina, Chile, Colombia, Mexico, Peru and Uruguay for the period 1995-2006.

Also, the recourse to the fixed effect variant whereby intersections were let to vary among countries, permitted to capture countries' particular features and yet consider similar variables' coefficients or common slopes for all the cross section units.

In relation to the econometric estimation of coefficients, results gave ample support to the assertion that mandatory pension fund regimes would have a positive impact upon aggregate private savings as the coefficient of pension fund stocks not only held the expected sign but it was also significantly different from 0 in all but one single case.

With regards to the rest of estimations, coefficients' performance exhibited results of varying econometric soundness, depending on the variable analyzed, but generally falling in line with predictions of the life-cycle model; thus, the interest rate's coefficient was always positive and statistically significant independent of whether the nominal or the real interest rate were used, the main implications being that substitution effects prevailed over income effect and that the assumed hypothesis of a positive impact of liquidity restrictions upon private savings really held.

The idea of ultrarationality between private and public savings resulted also generally proven as the coefficient held the expected negative sign and resulted significantly different from 0 at 5 per cent, in two cases and at 10 per cent in other two cases. On the other hand, the Keynesian relationship between saving and income (with gross domestic product used as a proxy for the latter) gathered in general econometric support as, apart from the bearing the correct sign, results showed coefficients statistically different from 0.

Poor results were however found for the cases of loans to the private sector and the growth rate of per capita income as, in spite of expected signs generally being achieved, higher significance levels (10 or 15 per cent) were required for discarding equal to 0 coefficients.

Finally, the almost null econometric performance of the dependence index is a worth stressing feature as, contrariwise to what it would have been expected, no relationship could be found between this ratio and the level of aggregate private savings and therefore the idea that demographic variables could somehow influence savings could not at this stage be proven. The point is not however ruled out that the short length of statistical series, as well as the way the ratio was computed, somehow conspired against the variable's performance at the moment of assessing its real impact upon savings.

## APPENDIX

### Argentina

By Law 24.241, enacted in September 1993, the so-called Integrated Pension System was created embodying both the existing PAYG Regime and the fully-funded system based on individual capitalization, operating since 1994 and stopped in November 2008.

Integration to any of the mentioned regimes was mandatory, falling on labour and self-employed workers the responsibility to choose. When PAYG was the decided upon regime, workers' contribution amounted to 11 per cent of monthly wages whereas employers' tax would in turn be 16 per cent of salaries paid.

When workers chose the fully funded system their 11 per cent contribution covered a life insurance premium of around 1.50 per cent and a 1.50-2 per cent fee for pension funds' operational expenses and portfolio management; the remainder went to personal capitalization accounts which also allowed the possibility for individuals to make voluntary contributions beyond the legally set 11 per cent. The 16 per cent tax on employers would in this case continue being collected in order to finance pensions of the already retired people within the PAYG System. Pension fund associations, in charge of managing individual capitalization accounts, were regulated and supervised by the Superintendence of Pension Fund Associations.

Benefits included ordinary pensions for the elderly, paid from the age of 65 for male and 60 for female, and disability and death pensions in the case of people under 65 years whose contributions to the system extended for at least 18 months in the last 36 months.

It is worth stressing that, no matter that beneficiaries belonged to PAYG or the individual capitalization system, the State guaranteed to individuals reaching the retirement age,[34] as a part of their pension, a Basic Universal Benefit (PBU)[35] that was equal to 2.5 times the average social security contribution. There was also a Compensatory Benefit (PC), aimed at bridging the years contributed by beneficiaries to the PAYG system before 1994, when the fully funded regime started and amounting to 1.5 per cent of average existing wages and computed on the basis of the number of years individuals belonged to the unfunded regime. The pension, at the age of retirement, completed with the Additional Benefit for Permanence (PAP), equal to 0.85 per cent per year beyond 1994.

The mentioned Law 24.241 was also specific as to the participation that diverse national and foreign assets could reach within pension funds' portfolios, as is indicated below:

1) central government's public credit operations: up to 50 per cent,
2) provinces, local governments and public utilities' bonds: up to 35 per cent,
3) public debt's bonds, with public bid authorized by the National Securities and Exchange Commission: up to 40 and 20 per cent,[36]
4) convertible corporate bonds with public bid authorized by the National Securities and Exchange Commission: up to 40 per cent,
5) convertible corporate bonds issued by privatized public ptilities: up to 20 per cent,
6) fixed term deposits in banks and other financial entities: up to 30 per cent,

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[34] The PBU was however subject to the condition of potential beneficiaries proving at least contributions for a period of 30 years.

[35] Prestación Básica Universal.

[36] Depending on whether the time to maturity is greater or smaller than 2 years.

7) domestic firms' shares with authorized public bid by the National Securities and Stock Exchange Commission: up to 50 per cent,
8) privatized public utilities' shares with authorized public bid: up to 20 per cent,
9) shares in open-end or closed-end investment mutual funds: up to 20 per cent,
10) bonds issued by foreign states or international organisms: up to 10 per cent,
11) securities issued by foreign firms: up to 10 per cent,
12) contracts negotiated in future and options markets: up to 10 per cent,
13) securities holding a mortgage as a collateral and authorized in public bid: up to 40 per cent,
14) securities representing participation in investment mutual funds with authorized public bid: up to 10 per cent.

In November 2008 the Argentine Government, following a political decision, sent a project to the Congress seeking to stop the existing fully funded capitalization regime. By Law 26425, Argentina came back to a single unified PAYG system.

**Chile**

The Decree Law 3500 approved in 1980 the creation of an individual capitalization scheme, whose operations started in 1981. The fully funded regime, based on individual capitalization completely substituted the PAYG system and voluntary contributions are also allowed.

The individual capitalization regime was made mandatory for workers acceding to labour markets as of January 1983, whereas workers already contributing to the PAYG system had the option to switch to the new regime.[37]

Contributions amount to 12.37 per cent of individuals' wages or earnings, 10 per cent out of which goes to individual capitalization accounts while the rest (1.04 and 1.33 per cent) includes the life insurance premium (1.04 per cent) and pension funds' fees aimed at defraying administrative costs and returns. There are no contributions imposed upon employers who only act as withholding agents. Pension fund associations, in charge of collecting and administering social security taxes, are in turn under the supervision of the Superintendence of Pension Funds.

Benefits of the individual capitalization system include ordinary pensions, paid at the age of 65 for male and 60 for female, and disability and death pensions in the case of people under 65 years and survival pensions. Pensions may accrue to beneficiaries under one of the following alternatives: an immediate annuity straightforwardly arranged by contributors with a chosen insurance company; a temporal rent combined with a differed annuity which is made possible by keeping funds in the individual capitalization account in order to enable the pension fund administrator to pay the former during the differed period and a programmed retirement, expressed in UF,[38] taken from the capitalization account by an amount determined by annually dividing the account's effective balance by the capital necessary to pay a unit of pension.

The Chilean state also guarantees a minimum pension to individuals showing contributions for 20 years and to those whose accumulated amount in their capitalization accounts falls short of the minimum required to finance the benefit. Contributors coming by choice from the PAYG system are entitled to a monetary expressed Recognition Government Bond for periods effectively

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[37] Self-employed workers kept in turn the option of choosing between the old and the new system.

[38] UF stands for Unidades de Fomento.

registered in the old regime.[39] Welfare-type pensions are also available for individuals under the poverty line, with monthly incomes inferior to 35.000 pesos.[40]

Chilean pension funds divide into five categories, depending on the maxima and minima percentages of their assets they are entitled to invest in equities, as shown by the table below:[41]

| Fund | Maximum Limit | Minimum Limit |
|---|---|---|
| **A** | 80% | 40% |
| **B** | 60% | 25% |
| **C** | 40% | 15% |
| **D** | 20% | 5% |
| **E** | 0% | 0% |

Pension funds are asked to offer alternatives B, C, D and E, of lesser relative risk, whereas the setting of option A, more intensive in equities, is not compulsory although effectively offered by all pension fund associations. The table in the following two pages in turn shows investment limits for type of instrument.

## Colombia

The new Pension Regime was legally enacted in December 1993 and its operations initiated in 1994. The scheme is composed of a Non Contributory Public System and a Contributory Compulsory Mixed System in which a public defined benefit Average Premium Solidarity Regime[42] compete with an Individual Capitalization Private Regime[43] allowing also for voluntary contributions. Workers and self-employed individuals must indicate the regime to which they adhere with a switch between systems allowed each five years.[44]

Contributions to the individual capitalization regime reach 15.5 per cent of monthly earned wages (11 per cent goes to the individual pension fund, whereas the pension fund administrator's fee and the insurance premium amount to 1.60 and 1.40 per cent respectively; the remainder 1.5 per cent is absorbed by the Fund of Guarantee for the Minimum Pension, 75 per cent of which is in charge of employers and 25 per cent of workers. Self-employed workers, who finance by themselves the compulsory 15 per cent contribution, have also an additional 1 per cent contribution for the Fund of Pension Solidarity when their incomes exceed four minima wages.

The contribution rate gradually increased from 9 per cent in 2004 to the present 11 per cent. As of 2008, the Government is entitled to add an extra 1 per cent whenever the rate of growth of

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39 This monetary benefit is subject to the condition that individuals prove an effective contribution of at least 12 months to the PAYG regime, between November 1975 and October 1980.

40 Around US$ 66.

41 See also Raddatz and Schmukler (2008).

42 The Average Premium Solidarity Regime is managed by the Social Insurance Institute (ISS).

43 Individuals deciding for Individual Capitalization are entitled to the so called "pensional bond" whereby previous contributions to the Social Insurance Institute are acknowledged and will make part, on retirement, of the fund financing the private system pension.

44 The possibility for individuals to switch between regimes ceases within the 10 years to retirement date.

| Instruments | Maximum Limits for Each Type of Fund | | | | |
|---|---|---|---|---|---|
| | **Fund A** | **Fund B** | **Fund C** | **Fund D** | **Fund E** |
| 1. Bonds issued by the Central Bank and the Treasury; letters of credit, recognition bonds and other bonds and securities issued public agencies and or institutes and bonds issued or bearing the State's guarantee | 40% | 40% | 50% | 70% | 80% |
| 2. Fixed term deposits, bonds and securities issued by financial institutions | 40% | 40% | 50% | 70% | 80% |
| 3. Securities guaranteed by financial institutions | 40% | 40% | 50% | 70% | 80% |
| 4. Letters of credit issued by financial institutions | 40% | 40% | 50% | 60% | 70% |
| 5. Private and public enterprises' securities | 30% | 30% | 40% | 50% | 60% |
| 6. Share-exchangeable private and public enterprises' securities | 30% | 30% | 10% | 5% | - |
| 7. Shares of open corporate firms | 60% | 50% | 30% | 15% | - |
| 8. Shares of open real estate corporations | 60% | 50% | 30% | 15% | - |
| 9. Mutual investment funds' quotas referred to by law Nº 18.815, plus compromised contributions in subscription promise contracts and payment of national mutual funds' quotas, when ruled by D.L. No. 1.328/76 | 40% | 30% | 20% | 10% | - |
| 10. Commercial instruments issued by private and public enterprises (promissory notes, credit and investment bonds) if time to maturity is up to a year | 10% | 10% | 10% | 20% | 30% |
| 11. Credit bonds, securities and commercial papers issued or guaranteed by international or foreign or international banks or foreign states and central banks; credit bonds issued by municipalities, regional states and local governments; shares, securities and commercial papers issued by foreign firms; share convertible bonds issued by foreign banks and firms; securitized credit bonds issued by foreign firms; structured notes issued by foreign entities; participation quotas issued by foreign mutual funds; foreign bonds representing share indices; short term deposits; operations aimed at hedging fluctuation risks among foreign currency or rate of interest risks in a determined foreign currency; investment in foreign countries through participation quotas issued by mutual funds referred to in 9 above, when they have more than 50% of their assets invested abroad | The investment in foreign bonds and securities of the same pension fund's types of funds, plus the amount of foreign investment through mutual funds' quotas and national investment, are limited to 35 per cent of total of the same pension fund's types funds | | | | |
| 11a. Share-convertible bonds issued by foreign banks and firms | Foreign Global Limit | Foreign Global Limit | 10% | 5% | - |

| Instruments | Maximum Limits for Each Type of Fund | | | | |
|---|---|---|---|---|---|
| | **Fund A** | **Fund B** | **Fund C** | **Fund D** | **Fund E** |
| 11b. Current accounts in foreign banks (moving average for the last 30 days) | 0.20% | 0.20% | 0.20% | 0.20% | 0.20% |
| 11c. Structured notes issued by foreign institutions | 4% | 3% | 2% | 2% | - |
| 11d. Overnight and short time deposits | 2% | 2% | 2% | 2% | 2% |
| 11e. Contracts whose object is the loan or mutual of foreign issuers' financial instruments, computed on the basis of lent instruments | 1/3 Foreign investment in each type of fund | | | | |
| 12. Public bid instruments, authorized by the Central Bank and whose issuers are supervised by the Superintendence of Securities and Insurance or of Banks and Financial Institutions | Investment limits for each instruments will range between 1 and 5 per cent of the respective fund's total amount, as determined by the Central Bank of Chile | | | | |
| 12a. Foreign capital mutual funds' quotas | 1% | 1% | 1% | 1% | - |
| 12b. Commercial papers of Law 3500's letter I) (not considered in 10 above) | 5% | 5% | 5% | 5% | 5% |
| 13. Amount of investment in foreign currency without exchange coverage | 43% | 28% | 22% | 17% | 10% |
| 14. Contracts whose object is the loan or mutual of domestic issuers' financial instruments, computed on the basis of lent instruments | 15% | 10% | 5% | 5% | 5% |
| 15. Term deposits; bonds and securities issued by financial institutions and securities guaranteed by financial institutions | 40% | 40% | 50% | 70% | 80% |
| 16. Private and public enterprises' securities, including those permitting their exchange for shares | 30% | 30% | 40% | 50% | - |
| 17. Shares of open corporate firms and open real state corporate firms | 60% | 50% | 30% | 15% | - |
| 18. Domestic mutual funds' quotas ruled by Law 1.328/76, referred to in 9 above | 5% | 5% | 5% | 5% | - |
| 19. Subscription promised contributions and payment of quotas belonging to mutual funds referred to in 9 above | 2% | 2% | 2% | 2% | - |
| 20. For each type of financial risk coverage, customarily done in formal secondary markets (limit computed in function of coverage instruments and measured in net terms) | Investment in coverage instruments | | | | |
| 21. Risk cover operations in domestic and abroad markets | Superintendence's Circular No. 1216 determines investment limits to be met by Administrators when undertaking risk cover operations on behalf of Pension Funds | | | | |

the gross domestic product reaches an average increase of 4 per cent during the preceding two years. In the case of the Solidarity Regime contributions amount to 15 per cent of earnings, 12 per cent out of which is devoted to finance pensions for the elderly and the constitution of reserves and 3 per cent is used in covering administration costs and pensions for the disabled and death benefit payments.

Benefits covered by the Pension General System are pensions for the elderly and the disabled, death benefit and burial expenses. Pensions for the elderly are offered under the following variants: annuities, reversible annuities, programmed retirement and programmed retirement with differed annuities. There also exists a minimum pension guarantee whereby the State makes up the possible difference between the pension and the legal minimum wage.

The ensuing list illustrates about alternatives permitted by the Colombian legislation for investing funds from individual capitalization, as well as about the maximum limits, in percentage of the total portfolio, set for each type of instrument:

1) issued internal and external public debt's bonds bearing the guarantee of the State,
2) other public debt's bonds issued by governmental agencies (up to 20 per cent),
3) securities issued by or with the guarantee of the Financial Institutions Guarantee Fund (Fogarin) and Cooperatives Guarantee Fund (Fogacoop) (up to 10 per cent),
4) Bank of the Republic's securities,
5) mortgage securities (Law 546/1999) (up to 40 per cent),
6) debt bonds issued, accepted or guaranteed by institutions under the control of the Colombian Financial Superintendence (up to 70 per cent),
7) securities issued by institutions not controlled by the Colombian Financial Superintendence (up to 30 per cent),
8) equities (up to 30 per cent),
9) current account deposits (up to 2 per cent),
10) repurchase agreement operations and active simultaneous operations over admissible investments (up to 10 per cent),
11) repurchase agreement operations and active simultaneous operations carried out through agricultural or agroindustrial stock exchanges (up to 5 per cent),
12) investment in securities issued by foreign entities (up to 20 per cent),
13) protected capital structured products domestically issued or issued abroad whose contractual terms referring to 100 per cent payment of capital and yield are guaranteed by issuers,
14) temporal value transfers (only for securities allowed in pension funds' regime of admissible investments) (up to 30 per cent).

**Mexico**

The Social Insurance Law enacted in December 1995 did away with the existing PAYG system and created a defined contribution regime (individual capitalization) privately managed by the so called Retirement Fund Administrators (AFORES).[45]

As of 1 July 1997, individuals acceding to labour markets freely choose an AFORE whereas they also decide where their contributions will be invested by choosing, on the basis of investment

[45] Their operations actually began in 1997.

profiles, preferences and age, one of the two Retirement Funds Specialized Investment Societies (SIEFORES). Benefits include retirement pensions and pensions for the elderly.

Contributions to the fully funded regime reach 6.5 per cent of earnings, 5.30 points of which go to individual capitalization accounts while AFORES in turn perceive 1.20 points in concept of average fees.[46] In addition to this, a social quota (solidarity contribution) equal to 5.5 per cent of the minimum wage prevailing in the Federal District is provided by the Mexican State to each capitalization account. Individuals can also increase pension fund assets with short and long run voluntary contributions.

Benefits include retirement pensions and pensions for the elderly. Given the regime's defined contribution feature, benefits depend upon the accumulated value and interests in the respective individual capitalization account; beneficiaries have the choice of buying an annuity from an insurance company or deciding for programmed periodic retirements from the AFORES, computed on the basis of the life expectancy and the expected return.

Pension fund administrators are subject to the supervision of an autonomous organism called the System of Saving for Retirement National Commission (CONSAR).

There also exists an insurance for the disabled and the surviving spouse, administered by the Mexican Institute of Social Security (IMSS) and jointly financed by workers, firms and the State (0.62,1.75 and 0.13 per cent of earned wages respectively).

Workers with proven contributions until June 1997 are entitled to perceive PAYG's benefits, whereas individuals having contributed to PAYG and the fully funded regime have the possibility of choosing between both systems.

A minimum pension, equal to a minimum wage, is guaranteed by the government to individuals proving 1250 weekly contributions and reaching 60/65 years of age.

A multifund system is available from AFORES, as of January 2005, to which pension fund assets can be directed:

- Basic 1 SIEFORE (SB1), whose assets can be only invested in domestic and foreign fixed interest securities and in international permitted bonds and securities from governments and qualified firms.
- Basic 2 SIEFORE (SB2), differing from the preceding one in that investment in equities is also permitted up to a maximum participation of 15 per cent of total. SB3, SB4 and SB5, created in 2008, have authorized participations of 20, 25 and 40 per cent, respectively.[47]

The evolution of the legal framework, from a single fund basically investing in bonds of the domestic public debt to funds respectively investing only in fixed interest securities and in a combination of fixed interest securities and equities, shows that investment alternatives have increased for individual capitalization and that individuals' risk-return profiles are better served now by the five funds available to date.

The new investment regime permitted also to introduce three new possibilities for SIEFORES: investment in private capital and infrastructure (by using structured notes and trusts) and real estate investment (by using trusts).

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[46] Since AFORES charge different fees, a single uniform fee for all administrators is computed in terms of the contribution flow, following the CONSAR's methodology.

[47] These three funds can be voluntarily established by the AFORES.

**Peru**

The Peruvian retirement structure embodies a public not contributive regime and a mandatory mixed contributive system with public PAYG and private individual capitalization regimes operating in competence. By being affiliation compulsory, workers must decide to which one they will adhere. The fully funded system, enacted in 1992 by Law 25987, started its operation in June 1993.

The average worker's contribution to the private system[48] is 12.66 per cent of his/her taxable income, 10 points of which go to individual capitalization accounts, 0.91 is devoted to finance disability and survival insurances and 1.81 is the fee perceived by the fund administrators. Workers can also realize voluntary contributions. Contributions to the public regime amount to 13 per cent of earned wages.

Benefits from the private system are retirement pensions and pensions for the disabled and the surviving spouse, paid by pension fund administrators or insurance companies under one of the following alternatives: monthly programmed withdrawals from the individual account until funds' exhaustion, family annuities whereby individuals contract an annuity for him/her until death including a survival pension for his/her beneficiaries, temporal rents with differed annuities during a determined first period and a family annuity thereafter.

The Superintendence of Bank and Insurance is in charge of supervising pension fund administrators whereas the PAYG regime is managed by the Prevision Normalization Office.

There are variants whereby pension fund assets can be invested by administrators, the percentage in brackets indicating each instrument's maximum allowed participation within portfolios:

1) government bonds (30 per cent),
2) Central Bank bonds (30 per cent),
3) term deposits and securities from financial system's firms (30 per cent),
4) securities issued by financial system's firms (25 per cent),
5) subordinated securities issued by financial system's firms and insurance companies (15 per cent),
6) investment bonds issued by banks, financial firms and other entities for mortgage financing (40 per cent),
7) securities issued by private legal entities not belonging to the financial system (40 per cent),
8) short term instruments (15 per cent),
9) repurchase agreement operations (10 per cent),
10) shares and representative values of rights upon deposited shares registered in the stock exchange (35 per cent),
11) certificates of preferential subscription (3 per cent),
12) derivatives of values traded in the stock exchange (0,1 per cent),
13) financial risk coverage operations (5 per cent),
14) participation quotas in investment mutual funds (15 per cent)
15) investment instruments representing securitized assets (10 per cent),
16) financial instruments issued or guaranteed by foreign states and central banks; shares and values representing rights upon deposited shares registered in the stock exchange; debt bonds,

[48] Contributions to the private system are not deductible from the Income Tax.

participation quota in mutual funds and risk coverage operations issued by foreign entities (9 per cent),

17) share primary issuance and securities representing credit rights oriented to financing new projects (4 per cent),

18) promissory notes issued or guaranteed by financial system's firms (5 per cent),

19) promissory notes issued or guaranteed by other entities (5 per cent).

The above mentioned investment possibilities are however subject to general participation limits, as indicated below:

a) bonds issued or guaranteed by the Peruvian Government (30 per cent),

b) bonds issued or guaranteed by the Central Bank (30 per cent),

c) the overall sum of a) and b) (40 per cent),

d) bonds and securities issued by foreign governments and for financial and not financial entities whose economic activity is mostly carried out abroad (17 per cent).

There exist, since 2005, a multifund scheme for mandatory contributions composed of Type 1 Fund (Conservative or Capital Preservation Fund), oriented to a stable growth with low investment volatility; Type 2 Fund (Balanced or Mixed Fund), seeking a moderate growth level with investment medium volatility and Type 3 Fund (Growth Fund), pursuing the fund's highest growth levels with high investment volatility.

Asset investment limits in each fund was set as follows:

| Fund type | Instruments and maximum limits for each type of fund | | | |
|---|---|---|---|---|
| | Equities | Derivatives | Short-term Securities | Fixed-interest Securities |
| Type 1 | 10% | 10% | 40% | 100% |
| Type 2 | 45% | 10% | 30% | 75% |
| Type 3 | 80% | 20% | 30% | 70% |

Finally, no minima limits are established for investment in equities or in fixed interest securities.

## Uruguay[49]

The present Social Security System dates from 1995 (Law 16713), but its operation actually started in 1996. It is a mixed scheme composed of a defined benefit contributive public regime, a private defined contribution individual capitalization regime and derived benefits integrating therefore the Intergenerational Solidarity Retirement System (PAYG) with Individual Capitalization System. Affiliation to the corresponding regime is determined in function of the three following earning levels:

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[49] We are very grateful to Alvaro Forteza for his helpful comments on the Uruguayan case.

a) retirement regime for intergenerational solidarity (PAYG): it includes workers whose monthly incomes are equal to or less than $ 5,000 pesos (215 dollars),
b) individual capitalization system: it includes individuals whose monthly income ranges between $ 5,000 and $ 15,000 (between 215 and 644 dollars) and those deciding for the fully funded system although their monthly incomes fall below $ 5,000,
c) voluntary individual capitalization regime: for all individuals, for amounts exceeding the mentioned compulsory upper limits.

Contributions to the PAYG regime reach 15 per cent of wages and, depending on individuals' earnings and choices, this percentage is split between the public and the private system. Workers with monthly incomes below $ 5,000 (215 dollars) may also opt for devoting half of their contributions to the individual capitalization regime (voluntary option for the mixed regime).

Contributions to the mandatory fully funded regime reach 15 per cent, of which 12.16 points go to individuals' accounts, 1.854 points is the administrator's fee and 0.988 the insurance premium. Employers' contributions (12.5 plus 5 per cent for mutual insurance for all salary levels) are directed to the PAYG system.

Benefits include pensions for the elderly,[50] computed on the basis of individuals' accumulated assets, the interest rate paid by the insurance company and the beneficiary's life expectancy.[51] Disability contingencies and pensions to the surviving spouse are financed by means of a specific insurance that AFAPS must compulsory take; this insurance's premium is discounted from monthly individuals' contribution to their capitalization accounts.

Pension fund assets are managed by Prevision Save Funds Administrators (AFAP), whereas the Bank of Social Prevision administers the PAYG regime, non contributive benefits, the unemployment insurance, the health insurance and family allowances. The AFAP Control Division, at the Central Bank of Uruguay, is in charge of supervising the individual capitalization regime of second and third pillars.

There also exist a non contributive welfare benefit (62.58 dollars) granted to individuals beyond 70 years who, due to age or disabilities can not accede to a permanent paid job.

The legislation is also specific concerning the participation that diverse national and foreign assets can reach within pension funds' portfolios, as well as the Previsional Save Funds' permitted investments to administrators, as is indicated below:

1) bonds issued by the Uruguayan Government (up to 65 per cent),
2) securities issued by the Uruguayan Mortgage Bank and instruments of monetary regulation issued by the Central Bank of Uruguay (up to 30 per cent),
3) term deposits in domestic financial entities, in national or foreign currency (up to 30 per cent),
4) securities from Uruguayan utilities or private firms and mutual investment funds' quota parts, operating in formal markets and authorized by the Uruguayan Central Bank (up to 25 per cent),
5) instruments standing for domestically located real estate, industrial, forest and other productive sectors gathering acceptable conditions of safety, return and guarantee, according to the requirements of the Uruguayan Central Bank (up to 20 per cent),

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[50] Contrariwise to the capitalization scheme, in which a lower limit does not exist for benefits (pension for the elderly), there is a minimum value for the quota part in the public Intergenerational Solidarity Retirement System equal to $ 550 (23,60 dollars), which is annually increased in 12 per cent (each year after retirement) with a ceiling of 120 per cent.

[51] Acknowledgement bonds' issuance is not considered by the new regime.

6) guaranteed investments in public and private entities whose purpose is to grant loans to social security system's contributors and beneficiaries, Individual loans[52] should be not higher to six salaries or pensions (up to 15 per cent),
7) operations aiming at supplying financial risk coverage to the prevision save fund, with limitations and conditions set by the Uruguayan Central Bank (up to 10 per cent),
8) fixed interest securities issued by international credit entities, subject to conditions established by the Executive Power (up to 15 per cent).

[52] Loans granted should be cancelled within the year and their rate of interest will at least equal the evolution of the Wage Average Index plus five percent points.

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# PENSION PRIVATIZATION AND COUNTRY RISK

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*This paper explores how privatizing a pension system can affect sovereign credit risk. For this purpose, it analyzes the importance that rating agencies give to* implicit *pension debt (IPD) in their assessments of sovereign creditworthiness. We find that rating agencies generally do not seem to give much weight to IPD, focusing instead on* explicit *public debt. However, by channeling pension contributions away from the government and creating a deficit of resources to cover the current pension liabilities during the reform's transition period, a pension privatization reform may transform IPD into explicit public debt, adversely affecting a sovereign's perceived creditworthiness, thus increasing its risk premium. In this light, accompanying pension reform with efforts to offset its transition costs through fiscal adjustment would help preserve a country's credit rating.*

## 1 Introduction

Pension "privatization" (social security reform characterized by the introduction of a defined-contribution pension scheme) aims at correcting actuarial imbalances at the root of long-run solvency problems in pre-existing pay-as-you-go (PAYG) defined-benefit public pension systems. However, other things equal, the reform's diversion of social security contributions to private personal accounts deprives the general government of revenues without an offsetting reduction in public spending because ongoing pension payments to existing pensioneers must continue, at least during a transition period. It is during this transition that governments often resort to market financing to make up for lost social security contribution revenue, leading to an increase in public debt.

During the wave of pension reform – particularly in Latin America during the 1990s – it was often argued that issuing debt to cover the imbalances that usually followed such reforms was not a cause for concern, since it just meant replacing implicit pension debt (IPD) with "explicit" public debt. A PAYG system is an intergenerational redistribution mechanism based on the rollover of IPD across generations of workers. [1] Contributors implicitly buy claims to future income from the government, which uses the proceeds to finance the benefits of retirees – that is, to redeem previously issued claims. However, once pension privatization takes place, the government cannot rollover pension claims any further, and must find new financing for the redemption of pension claims still falling due. Thus, financing the payments of benefits to pensioners (or making up for lost contribution revenue) by issuing financial debt would be, in some sense, gradually making IPD explicit.[2] However, if markets do not consider IPD and explicit public debt as equivalent, then turning one into the other could affect the market's perception of a government's credit risk.

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[1] See Conesa and Garriga (2005).

[2] Strictly speaking, making up for lost contribution revenue with financial borrowing is to replace a flow of new implicit financing with a flow of new explicit borrowing. Issuing "recognition bonds" to compensate workers for the loss of acquired rights, as has

*(continues)*

Several factors would seem to make financial debt a more problematic liability for the government than IPD. In most cases, IPD can be seen a contingent liability,[3] whereas explicit financial debt is a firm commitment. By definition, IPD is a very long-dated liability, payable in the country's own currency, and positively correlated with the tax base. In contrast, in most countries' financial debt has a relatively shorter average maturity, is often denominated in foreign currency, and its burden generally bears little relation to the tax base – if it does not bear a negative correlation to it. Creditors hold financial debt on a voluntary basis, which gives rise to relatively high rollover risks, whereas social security contributions are mandatory. More fundamentally, governments can, and often do, change the terms of PAYG pension schemes, thereby unilaterally restructuring IPD, whereas the terms of financial debt cannot be unilaterally modified.

Not only does pension privatization change the composition of the government's liabilities; it also changes the relationship between government and pension scheme's participants. Under a defined-benefit, PAYG-financed scheme, workers and retirees hold junior claims on the government, while bondholders and other creditors hold more senior claims. In fact, experience shows that governments will try to reduce pension benefits or increase pension contributions under PAYG plans before considering defaulting on financial debt. Workers and retirees are like equity holders, subject to residual risk. However, once pension privatization takes place, workers and pensioners become, through their pension funds, creditors on a par with other bondholders. The bonds held by pension fund managers (largely government bonds) are quite similar to the bonds held by other investors. Thus, a reform that kept the size of total obligations unchanged, but transformed IPD into explicit debt would increase the riskiness of the government's balance sheet and dilute the value of the financial claims already held by creditors.

Starting from an unsustainable PAYG scheme, a pension reform will usually aim at curbing the growth in total government liabilities over time. Thus, a pension privatization can involve a trade-off between reducing total public (implicit plus financial) debt in the long run, but increasing the riskiness of the composition of liabilities in the short and medium term as financial debt replaces IPD, at least during the transition period of the reform. This is not an argument against pension reform; it is an argument in favor of accompanying pension reform with fiscal efforts to offset the tendency of the reform to increase riskiness associated with the higher path of financial debt.

In this paper, we explore whether these conclusions can be supported by showing that financial markets – and financial analysts in particular – judge IPD and financial public debt differently as they assess sovereign creditworthiness. Our empirical evidence suggests that this may be, in fact, the case. This diverging perception of financial analysts over both types of debt may be simply due to their understanding of the intrinsic differences between the two, (as mentioned above), but it could also reflect myopia by the financial analysts themselves, who may not fully appreciate the obligations represented by IPD – in fact, such a myopic perception of IPD by the markets would constitute yet another difference between IPD and explicit debt.

Previous research in this area is scant, but the few available studies have mixed views on the equivalence between implicit and explicit liabilities.[4] When assessing the private sector, Feldstein and Seligman (1981) and Moody's (1998) argue that unfunded pension liabilities of corporations do end up reflected in corporate share prices and credit ratings. However, when assessing the determinants of sovereign credit risk, results are less clear. For example, Fiess (2003) seemingly

been done under some pension reforms, is closer to the idea of making the stock of IPD explicit, although it really involves putting a definitive value on IPD.

[3] Pension obligations under a PAYG-defined benefit system would be contingent on the life of the pensioneer who holds the claim, but also subject to discretionary changes in the parameters of the pension system itself.

[4] However, economists have increasingly emphasized the need to include the concept of IPD in the standard set of debt sustainability indicators (see Holzman, Palacios and Zviniene, 2004).

confirms the differential treatment of financial debt and IPD for the case of Mexico, by observing that the country's credit ratings remained broadly unchanged before and after the 1997 pension system reform, despite the fact that the reform's features generated, upon its approval, an immediate reduction of IPD. More generally, a widely held view among practitioners is that net present value estimates of IPD should not influence sovereign credit risk ratings for two reasons: first, these estimates are highly sensitive to small changes in parameters and assumptions, as noted by Truglia (2002) and Pinheiro (2004);[5] and second, they do not account for possible future policy actions to improve the finances of defined-benefit pension systems.[6]

We regress indicators of sovereign creditworthiness on IPD and explicit public debt, controlling for the main determinants of debt sustainability. The analysis shows that cross-country differences in financial public debt help explain differences in sovereign credit ratings, but differences in IPD do not. The apparent lack of attention to IPD on the assessment of sovereign creditworthiness could be an indication that markets, though concerned over contingent liabilities, simply do not trust available measures of IPD, which are subject to considerable error. To address this problem, we also estimate dynamic panel models of credit ratings that look at the effects of pension privatization *without* using direct measures of IPD – but focusing on the impact of the implementation of pension reforms. These models also suggest that markets focus mainly on explicit public debt levels without giving much weight to the IPD reductions generated by pension privatization. The corollary is that if a government wants to preserve its credit standing while it carries out a radical pension reform, then it must strengthen its non-pension fiscal balance to offset the loss of revenue from social security contributions, and avoid incurring additional explicit liabilities to finance the transition costs of the reform.

To illustrate the results of the econometric analysis, we present one simple counterfactual pension reform scenario. We look at the case of Mexico, which privatized its pension system in the late 1990's  We construct simple fiscal scenario to show what might have happened to public debt and ratings, other things being equal, if it had done otherwise, and calculate the resulting impact on their credit standing, in line with our econometric estimates. This case helps illustrate the corollary mentioned above: public debt can become hard to manage when a country undertaking pension privatization does not offset its adverse cash flow effects with fiscal adjustment.

## 2 Country risk, credit ratings and implicit pension debt (IPD)

Financial debt is an important variable for rating agencies assessing government credit risk, and there is a strong relationship between a sovereign's debt and its credit rating (Figure 1).[7] For instance, as Argentina's federal government debt rose from 34½ per cent of GDP in 1997 to about 135 per cent of GDP in 2002, Standard and Poor's gradually downgraded its rating from BB to CC and ultimately SD (default). Similarly, Argentina's rating by the Institutional Investor's Country Credit Rating (IIR) System – which captures the aggregate views of economists and financial analysts on sovereign creditworthiness – fell from about 42½ in 1999 to 34¾ in 2001 and 23¾

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5 In particular, Pinheiro (2004) argues that in the late nineties estimates of IPD for Brazil from various sources varied by as much as 60 per cent of GDP.

6 See Moody's Investor Service's Sovereign Risk Unit managing director Truglia (2002).

7 General government debt is one key criterion for both Moody's and Standard and Poor's for assigning sovereign credit ratings, as stressed by Powell and Martinez (2008). Many other variables affect ratings – including the country's default history, the external and fiscal stance and the perceived institutional and governability status – which explains why advanced countries such as Japan, Belgium, Italy, Portugal and Spain can be in the "AA" range despite their high debts. These countries can rollover debt with relative ease, and there is no question on their ability to pay.

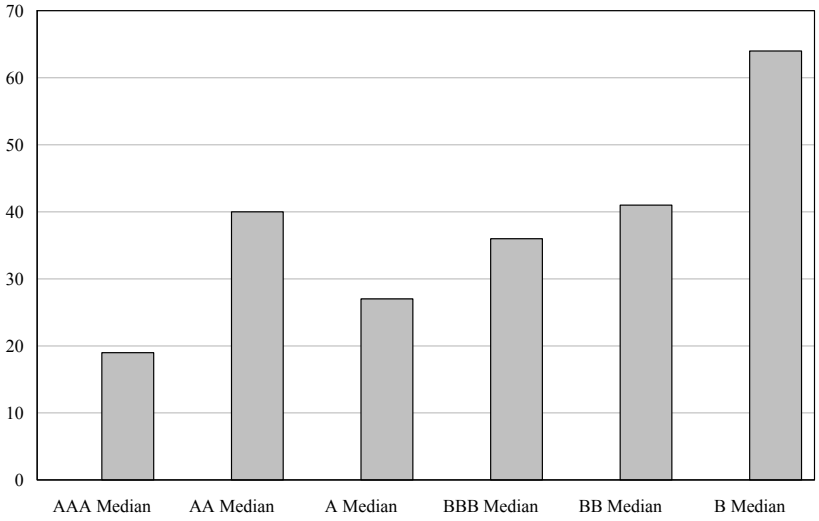
by 2002.[8]

Credit ratings are closely correlated with the risk premia countries face in the international capital markets (Figure 2). Thus, markets seem to penalize the same developments that rating agencies consider harmful to a country's creditworthiness, and are certainly informed by the ratings themselves. In this context, an increase in explicit debt (even if it is related to a generally beneficial pension reform), could be perceived as a sign of deteriorating creditworthiness – and be reflected in worsening borrowing terms for the sovereign.

The close link between financial debt and country risk is well documented, as noted in Powell and Martinez (2008). Moreover, some aspects of such link have been summed up in the concepts of "original sin" and "debt intolerance". Eichengreen, Hausman and Panizza (2003a and 2003b) define as the "original sin" a country's inability to borrow abroad in its own currency, even in the presence of good institutions and stability. In the context of pension reform, the "original sin" theory suggests that even

**Figure 1**

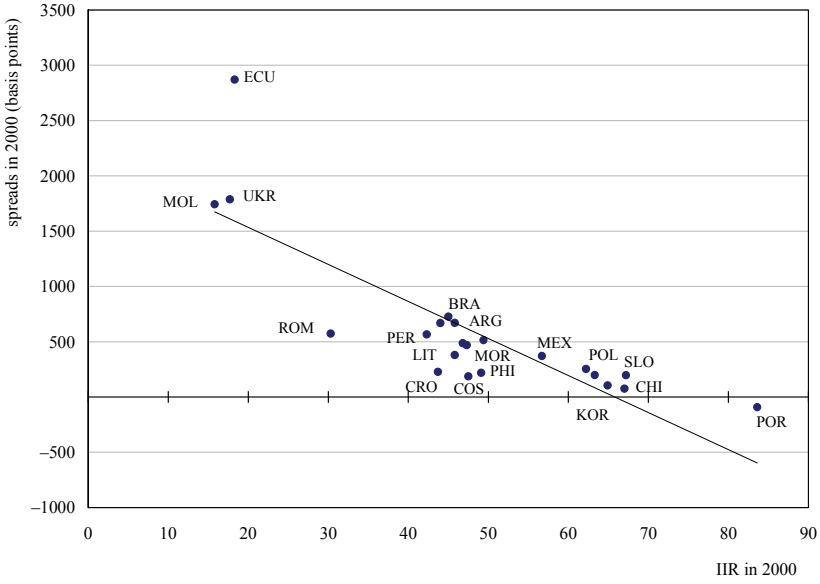
**Standard and Poor's Credit Ratings and Government Debt**
**Net General Government Debt, 2004**
*(percent of GDP)*




Source: Standard and Poor's.

**Figure 2**

**Risk Premia and International Investor Ratings**




Sources: JP Morgan and International Investor Ratings.

[8] The country credit ratings developed by the Institutional Investor (IIR) are based on information provided by senior economists and sovereign-risk analysts at leading global banks and money management and securities firms. Respondents grade each country in a scale of 0 to 100, where 100 represents the least chance of default.

if IPD is brought under control by the reform, the country may find it difficult to find financing on adequate terms for the transition costs arising from the reform itself. Reinhart, Rogoff and Savastano (2003) define "debt intolerance" as the inability of emerging countries to function with levels of external debt that are easily manageable for advanced countries. A corollary of this view in the context of pension reform is that financing the transition costs with debt can generate or raise instability. Reinhart *et al.* (2003) also show that, as debt increases, the ratings deteriorate more rapidly in emerging countries than in advanced economies, a phenomenon that may be interpreted as a perception of lower debt management capacity in emerging markets.

In any case, whether IPD and explicit public debt are seen as equivalent by the financial markets is an empirical issue. In the following section we take this question to the data.

## 3 Econometric analysis

To test the hypothesis that IPD matters as much as financial debt for credit risk assessments we first use a direct approach, based on cross-country regressions of IIR against IPD, controlling for financial public debt and other factors.[9] This approach is constrained by data availability, especially since it is difficult to find data on IPD for a large sample of countries.

We also use an indirect approach based on the idea that if financial markets care about IPD, they should react positively to a pension privatization reform that reduces it. The coefficient of a pension reform dummy should capture the impact that reducing IPD has on the rating. This approach does not require estimates of IPD, which allows us to use a much larger sample of countries, and to avoid the measurement and conceptual problems affecting IPD estimates. Moreover, we can use panel regressions in this case, since we have identified 21 countries where a pension privatization took place and the ratings and control variables can be sampled over several years. The main constraint for this regression is the availability of time series for country ratings.

### *3.1 Direct approach*

As our dependent variable, we use a transformation of the IIR for 2000, defined as 100 minus the original IIR (thus, for our variable, a value of 100 represents the highest risk of default). That is, a positive sign in an estimated coefficient means that a variable has a positive effect on the perceived probability of default. The focus of the analysis is a measure of IPD in 33 countries in 1999/2000 taken from Holzman, Palacios and Zviniene (2004), which is the widest homogeneous IPD data set available. The well-known debt sustainability condition suggests that the primary balance in percent of GDP and real growth should be on the right-hand side of a regression explaining the perceived creditworthiness of a sovereign, along with financial debt. Two measures of financial debt are used: in dataset (A), we include the public debt series as a share of GDP, presented in Holzman *et al.* (2004), while dataset (B) uses the public debt series provided by Tsibouris *et al.* (2006), to ensure robustness in our results regarding coverage.[10] In addition, international reserves, inflation, country size (proxied by the ratio of the country's GDP relative to

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[9] As noted by Baek *et al.* (2005), in the country risk literature, indicators of sovereign creditworthiness are usually represented by ratings of agencies and publications. For example, Jacque *et al.* (1996) also use the IIR and the Economic Intelligence Unit (EIU), while Cantor and Packer (1996) use Moody's and S&P ratings.

[10] The key difference in the series is that of coverage, with the Tsibouris *et al.* (2006) database including generally wider public sector debt in its series.

that of the U.S.), the current account balance in percent of GDP, an index of political stability[11] and an indicator of the regional "Original Sin" (as calculated by Hausman and Panizza, 2003a)[12] are used as control variables. All variables are for the year 2000, with the exception of real growth, which is the average for 1995-2000, and the "Original Sin", which is averaged for 1999-2001 (Annexes B and C).

We test for the effect of debt and IPD on country ratings by defining two different model specifications. In the first case, debt and IPD enter into the regression linearly, and a single coefficient for their impact on IIR is estimated across the sampled countries. The second specification allows for country-specific effects on the coefficients for debt and IPD by rescaling these variables by each country's relative size to the US economy.

Our estimates suggest that rating agencies do not consider financial debt and IPD equivalent when assessing country risk (Table 1, columns 1, 3, 5 and 7). Public debt has the expected positive sign and is significant across specifications; in contrast, the coefficient on IPD is close to zero, and not significant in all specifications, including those allowing for non-linearities on the countries' size. The coefficients on average growth rate, reserves, primary balance and relative size of the country are broadly significant across specifications and, as expected, tend to reduce the probability of default. The coefficient of the index of political stability has the expected sign, but is significant only in some of the specifications, suggesting that economic factors are the most important in the assessment of sovereign country risk. The multicollinearity test using the VIF (Variance Inflation Factor) reveals weak multicollinearity between total debt and the current account balance (Annex D). Thus, the same regressions are estimated by considering the net exports rather than the current account balance. The estimates for this specification are reported in columns 2, 4, 6 and 8, and broadly similar in magnitude and level of significance to those that included the current account balance.

Based on our regression estimates, we can reject the null hypothesis that the coefficients of IPD and public debt are equal. This provides support for the idea that markets see important differences between a sovereign's pension liabilities and financial public debt – differences which are relevant for the assessment of country risk. In consequence, making IPD explicit by financing the transition costs of a pension reform in the financial markets could trigger a deterioration of sovereign credit ratings.

### *3.2 Indirect approach*

We assess the impact of enacting a pension reform law on credit ratings by estimating a panel regression with fixed effects, in which country risk is the dependent variable and the key regressor is a dummy variable indicating a pension reform. The panel used in this section contains data for 63 countries, including available data for each country between 1979 and 2003. The credit risk perception is again measured using the IIR. The dataset has 20 countries where a pension privatization reform took place in the period 1979-2003; introduction of a fully funded pension scheme is represented with dummy variables following three different specifications.[13] In the first specification, the dummy takes a unit value the year the pension reform law is enacted. Taking the year of enactment as the date of the pension reform implies that the expectation of a known

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[11] The political stability variable measures the likelihood of violence threats to, or changes in, government, including terrorism. The source is Kaufmann, Kraay and Mastruzzi (2005) and it is measured in units ranging from –2.5 to 2.5, with higher values corresponding to more stability.

[12] See "OSIN3" variable, Hausmann and Pannizza (2004), Table 1.

[13] The countries are Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Peru, Poland, Uruguay, Iceland, Kazakhstan, Latvia, Russia, Slovakia, Estonia, Lithuania, Bulgaria and Croatia.

**Table 1**

## Institutional Investor Ratings (IIR), IPD and Debt

| | (A) Holzman *et al.* (2004) | | | | (B) Tsibouris *et al.* (2006) | | | |
|---|---|---|---|---|---|---|---|---|
| | Non-Interacted Debt and IPD | | Debt and IPD Interacted with Relative Country Size | | Non-Interacted Debt and IPD | | Debt and IPD Interacted with Relative Country Size | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Constant | 56.28 (0.00)*** | 56.67 (0.00)*** | 64.63 (0.00)*** | 66.98 (0.00)*** | 59.61 (0.00)*** | 59.29 (0.00)*** | 66.10 (0.00)*** | 68.43 (0.00)*** |
| Public Debt | 13.13 (0.08)* | 14.56 (0.05)** | –1071.25 (0.07)* | –982.69 (0.11) | 13.71 (0.02)** | 14.01 (0.01)*** | –1588.71 (0.06)** | –1535.34 (0.10)* |
| IPD | –0.10 (0.95) | 0.08 (0.96) | 28.43 (0.49) | 28.27 (0.51) | –0.52 (0.75) | –0.48 (0.76) | 119.57 (0.17) | 119.84 (0.21) |
| Primary Balance | –1.20 (0.11) | –1.25 (0.11) | –0.65 (0.36) | –0.75 (0.35) | –0.75 (0.27) | –0.74 (0.28) | –0.95 (0.19) | –1.00 (0.20) |
| Reserves | –96.31 (0.00)*** | –100.45 (0.00)*** | –68.92 (0.01)*** | –70.15 (0.02)** | –85.99 (0.01)*** | –85.69 (0.01)*** | –77.51 (0.00)*** | –78.52 (0.01)*** |
| Average Growth | –1.66 (0.17) | –1.83 (0.15) | –1.58 (0.10)* | –1.79 (0.11) | –1.96 (0.10)* | –1.94 (0.09)* | –1.76 (0.08)* | –1.95 (0.09)* |
| Inflation | –0.02 (0.88) | –0.03 (0.83) | 0.12 (0.29) | 0.13 (0.29) | 0.08 (0.47) | 0.08 (0.52) | 0.10 (0.40) | 0.10 (0.40) |
| Current Account | –0.39 (0.21) | | –0.55 (0.05) | | –0.01 (0.98) | | –0.53 (0.09)* | |
| Net Exports | | –0.37 (0.14) | | –0.47 (0.15) | | 0.02 (0.96) | | –0.46 (0.15) |
| Relative GDP | –216.24 (0.06)* | –194.88 (0.11) | | | –219.85 (0.05)** | –221.78 (0.06)* | | |
| Political Stability | –7.48 (0.14) | –7.11 (0.15) | –10.34 (0.06)* | –9.90 (0.07)* | –6.62 (0.19) | –6.61 (0.19) | –10.86 (0.05)** | –10.48 (0.07)* |
| Original Sin | 17.09 (0.29) | 16.26 (0.36) | 8.92 (0.57) | 6.62 (0.71) | 12.36 (0.43) | 12.47 (0.44) | 10.44 (0.48) | 8.12 (0.63) |
| Observations | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| $R$-squared | 0.72 | 0.72 | 0.69 | 0.68 | 0.74 | 0.74 | 0.70 | 0.69 |

Robust $p$ values in parentheses. * Significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.

upcoming reduction in IPD should be immediately reflected in the country's rating if the rating agencies are concerned about IPD. In the second specification, the dummy variable equals one both in the year of the reform and on the years that follow, to capture the permanent effect that the reform might have on country ratings. The third specification has dummy variables for the short term after the reform (when the reform is 0-4 years old), medium term (5-8 years old) and long term (9+ years old).

The control variables are largely as in the direct approach. The variables that represent macroeconomic and fiscal conditions are total public debt, international reserves, the primary balance, and the current account balance, all expressed in percent of GDP; real growth, inflation and country size (once more measured as the ratio of a country's GDP to that of the U.S.). Unfortunately, the political stability and Original Sin variables are not available for a sufficiently long period to be included in the exercise.[14]

We employ two different panel estimation techniques. We start with a static panel to estimate a model similar to the cross-country regressions in the direct approach. We also estimate a dynamic panel data analysis including instrumental variables for two reasons. First, the high persistence of IIR ratings might indicate a "reputation effect" (thus, the lagged ratings could contain relevant economic information); second, more robust estimation techniques can rule out potential inconsistency and biases in our regressions.

### *3.2.1 Static panel*

The estimates for our static panel regressions indicate that pension reform dummies (and hence, IPD) generally do not help explain a country's credit rating. Table 2 shows the results of the indirect approach following a model similar to the one used in the cross-country regressions. In general, the pension reform dummy variables are not significant[15] – a surprising result, given that about 80 per cent of the pension reforms in the sample also cut workers' pension benefits, which should have reduced the probability of defaulting on total debt in the future, at least to some extent.

Most control variables have the expected signs. Total debt has a positive and significant effect on the probability of default (as measured by the IIR), while higher international reserves reduce this probability; inflation has a significant but low positive coefficient. The positive and highly significant coefficient in the current account may seem unintuitive at first glance, but it is correct – with the average country in the sample holding a current account deficit, the coefficient implies a negative elasticity between the probability of default and improvements in the current account. Country size and the primary balance have the expected negative sign, but the coefficients are not significant. These results suggest that given the relevance of total debt and international reserves in the country risk assessments, the rest of the macroeconomic variables might have a relatively minor bearing for the rating agencies.

### *3.2.2 Dynamic panel*

As noted earlier, data inspection[16] suggests that our static panel results might be subject to potential problems of biased and inconsistent estimators. To address these issues, we estimate a dynamic panel using a two-stage least squares (2SLS) method yielding asymptotically efficient

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[14] The Variance Inflation Factor (VIF) shows no multicollinearity among these variables (Annex E).

[15] The exception is the medium-term dummy variable in the third specification, both when included alone and when interacted by the country's relative size. This implies that the pension reform might improve the rating only after 4 years. However, the lack of significance of the long-term dummy variable could mean that benefit on country ratings again fade away 8 years after the reform.

[16] The Arellano-Bond test confirms the existence of serial correlation of order one in our dataset.

**Table 2**

## IIR and Pension Reform: Static Panel Estimation with Fixed Effects

| | Non-interacted Debt and Dummies | | | Debt and Pension Dummies Interacted with Relative Country Size | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | Pension Temporal Dummy | Pension Permanent Dummy | Pension Dummy by Period | Pension Temporal Dummy | Pension Permanent Dummy | Pension Dummy by Period |
| Constant | 46.73 | 46.770 | 46.59 | 47.614 | 47.51 | 47.48 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** |
| Total Debt | 7.97 | 7.76 | 7.78 | 24.00 | 22.35 | 22.43 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.08)* | (0.11) | (0.11) |
| Pension Temporal Dummy | 0.91 | | | 64.77 | | |
| | (0.44) | | | (0.11) | | |
| Pension Permanent Dummy | | –4.05 | | | –106.79 | |
| | | (0.12) | | | (0.21) | |
| Pension Dummy Short Run | | | –3.22 | | | –39.82 |
| | | | (0.24) | | | (0.70) |
| Pension Dummy Medium Run | | | –7.62 | | | –156.88 |
| | | | (0.01)*** | | | (0.04)** |
| Pension Dummy Long Run | | | –5.19 | | | –40.002 |
| | | | (0.13) | | | (0.90) |
| Primary Balance | –2.624 | –3.87 | –5.27 | 6.09 | 4.78 | 4.65 |
| | (0.83) | (0.74) | (0.66) | (0.64) | (0.72) | (0.72) |
| Reserves | –24.72 | –24.76 | –24.20 | –26.60 | –26.58 | –26.49 |
| | (0.01)*** | (0.01)*** | (0.01)*** | (0.00)*** | (0.00)*** | (0.00)*** |
| Current Account Balance | 21.53 | 19.69 | 19.05 | 24.74 | 23.50 | 23.27 |
| | (0.01)*** | (0.01)** | (0.01)** | (0.01)*** | (0.01)*** | (0.01)*** |
| Growth | 0.03 | 0.03 | 0.02 | 0.047 | –0.044 | –0.047 |
| | (0.79) | (0.70) | (0.79) | (0.62) | (0.63) | (0.61) |
| Inflation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.07)* | (0.06)* | (0.05)* |
| Relative GDP | –57.030 | –55.235 | –53.825 | | | |
| | (0.19) | (0.19) | (0.18) | | | |
| Observations | 831 | 831 | 831 | 831 | 831 | 831 |
| *R* -squared | 0.41 | 0.41 | 0.42 | 0.32 | 0.33 | 0.33 |
| Number of Countries | 63 | 63 | 63 | 63 | 63 | 63 |

Robust *p* values in parentheses. * Significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.
Year dummies included in all models.
Fixed effects results are estimates with standard errors and test statistics consistent to heteroskedasticity and serial correlation.

estimates of our coefficients,[17] including the first lag of the suspected endogenous variables as instruments in the regression (Table 3).[18]

The estimation results are somewhat more mixed. In our first model, which considers both debt and the pension dummy variables independently of country size, the exercise again suggests that pension reform has not had a significant impact in the determination of credit ratings. In particular, the pension privatization dummy variables have statistically insignificant coefficients under each one of their potential specifications. Higher growth rates and primary balances reduce the probability of default as perceived by the rating agencies. Also, total debt and inflation raise perceived country risk. Most of the remaining control variables have the expected signs and are significant. As before, the apparently unexpected sign in the coefficient on the current account can be explained by the presence of current accounts deficits across the sample, yielding the correct sign for the elasticity of the modified IIR to improvements in the current account – with a narrowing current account deficit reducing the probability of default.

The coefficient on reserves also appears to have an incorrect sign in the estimation. A likely explanation is that the instruments used in this estimation could be introducing some inconsistency to the reserves variable. In this light, an alternative model that incorporates a different instrument (the third lag of the rating) was also estimated, showing that the lagged dependent variable captures the explanatory power of the reserves and the total debt. This is not surprising considering that these variables have shown to be the most relevant determinants of the ratings. In this context, the results of this estimation are consistent with the static model.

Finally, allowing for the interaction between the countries' relative size with the debt and pension dummy variables delivers a coefficient for public financial debt with a significant but unexpected negative sign, possibly suggesting that the "quality" of the country – as measured by its relative economic power – might have relatively more bearing on the sovereign's IIR ranking than its actual debt stock.[19] Pension dummies generally continue to prove insignificant and, at best, their effect on country ratings seem to show with a considerable lag and fade away quickly.

In sum, the econometric evidence suggests that, under a reasonable range of specifications and estimation methods, rating agencies treat IPD and financial public debt differently. As argued earlier, there are good reasons that could explain this differentiation, and this is a factor that must be taken into account when planning a pension reform.

## 4 A counterfactual study: Mexico's pension reform

In this section we illustrate the implications of pension reform by constructing simple counterfactual scenarios for the Mexican case As the country undertook a radical pension reforms in the nineties, we ask how fiscal balances and debt would have evolved if such a reform had not taken place. For this purpose, we construct a counterfactual scenario by adding to fiscal revenues the contributions actually paid into individual capitalization accounts by the insured populations since the reform. We also reduce the government interest bill in proportion to the debt that the government would have avoided issuing if they had received those contributions as revenue. We keep the observed underlying (non-pension) fiscal balance. The construction of such a

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[17] See Technical Appendix.

[18] The bottom of Table 3 displays the tests for serial correlation, and the number of observations and countries. The tests for serial correlation show that there is no serial correlation of order 1 and 2.

[19] Furthermore, the relative size indicator could likely be picking up the impact of other structural issues (such as political stability and the "original sin" ranking) which were not available for the panel regressions under the indirect method.

**Table 3**

## IIR and Pension Reform: Dynamic Panel (2SLS) Estimation Results

| | Non-interacted Debt and Dummies | | | Debt and Pension Dummies Interacted with Relative Country Size | | |
|---|---|---|---|---|---|---|
| | 1 Temporal Dummy | 2 Permanent Dummy | 3 Dummy by Period | 4 Temporal Dummy | 5 Permanent Dummy | 6 Dummy by Period |
| Constant | –0.18 | 0.48 | –4.23 | 0.04 | 0.20 | 0.16 |
| | (0.76) | (0.47) | (0.00)*** | (0.94) | (0.68) | (0.76) |
| Total Debt | 1.54 | 1.49 | 1.26 | –18.48 | –18.51 | –17.72 |
| | (0.13) | (0.14) | (0.10)* | (0.10)* | (0.09)* | (0.10)* |
| Pension Temporal Dummy | –0.07 | | | 11.65 | | |
| | (0.89) | | | (0.62) | | |
| Pension Permanent Dummy | | –0.81 | | | –62.83 | |
| | | (0.36) | | | (0.33) | |
| Pension Dummy Short Run | | | –0.81 | | | –21.88 |
| | | | (0.36) | | | (0.59) |
| Pension Dummy Medium Run | | | –1.14 | | | -60.41 |
| | | | (0.20) | | | (0.06)* |
| Pension Dummy Long Run | | | 0.92 | | | 80.00 |
| | | | (0.62) | | | (0.05)** |
| Primary Balance | –2.26 | –2.14 | –2.26 | –1.98 | –1.91 | –2.01 |
| | (0.54) | (0.56) | (0.54) | (0.60) | (0.61) | (0.59) |
| Reserves | 4.290 | 4.18 | 4.01 | 4.61 | 4.45 | 4.34 |
| | (0.064* | (0.07)* | (0.09)* | (0.07)* | (0.08)* | (0.10) |
| Current Account Balance | 11.15 | 10.81 | 10.49 | 10.95 | 10.37 | 9.73 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.01)*** | (0.01)*** | (0.01)*** |
| Growth | –0.06 | –0.06 | –0.06 | –0.07 | –0.07 | –0.06 |
| | (0.04)** | (0.04)** | (0.04)** | (0.03)** | (0.02)** | (0.05)** |
| Inflation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** |
| Relative GDP | –22.03 | –21.39 | –20.52 | | | |
| | (0.36) | (0.37) | (0.37) | | | |
| L. IIR | 0.37 | 0.36 | 0.35 | 0.39 | 0.40 | 0.39 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** |
| L. Total Debt | 1.80 | 1.77 | 1.72 | 11.98 | 11.20 | 10.52 |
| | (0.01)** | (0.01)** | (0.02)** | (0.23) | (0.23) | (0.27) |
| L. Total Debt | | | | | | |
| | | | | | | |
| L. Pension Temporal Dummy | 0.01 | | | 3.24 | | |
| | (0.98) | | | (0.88) | | |
| L. Pension Permanent Dummy | | -0.60 | | | –38.72 | |
| | | (0.20) | | | (0.00)*** | |
| L. Pension Dummy Short Run | | | 0.51 | | | –53.48 |
| | | | (0.24) | | | (0.02)** |
| L. Pension Dummy Medium Run | | | –1.67 | | | –92.27 |
| | | | (0.03)** | | | (0.00)*** |
| L. Pension Dummy Long Run | | | 2.68 | | | 320.68 |
| | | | (0.29) | | | (0.00)*** |
| L. Primary Balance | –8.36 | –8.41 | –8.290 | –9.36 | –9.29 | –8.91 |
| | (0.07)* | (0.07)* | (0.07)* | (0.06)* | (0.07)* | (0.08)* |
| L. Reserves | –2.70 | –2.90 | –2.47 | –3.60 | –3.36 | –2.87 |
| | (0.51) | (0.47) | (0.53) | (0.40) | (0.41) | (0.47) |
| L. Current Account Balance | 9.59 | 9.54 | 9.35 | 8.99 | 8.87 | 8.68 |
| | (0.01)*** | (0.01)*** | (0.01)*** | (0.01)*** | (0.02)** | (0.02)** |
| L. Growth | –0.09 | –0.090 | –0.09 | –0.10 | –0.10 | –0.10 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** | (0.00)*** |
| L. Inflation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.00)*** | (0.00)*** | (0.00)*** | (0.01)*** | (0.01)*** | (0.01)*** |
| L. Relative GDP | –7.49 | –7.84 | –8.13 | | | |
| | (0.43) | (0.43) | (0.41) | | | |
| m1 | 1.26 | 1.23 | 1.40 | 1.34 | 1.16 | 1.28 |
| m2 | –1.33 | –1.30 | –1.14 | –1.15 | –1.27 | 0.99 |
| Observations | 651 | 651 | 651 | 651 | 651 | 651 |
| *R*-squared | 0.57 | 0.57 | 0.58 | 0.55 | 0.56 | 0.58 |
| Number of Countries | 60 | 60 | 60 | 60 | 60 | 60 |

Robust *p* values in parentheses. * Significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.
L. indicates that the variable is lagged a period. Year dummies included in all models.
2SLS effects results are estimates with standard errors and test statistics consistent to heteroskedasticity and serial correlation.
m1 and m2 are tests for first-order and second-order serial correlation, asymptotically N(0,1). These test the first-differenced residuals.

counterfactual helps illustrate the order of magnitude of the adjustment needed in the fiscal sector if a pension reform is to be absorbed without allowing the trajectory of financial debt to change.

### *4.1 Pension privatization in Mexico*

The Mexican pension reform replaced the old defined-benefit, PAYG system for private sector workers with a privately managed, defined-contributions scheme in July 1997. According to Zviniene and Packard (2002), this reform reduced IPD by 7 per cent of GDP by 2001. With the reform, workers affiliated to the old program had to switch to the new one. These workers (but not those joining social security schemes for the first time after the reform) retained the option of retiring under the provisions of the old scheme by transferring to the government the assets accumulated in their capitalization accounts at the moment of retiring. Thus, while the government remained liable to service its previous implicit contracts when workers chose to remain under the old scheme, it stopped collecting the pension contributions paid by all private sector workers.

As noted earlier, Fiess (2003) examined country risk indexes for Mexico before and after the pension reform, concluding that it had no impact on country risk. While we agree with this observation, we argue that the pension reform did not have a negative impact on the country's credit rating *because the government made a significant effort to control its total explicit debt* – which, as we have seen, is the main indicator used by rating agencies in determining their risk assessments.[20]

To illustrate this point, we calculate a counterfactual scenario for Mexico's public debt as explained earlier.[21] We add to fiscal revenues workers' contributions to their private capitalization accounts (AFORES) and subtract from government expenditures the interest cost that the government would have saved if it had reduced financing with those contributions (Figure 3). The contributions that actually went to private capitalization accounts represent the gap between the actual primary balance and the counterfactual primary balance; both measures show a surplus between 1996 and 2004. The exercise reveals an effort to undo the easing of policies that followed the 1995 crisis. The path of the counterfactual debt following the pension reform in 1997 shows a clear downward trend, hinting that an adjustment of the non-pension or underlying balance prevented the large cash imbalance in the residual public pension system from causing financial debt to rise and thereby helped preserve the country's credit rating.

### *4.2 Risk assessment*

Based on the regression estimates of previous section, we measure the impact of pension reform on the Mexican credit rating.[22] Table 4 summarizes the cumulative estimated effect of the pension reform on IPD and explicit debt in the country. By 2001, IPD had declined as expected, while explicit debt had risen moderately. In fact, the reduction in IPD exceeded, in absolute terms, the increase in financial debt, as one should have hoped for reforms aimed at improving long-term solvency. The final column presents the estimated impact of this change in Mexico's composition of public liabilities on the country's sovereign credit ratings, based on our estimates from Table 1

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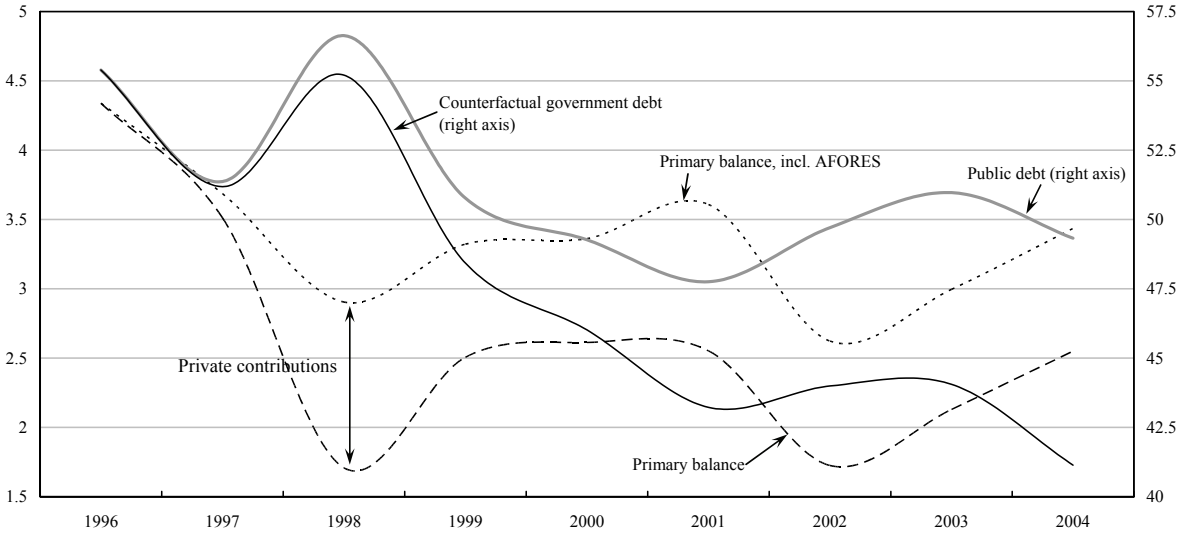
[20] Another possibility (see Gil, Packard and Yermo, 2005, chapter 3) is that the negligible effect on Mexico's country risk may reflect the country's low IPDs by Latin American standards prior to the reform. However, even if relatively low by regional standards, IPD was high in absolute terms and the reform reduced it by a significant amount in a few years.

[21] The concept of public debt used in the calculations shown in this section is the broadest one available for Mexico, the historical stock of the financial requirements of the public sector.

[22] The IIR used in this exercise is the one officially released, rather than the transformed variable used in the regressions presented in the previous sections.

**Figure 3**

**Mexico: Counterfactual Explicit Debt and Primary Balance**
*(percent of GDP)*




The counterfactual debt takes into account the debt creating flow generated from the lost of AFORES contributions and its cost.
Source: Fund staff estimates.

**Table 4**

**Estimated Impact of Pension Reform on IIR**

| Country | Pension Reform Implementation | Change in Explicit Debt Due to the Reform, 2001 | Reduction in IPD Due to the Reform, 2001[a] | Estimated Change in IIR Due to the Reform by 2001[b] |
|---|---|---|---|---|
| | | *(percent of GDP)* | | |
| Mexico | lug-97 | 4.6 | 7.1 | 0.66 |

[a] Source: Zviniene and Packard (2002) and authors.
[b] Impact from the increase in explicit debt and the law enactment. Calculated from estimates presented in Table 1, specification A(2), and the counterfactual debt scenarios.

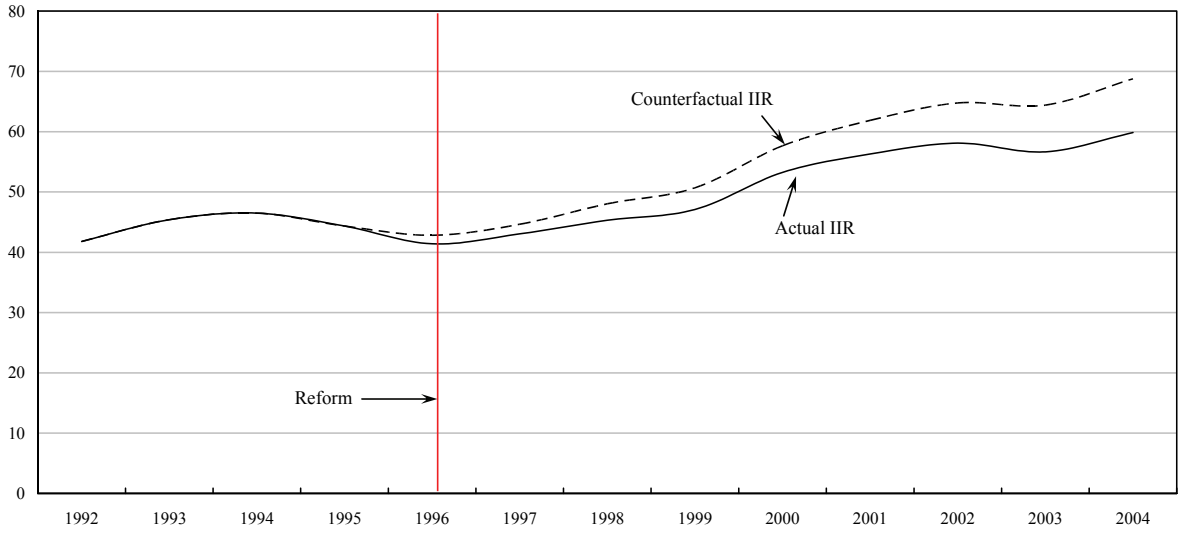
and the counterfactual debt scenario. In fact, the estimated sovereign credit risk was expected to rise marginally, given the limited increase in explicit public debt, and despite the large reduction in IPD. This result is consistent with the observations presented by Fiess (2003).

We also simulate the counterfactual credit ratings for Mexico over a time period (Figure 4), based on the estimation results of the dynamic panel estimates with a period dummy presented in Table 3. The counterfactual rating comes from the difference between actual and counterfactual debt.[23] According to our estimates, the IIR for Mexico in 2001 would have been 5.70 points better in the absence of a pension privatization – a relatively small amount, also in line with the results of Fiess (2003).

[23] The effect of the counerfactual primary balance is not taken into account into the counterfactual ratings, since the estimated coefficient on the primary balance is not statistically significant.

**Figure 4**

**Mexico: Counterfactual IIR**
*(percent of GDP)*




Source: Staff estimates.

## 5 Conclusion

In this paper, we explored the effect of a pension reform on country risk perceptions by examining the relevance of government debt and IPD debt for the credit ratings. We find that, rating agencies do not take into account IPD when assessing sovereign risk, but focus on the country's explicit financial debt. Now, determining whether this is the result of a rational assessment of the differences between IPD and financial debt – which we judge economically significant – or of myopia is probably besides the point. This bias (if we can call it so) in the assessment of sovereign risk appears to be robust to a reasonable range of model specifications, and does not just reflect problems in the measurement of IPD. Thus, the implications for the perception of creditworthiness of financing the transition costs of pension reform with debt, and a government's ability to finance them with adjustment, are factors to take into account when considering reform. It would be an error to waive the issue away by declaring that the reform simply makes implicit debt explicit.

A clear policy implication of the paper is that a radical pension reform that aims at improving a sovereign's long-term solvency by reducing implicit pension liabilities could end up increasing the riskiness of the government's balance sheet in the short and medium term, thereby hurting the country's credit rating, unless fiscal adjustment keeps the explicit debt trajectory from deteriorating. There are two corollaries to this conclusion. The first is that pension reforms require fiscal space to be implemented, to help compensate their transition costs in the short and medium terms. In support of pension privatization, the reforming government would be well advised to take policy actions to offset some or all of the transitional costs of the reform and their effects on the path of financial debt. The second is that when governments do not have room to implement the needed fiscal adjustment to offset the near- and medium-term cash costs of a pension privatization, it might be preferable to follow a gradual but decisive parametric approach to improve the sustainability to the PAYG pension system before a transition to a fully-funded system might be undertaken.

# ANNEXES

## ANNEX A
## Distribution of Countries by Rating, S&P, 2004

| | |
|---|---|
| AAA | Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Isle of Man, Liechtenstein, Luxembourg, Netherlands, Norway, Singapore, Sweden, Switzerland, United Kingdom, United States |
| AA | Andorra, Belgium, Bermuda, Italy, Japan, New Zealand, Portugal, Spain, Taiwan |
| A | The Bahamas, Bahrain, Botswana, Chile, Cyprus, Czech Republic, Estonia, Greece, Hong Kong, Hungary, Iceland, Israel, Korea, Kuwait, Latvia, Lithuania, Malaysia, Malta, Qatar, Saudi Arabia, Slovenia |
| BBB | Barbados, Bulgaria, China, Croatia, Kazakhstan, Mexico, Montserrat, Oman, Poland, Slovak Republic, South Africa, Thailand, Trinidad and Tobago, Tunisia |
| BB | Brazil, Colombia, Cock Islands, Costa Rica, Egypt, El Salvador, Guatemala, India, Jordan, Macedonia, Panama, Peru, Philippines, Romania, Russia, Turkey, Vietnam |
| B | Belize, Benin, Bolivia, Burkina Faso, Ghana, Grenada, Indonesia, Jamaica, Lebanon, Madagascar, Mali, Mongolia, Mozambique, Pakistan, Papua New Guinea, Paraguay, Senegal, Serbia, Suriname, Ukraine, Uruguay, Venezuela |
| CCC | Cameroon, Ecuador |
| CC | Dominican Republic |

Source: Standard and Poor's.

## ANNEX B

| Series | Description and Sources | Sample Period |
|---|---|---|
| Institutional Investor's Country Credit Ratings | Institutional Investor | 1979-2003 |
| Standard and Poor's Country Sovereign Ratings | Standard and Poor's | 2000 |
| Implicit Pension Debt/GDP | Holzmann, Palacios and Zviniene(2004), World Bank Discussion Papers | 2000 |
| Political Stability | World Bank's Governance Research Indicator Country Snapshot (GRICS) | 2000 |
| Public Debt/GDP | Holzmann, Palacios and Zviniene(2004), World Bank Discussion Papers | 1979-2003 |
| Total Debt/GDP | Experience with Large Fiscal Adjustments database: Tsibouris *et al.* (2006), completed with IMF data | 1979-2003 |
| Primary Balance/GDP | Experience with Large Fiscal Adjustments database: Tsibouris *et al.* (2006) and OECD | 1979-2003 |
| Reserves | World Development Indicators, World Bank | 1979-2002 |
| Growth Rate | World Development Indicators, World Bank | 1979-2003 |
| Inflation | World Development Indicators, World Bank | 1979-2003 |
| GDP | World Development Indicators, World Bank | 1979-2003 |
| Current Account Balance | World Development Indicators, World Bank | 1979-2003 |
| Net Exports | World Development Indicators, World Bank | 1979-2003 |
| Pension Reform Dummy | Own Research | Different years |
| Spreads | JP Morgan | 1998-2001 |

## Annex C

| | | |
|---|---|---|
| Argentina | Hungary | Peru |
| Bolivia | Iran | Philippines |
| Brazil | Korea | Poland |
| Chile | Kyrgyz Republic | Portugal |
| Colombia | Lithuania | Romania |
| Costa Rica | Malta | Senegal |
| Croatia | Mauritius | Slovakia |
| Dominican Republic | Mexico | Slovenia |
| Ecuador | Moldova | Turkey |
| El Salvador | Morocco | Ukraine |
| Estonia | Nicaragua | Uruguay |

## Annex D

| **Variable** | **Variance Inflation Factor (VIF)**[a] | **Tolerance**[b] |
|---|---|---|
| CA Balance | 2.67 | 0.37 |
| Total Debt | 2.52 | 0.40 |
| Political Stability | 2.09 | 0.48 |
| Inflation | 1.78 | 0.56 |
| IPD | 1.69 | 0.59 |
| Average Growth | 1.57 | 0.64 |
| Reserves | 1.54 | 0.65 |
| Primary Balance | 1.50 | 0.67 |
| Relative GDP | 1.33 | 0.75 |
| **Variable** | **Variance Inflation Factor (VIF)**[a] | **Tolerance**[b] |
| Net Exports | 2.44 | 0.41 |
| Political Stability | 2.07 | 0.48 |
| Total Debt | 2.05 | 0.49 |
| Inflation | 1.79 | 0.56 |
| Average Growth | 1.71 | 0.58 |
| IPD | 1.61 | 0.62 |
| Reserves | 1.58 | 0.63 |
| Primary Balance | 1.53 | 0.65 |
| Relative GDP | 1.38 | 0.72 |

[a] VIF = $1/(1–R^2)$; [b] Tolerance = $1–R^2$.

**Annex E**

| | Variance Inflation Factor (VIF)[a] | Tolerance[b] |
|---|---|---|
| Pension Reform | 1.01 | 0.99 |
| Primary Balance | 1.13 | 0.88 |
| Total Debt | 1.11 | 0.90 |
| Reserves | 1.23 | 0.81 |
| Net Exports | 1.27 | 0.79 |
| Growth | 1.06 | 0.95 |
| Inflation | 1.01 | 0.99 |
| Relative GDP | 1.07 | 0.93 |

[a] VIF = $1/(1–R^2)$; [b] Tolerance = $1–R^2$.

**Annex F**

| | OLS | FE |
|---|---|---|
| **Institutional Investor Rating** | | |
| L.iirating | 1.00 | 0.92 |
| | (0.00)*** | (0.00)*** |
| **Primary Balance** | | |
| L.pb | 0.80 | 0.67 |
| | (0.00)*** | (0.00)*** |
| **Inflation** | | |
| L.inflation | 0.30 | 0.22 |
| | (0.12) | (0.03)** |
| **Growth** | | |
| L.growth | 0.61 | 0.36 |
| | (0.00)*** | (0.00)*** |
| **Current Account Balance** | | |
| L.cabalance | 0.79 | 0.65 |
| | (0.00)*** | (0.00)*** |
| **Reserves** | | |
| L.reserves | 1.01 | 0.88 |
| | (0.00)*** | (0.00)*** |
| **Total Debt** | | |
| L.totaldebt | 0.99 | 0.82 |
| | (0.00)*** | (0.00)*** |

Robust *p* values in parentheses.
* Significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.
L. indicates that the variable is lagged a period.
Year dummies included in all models.

## TECHNICAL APPENDIX

There are two reasons for considering a dynamic panel data analysis for our estimation in Section 2. First, the high persistence of the ratings provided by the IIR might indicate a "reputation effect" faced by the rating agencies. Thus the lagged ratings should contain relevant economic information. The AR(1) process estimations for each dependent variable, included in Annex F, show that series such as the investor rating, current account balance, reserves and the total debt are highly persistent. Second, the size of the coefficients on total debt and international reserves estimated in the static panel seem very high, hinting at a possible overestimation.

The model considered here is:

$$y_{i,t} = \beta x_{i,t} + \eta_i + v_{i,t} \tag{1}$$

$$v_{i,t} = \rho v_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

for $i = 1,\ldots, N$ and $t = 2,\ldots, T$,

where:

$$E(\varepsilon_{i,s}\, \varepsilon_{i,t}) = 0 \text{ for } s \neq t$$

$$E(y_{i,t}\, \varepsilon_{i,t}) = 0 \text{ for } t = 2,\ldots,T$$

The dependent variable, $y_{i,t}$, represents the IIR for country $i$ at period $t$, while $x_{i,t}$ represents a matrix containing the rest of the variables. There is an unobservable individual effect for each country, $\eta_i$. The error term is given by $v_{i,t}$. The Arellano-Bond test for serial correlation confirms the existence of serial correlation of order one for our dataset. In order to quantify the level of serial correlation the residuals from the ordinary least squares (OLS) estimation are regressed on the lagged residuals. This is:

$$v_{i,t} = \rho v_{i,t-1} + \varepsilon_{i,t}$$

Obtaining a significant and strong serial correlation of order one, represented by $\rho > 0$. The static model is transformed in order to obtain a dynamic representation with serially uncorrelated shocks. Lagging equation 1 by one period and multiplying it by $\rho$ gives:

$$\rho y_{i,t-1} = \rho\beta x_{i,t-1} + \rho\eta_i + \rho v_{i,t-1} \tag{3}$$

Using (3), equation (1) can be rewritten as:

$$y_{i,t} - \rho y_{i,t-1} = \beta x_{i,t} - \rho\beta x_{i,t-1} + \eta_i - \rho\eta_i + v_{i,t} - \rho v_{i,t-1}$$

$$y_{i,t} = \rho y_{i,t-1} + \beta x_{i,t} - \rho\beta x_{i,t-1} + (1-\rho)\eta_{i} + \varepsilon_{i,t} \tag{4}$$

This is a dynamic panel model with serially uncorrelated shocks.

Some considerations about estimation alternatives are relevant to find the consistent estimator for $\rho$ and $\beta$. Since the explanatory variable $y_{i,t-1}$ is positively correlated with the error term $(1-\rho)\eta_{i} + \varepsilon_{i,t}$ due to the presence of the individual effects, the OLS estimator in the levels equation (4) is inconsistent. This estimator is biased upwards as a result of the positive correlation between $y_{i,t-1}$ and $\eta_i$. In principle, the Fixed Effects (FE) estimator could be seen as addressing this inconsistency by transforming equation (4) to eliminate $\eta_i$. This transformation consists in expressing the original observations as deviations from the individual means. OLS is used to estimate the transformed equation. The individual effects are removed from the transformed equations since the mean of the time invariant $\eta_i$ is itself $\eta_i$. For simplicity, we focus on the simple AR(1) model, abstracting from the variables $y_{i,t-2}$, $x_{i,t}$ and $x_{i,t-1}$, however, the same reasoning applies when they are present. The transformed model is given by:

$$\tilde{y}_{i,t} = \rho_1 \tilde{y}_{i,t-1} + \tilde{e}_{i,t} \tag{5}$$

where:

$$\tilde{y}_{i,t-1} = y_{i,t-1} - 1/(T-1)(y_{i,1} + \ldots + y_{i,t} + \ldots + y_{i,T-1}) \tag{6}$$

$$\tilde{e}_{i,t} = e_{i,t} - 1/(T-1)(e_{i,2} + \ldots + e_{i,t-1} + \ldots + e_{i,T}) \tag{7}$$

Thus, this transformation implies a correlation between the transformed lagged dependent variable and the transformed error term. The component $-y_{i,t}/(T-1)$ in equation (6) is correlated with $e_{i,t}$ in equation (7), and the component $-e_{i,t-1}/(T-1)$ in (7) is correlated with $y_{i,t-1}$ in (6). Nickel (1981) and Bond (2002) show that these negative correlations dominate positive correlations between other components such as $-e_{i,t-1}/(T-1)$ and $-y_{i,t-1}/(T-1)$, so that the correlations between the transformed lagged dependent variable and the transformed error term are negative. This indicates that the FE estimator is biased downwards. Thus, we might expect that a consistent estimator will lie between OLS and FE estimates, or at least not be significantly out of the interval described by these two estimators.

A class of consistent estimators would require to first transforming the model to eliminate the individual effects and then apply instrumental variables. As noted before the FE estimator is not useful in this context, since it introduces the shocks from all time periods into the transformed error term. In this context, the first-differencing transformation has proved to be more promising. First differencing equation (4) gives:

$$y_{i,t} - y_{i,t-1} = \rho(y_{i,t-1} - y_{i,t-2}) + \beta(x_{i,t} - x_{i,t-1}) - \rho\beta(x_{i,t-1} - x_{i,t-2}) + \varepsilon_{i,t} - \varepsilon_{i,t-1}$$

$$\Delta y_{i,t} = \pi_1 \Delta y_{i,t-1} + \pi_2 \Delta x_{i,t} - \pi_3 \Delta x_{i,t-1} + \Delta\varepsilon_{i,t} \tag{8}$$

For $t=2,\ldots,T$, for which we have the moment conditions:

$$E(y_{i,t-s}\,\Delta\varepsilon_{i,t}) = 0 \text{ for } s \geq 2$$

$$E(x_{i,t-s}\,\Delta\varepsilon_{i,t}) = 0 \text{ for } s \geq 1$$

In equation (8) the correlation between $\Delta y_{i,t-1}$ and $\Delta\varepsilon_{i,t}$ is negative since $\Delta y_{i,t-1} = y_{i,t-1} - y_{i,t-2}$ and $\Delta\varepsilon_{i,t} = \varepsilon_{i,t} - \varepsilon_{i,t-1}$. However, if $y_{i,t-1}$ is uncorrelated with the subsequent disturbances, $\varepsilon_{i,t}$, then $y_{i,t-2}$ and $\Delta y_{i,t-2}$ are valid instrumental variables for $\Delta y_{i,t-1}$ in the first-differencing equations. The two-stage least squares (2SLS) estimator[24] provides asymptotically efficient estimators in this context. In particular, for the small size that characterizes our sample. In the case of large samples the Generalized Method of Moments (GMM), developed by Hansen (1982) provides efficient estimators.

[24] Also known as Anderson and Hsiao (1981) estimator.

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# PENSION FUNDS AND FINANCIAL MARKETS: EVIDENCE FROM THE NEW EU MEMBER STATES

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*The recently established pension funds in the new EU Member States face investment risks that stem from a challenging macroeconomic environment, including, inter alia, volatile inflation and shallow domestic capital markets. The question arises whether a move to funded pension system in such a volatile economic environment always increases the long-term sustainability of public finances. Against this background, this paper surveys the main challenges for pension systems and public finances in the new EU Member States and provides evidence on pension fund performance in recent years. We conclude that in some of these countries the limited diversification of assets, the impact of high inflation as well as the financial market turmoil may have indeed reduced the positive impact of systemic pension reforms on fiscal sustainability.*

## 1 Introduction

During the 1990s many of the Member States that entered the EU in 2004 or 2007 faced severe problems with the functioning of their statutory pay-as-you-go (PAYG) public pension systems. Particularly the relatively low retirement ages, high replacement rates and rather high social security contribution rates – which provided limited incentives to participate in the system – put the PAYG schemes under pressure as their economies shrank and the informal sector rose. As a consequence, several of these countries started to implement parametric reforms of their PAYG public pension systems in order to contain the rise in pension expenditure, including, inter alia, reductions in replacement rates.[1] At the same time, several of the new EU Member States (NMS) started to introduce a mandatory fully funded component into their pension systems and/or set the framework for a voluntary pension pillar (see Holzmann and Palacios, 2001, and Nickel and Almenberg, 2006). Notwithstanding these parametric and systemic pension reforms, this paper argues that challenges for these countries' age-related public expenditures may remain sizeable, both in the short-to-medium as well as in the long term. First, in the presence of a substantial ageing of the population, in several NMS public pension expenditure-to-GDP ratios are projected to rise partly significantly over the long term, despite already enacted reforms (see European Commission and Economic Policy Committee, 2009). Second, in addition, governments in the NMS may be called upon to step in also for risks associated with the private pension pillar. For example, in the NMS the newly established private pension funds face significant risks related to shallow domestic capital markets, volatile inflation and flexible exchange rates. The economic crisis has shown that funded pension systems are vulnerable to financial market developments. Pensioners who retired recently and who had to buy annuities out of their savings from the private pension pillar tended to suffer losses. Nevertheless, at the current juncture, these losses seem to be contained in the NMS as many of these systems are not yet mature and the amount of accumulated savings in these pension funds is thus limited. This notwithstanding, with increasing maturity of these systems and rising importance of private pension income, risks of losses from the private pension pillar may give rise to calls to governments to step in and ensure sufficient retirement

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[1] See for a survey provided in Cangiano, Cottarelli and Cubeddu (1998).

incomes.[2] For example, as the experience with the economic crisis shows, Worldbank (2009) argues – though not specifically for the NMS – "Indeed, there are some, primarily, low income workers with lower saving levels who might, even under a phased annuity purchase or withdrawal program, be required to liquidate their diminished accounts in the short term. This group could be assisted through programs that offer a minimum return guarantee, analogous to what has been provided in the banking system in response to the crisis". They conclude that "A well-designed zero pillar or the incorporation of a minimum pension guarantee into one of the other pillars can mitigate the effects of future economic volatility on the vulnerable elderly and lifetime poor. These systems need to be carefully designed to ensure their affordability and that they do not have negative incentive effects". Also IMF (2009a) sees private pension related risks for the general government arsing from the crisis to stem from "[..] pressures to make up for the losses suffered by pensioners covered by private pension plans". Thus, to sum up, if the aggregate outcome the individual pensioner receives from both the public PAYG as well as from statutory and voluntary funded private pension systems would be inadequate to ensure a decent standard of living, pressure on governments to top up "insufficient" pensions may tend to rise, posing additional risks to the general government budget, which governments had originally hoped to reduce through the implementation of funded pensions systems.[3]

Against this background, this paper addresses the risks to public finances associated with a move to funded pension systems in a volatile economic environment as in catching up economies such as the NMS. The analysis covers ten countries, namely Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Romania, Poland, Slovenia and Slovakia. As a caveat, the analysis is impeded by poor data availability in the area of private pensions. Not only are there often only a few annual observations, given the relatively short period of time since the implementation of these funded systems. In addition, the lack of comparable data across the NMS impedes an in-depth econometric analysis in this field. Against this backdrop, this paper takes stock of the available pension asset data and links it with inflation as well as with the most recent financial market developments. This way it identifies exposures to risks and where government budgets should therefore account for these risks over the medium to long term. The paper finds the risks for public finances not so much to come from potentially strong variation in pensions incomes due to stock market developments as the share of pension funds invested in stocks tends to be comparatively low. In the contrary, it finds that in some of the NMS the limited diversification of assets and especially the relatively high fraction of total assets held in government debt securities limits to some extent the possible positive impact from systemic pension reforms over the long term. In case pension outcomes would render pension incomes insufficient during the catching up process over the medium to long term, this could potentially lead to a stepping in of the government and thus imply a smaller relieve to general government budgets than anticipated. As a consequence, while maintaining multi-pillar pension systems continues to be of paramount importance, a wider diversification of assets and better financial knowledge is decisive.

The paper is structured as follows. Section 2 presents a brief overview of pension systems in the NMS. Section 3 then surveys the pension system related challenges for public finances in the NMS. Section 4 first addresses the severe data limitations in the area of research on private pensions in the NMS. In order to analyse the performance of private pension funds in these countries against the background of inflationary and capital market developments, the paper then surveys the asset structure of private pension funds and aims at identifying the vulnerability of

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[2] At the same time, several NMS weakened the second pillar by, *inter alia*, allowing employees to reduce contributions to the second pillar and increase contributions to the PAYG systems (see for a survey Antolin and Stewart, 2009).

[3] Against this background, also the Economic Policy Committee and European Commission (2009) in their regular projections on age-related spending for the EU27 intend to increase their reporting on private pensions.

**Table 1**

**Pension Systems in the New EU Member States**

| Country | Old-age Pension Scheme PAYG | Funded Pension Scheme | | Occupational Pension Scheme (Voluntary Participation) | Minimum Pension/ Social Assistance |
|---|---|---|---|---|---|
| | | Mandatory Private Pension | Voluntary Private Pension | | |
| Bulgaria | x | x | x | x | x |
| Czech Republic | x | - | x | - | x |
| Estonia | x | x | x | - | x |
| Latvia | x | x | x | - | x |
| Lithuania | x | voluntary | x | - | x |
| Hungary | x | x | x | - | x |
| Poland | x | x and voluntary | x | x | x |
| Romania | x | x | - | - | x |
| Slovenia | x | - | x | x | x |
| Slovakia | x | x and voluntary | x | - | x |

Source: European Commission and Economic Policy Committee (2009).

these schemes against the background of the in some instances high inflation over the past years and the 2008-09 stock market developments. Section 5 draws policy conclusions.

## 2 Overview of pension systems in the NMS

All NMS have a funded pension pillar in combination with the standard old-age PAYG public pension scheme (see Table 1). While all of these countries apart from Romania have a private pension scheme with voluntary participation, not all of these countries have yet implemented a private pension scheme with mandatory participation. In the Czech Republic and Slovenia a mandatory private pension scheme does not exist at all, while in Lithuania, Poland and Slovakia, participation in these schemes is voluntary for some groups. In principle, the younger cohorts are encouraged to participate in the funded schemes, while the older cohorts closer to retirement have more flexibility to decide whether to participate or not. Occupational pension schemes exist only in Bulgaria, Poland and Slovenia. As the last column of Table 1 indicates, in all of the countries analysed here, a minimum pension and/or social assistance scheme exists. Consequently, it could, in principle, have a budgetary impact if pensions received from the first, second and third pillar of the pension system would turn out to be below the levels of either a minimum pension or social assistance, which would in such cases be paid to pensioners.

As Table 2 shows, statutory funded private pension schemes differ significantly across countries. First, the stage of development of these systems differs depending on the year of their

**Table 2**

**Statutory-funded Private Pension Schemes**

| Country | Year of Introduction | Total Contribution *(percent of gross wages)* | Share Paid by Employer | Share Paid by Employee |
|---|---|---|---|---|
| Bulgaria | 2002 | 5 | 60 | 40 |
| Estonia | 2002 | 6 | 67 | 33 |
| Latvia | 2001 | 4 (in 2007) rising to 10 in 2010 | 27 | 73 |
| Hungary | 1998 | 8 (for participants of so-called hybrid system: 2% can be given by employer) | 0-(20) | 100-(80) |
| Poland | 1999 | 7.3 | 0 | 100 |
| Romania | 2004 | 2 (in 2008) rising to 6 by 2016 | 0 | 100 |
| Slovakia | 2005 | 9 | 100 | 0 |

Source: Social Protection Committee (2008).

implementation. For example, Hungary[4] already introduced its statutory private pension scheme in 1998, while Slovakia implemented it only in 2005. In other words, the Slovak scheme is in this sense less mature than the Hungarian. Second, statutory funded private pension schemes differ both in terms of contribution levels and how these are shared between employers and employees. For example, in Poland and Romania the statutory pension scheme is fully financed by employees, while it is fully financed by employers in Slovakia.[5]

## 3 Pension system related challenges for public finances in the NMS

The share of public expenditure on pensions in total general government expenditure varies widely across the NMS (see Figure 1). With around 26 per cent of total general government expenditure, this share was largest in Romania in 2008, followed by Bulgaria (22.4 per cent). In contrast, with about 13 per cent, this share was lowest in Hungary.[6] As Figure 1 also shows, Poland and Latvia have reduced the share of public pension expenditure in total general government

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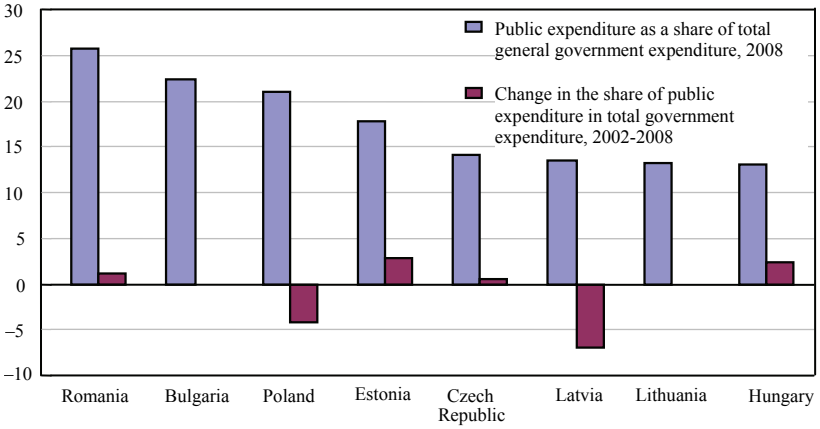
[4] However, Orbán and Palotai (2005) showed that the Hungarian pension system was even after the pension reform in 1998 unsustainable. In addition, they claim that the returns recorded in the private pension funds fall short of expectations and, on the condition that these low returns persist, the second pillar is projected to provide annuities that do not make up for the reduction in benefits received from the public pillar.

[5] Dušek and Kopecsni (2008) provide a survey of pension reform measures in Hungary, the Czech Republic and Slovakia and estimated of the policy risk of social security. They conclude that PAYG is not a secure source of retirement income since pension reforms do change the future contributions and benefits in different directions for different workers, and the magnitude of the reductions in social security wealth sometimes exceeds several years' worth of the workers' earnings.

[6] The size of the share of public pension expenditure in total general government expenditure gives a very first indication of the sensitivity of the latter with respect to shifting to a second pension pillar. In principle, the relief to the general government budget resulting from a shift to a private pension scheme or public occupational scheme outside the government budget should tend to be largest in those countries, in which the public PAYG scheme represents a particularly large share of total general government expenditure. Obviously, the budgetary impact depends on the magnitude of shift towards private pensions. Moreover, also parametric pension reforms such as changes in the retirement age can play a crucial role.

**Figure 1**

**Public Pension Expenditure, 2002-08**
*(share of total expenditure)*




Source: ESCB, ECB calculations.

expenditure between 2002 and 2008, while in the Czech Republic, Estonia, Hungary and Romania this share increased slightly. These changes may reflect systemic and parametric pension reforms as well as shifts in the overall structure of public expenditure, *i.e.*, efforts aimed at cutting back other expenditure.

Looking ahead, multiple challenges for public finances can be identified, depending on the channels through which the structure of the pension system affects public expenditure. These channels comprise, first, pressure from the public PAYG pensions systems and second, pressure arising from risks associated with the private pension pillar. In what follows, these channels are discussed in more depth.

Turning to the first channel, pressure on PAYG pension schemes and thus public finances in the NMS arise from demographic and macroeconomic developments. Regarding demographics, as Figure 2 shows, the old-age dependency ratio, *i.e.* the ratio of the population aged 65 and above over the population aged 15-64 has increased steadily over 1996-2007 in the NMS. This is due to several factors, for example, improved health care services increasing the life expectancy of the elderly. At the same time, the economic catching-up process opened new career opportunities for the young generations who changed their behavioural patterns (e.g. increased migration abroad, postponed childbearing) which generally reduced the population aged 15-64. Only in Slovakia, the old-age dependency ratio was slightly lower in 2007 than in 1996. However, with the exception of Bulgaria until 2006, the old-age dependency ratios in these countries remained partly significantly below the EU27 average.

Nevertheless, demographic pressures are projected to rise strongly in the future. As indicated in Figure 3, old-age dependency ratios, which in 2007 were in all NMS below both the EU27 and the euro area average, are projected to be above these levels in 2060. The strongest increases in the old-age dependency ratio are projected for Romania, the Czech Republic[7] and Lithuania.

Furthermore, developments in employment affect the net position of the public pension systems via revenue collection.[8] As the accession to the EU brought a growth stimulus to the NMS economies, the large increases in employment that many of the NMS saw boosted revenues in the

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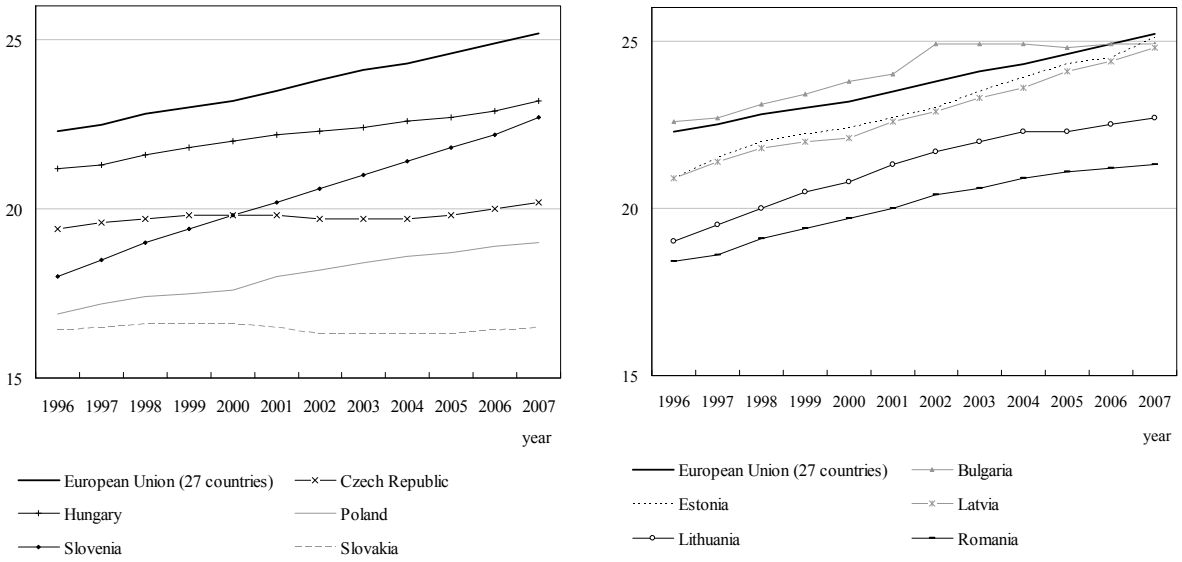
[7] For example, Botman and Tuladhar (2008) claim that given the ageing pressures in the Czech Republic, restoring debt sustainability will require additional reforms and a further increase in the retirement age is desirable, but will not suffice.

[8] Looking back to the 1990s, in many NMS early retirement was often used as a measure to lower high official unemployment figures. Eligibility rules for retirement were relaxed and older workers close to retirement who lost their jobs often exited the labour force and retired. This rendered the PAYG systems increasingly unsustainable.

**Figure 2**

**Old-age Dependency Ratios, 1996-2007**
*(population 65 and over to population 15 to 64 years)*

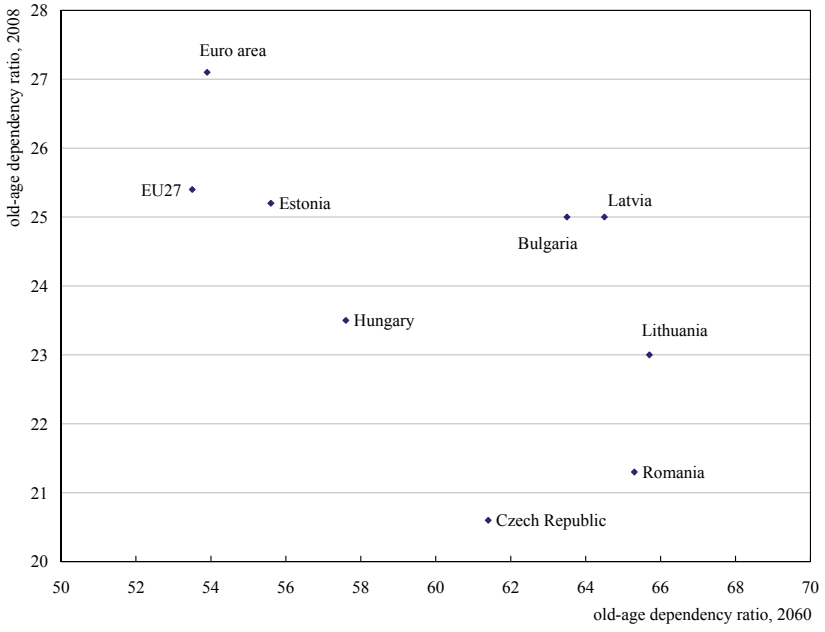



Source: Eurostat, ECB staff calculations.

statutory PAYG schemes (as well as in the individual accounts of the private pension schemes). As Figure 4 indicates, with 13.6 percentage points, Bulgaria saw the largest increase in the employment rate between 2000 and 2008, followed by Latvia (11.1 percentage points) and Estonia (9.4 percentage points). Looking forward, the beneficial contribution from strong employment growth is at least partially reversed. Instead, the projected and in part substantial increase in unemployment brought about by the economic

**Figure 3**

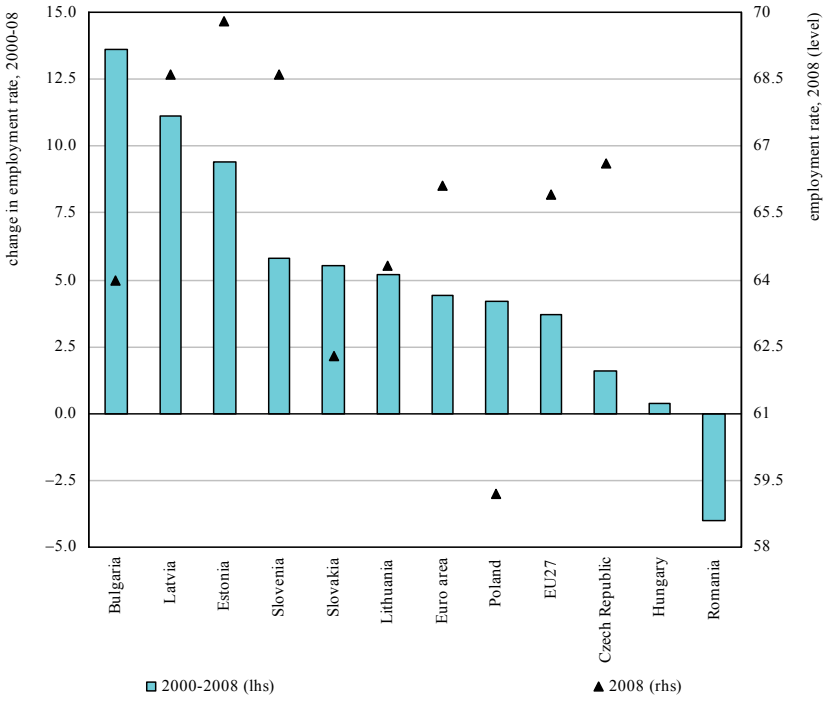
**Demographic Pressures:**
**Old-age Dependency Ratios in 2007 and 2060**



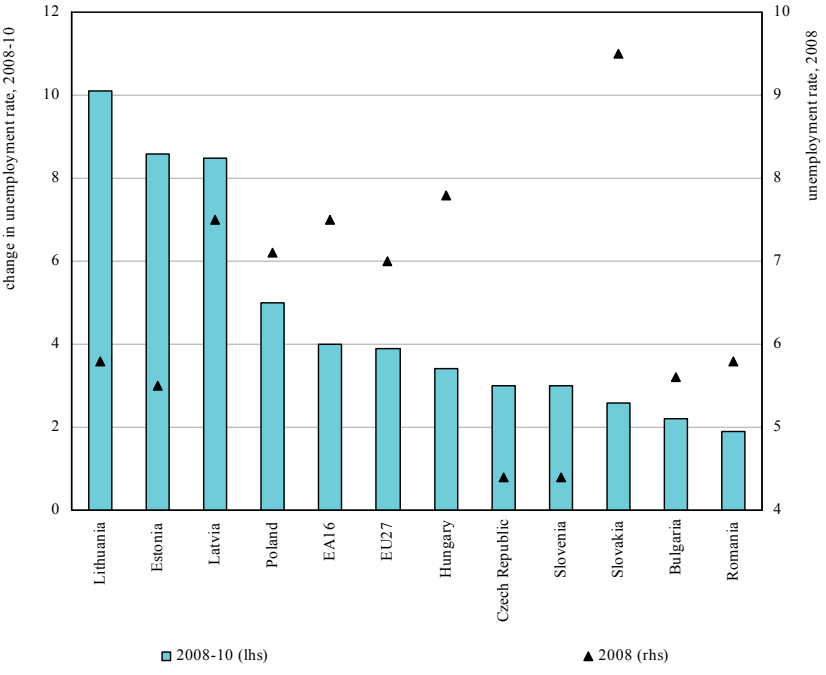

Source: Economic Policy Committee and European Commission (2008), ECB calculations.

**Figure 4**

**Labour Market Developments in the NMS**
**Employment Rates, 2000-08**




**Unemployment Rates, 2008-10**




Source: AMECO, staff calculations.

and financial crisis in all of these countries will deteriorate general government revenue in the short-term, putting some stress on public PAYG schemes. In addition, via lower contributions also to private schemes, the rise in unemployment also tends to reduce individual pensions accounts. As Figure 4 shows, the increase in unemployment over 2008-10 is projected to be the strongest in Lithuania (10.1 percentage points), followed by Estonia (8.6 percentage points) and Latvia (8.5 percentage points).

The second channel through which the structure of the pension system affects public finances relates to the risk that governments would need to top up "inadequately" low public and private pensions. The European Commission and Economic Policy Committee (2009) project the developments of benefit ratios and gross average replacement rates from public and private pensions for several of the NMS, the results of which are displayed in Table 3. These long-term projections should be treated with extreme caution given the large uncertainty and poor data

**Table 3**

**Benefit Ratios and Replacement Rates in the NMS, 2007-60**
*(percent)*

| Country | Benefit Ratio | | | | Gross Average Replacement Rate | | | |
|---|---|---|---|---|---|---|---|---|
| | Public Pensions | | Public and Private Pensions | | Public Pensions | | Public and Private Pensions | |
| | 2007 | 2007-60 | 2007 | 2007-60 | 2007 | 2007-60 | 2007 | 2007-60 |
| Bulgaria | 44 | –20 | 44 | –8 | - | - | - | - |
| Czech Republic | 45 | –17 | - | - | 33 | –17 | 33 | –17 |
| Estonia | 26 | –40 | 26 | –18 | 28 | –41 | 28 | 9 |
| Latvia | 24 | –47 | 24 | 4 | 33 | –33 | 33 | 2 |
| Lithuania | 33 | –16 | 33 | –2 | 32 | –10 | 32 | 15 |
| Hungary | 39 | –8 | 39 | –3 | 49 | –23 | 49 | –13 |
| Poland | 56 | –54 | 56 | –44 | - | - | - | - |
| Romania | 29 | 26 | 29 | 41 | 36 | - | 36 | 34 |
| Slovenia | 41 | –6 | 41 | –2 | - | - | - | - |
| Slovakia | 45 | –27 | 45 | –11 | - | - | - | - |

Note: The benefit ratio is the average benefit of public/private pensions as a share of economy-wide average wage (gross wages and salaries in relation to employees). The gross average replacement rate is calculated as the average first pension as a share of economy-wide average wage.
Source: European Commission and Economic Policy Committee (2009).

availability. This notwithstanding, the table shows that benefit ratios and replacement rates differ widely among the NMS. Benefit ratios from public pension schemes are highest in Poland and lowest in Latvia and Estonia. In all NMS apart from Romania, where the public pension pillar may still be considered as being in a "built-up" phase, the benefit ratios in public pension schemes are projected to decline – partly significantly. The projected decline in the public pension benefit ratio over 2007-60 is projected to be largest in Poland, Latvia and Estonia and smallest in Slovenia and Hungary. Accounting for income from private pensions, the table shows that the benefit ratio is projected to fall strongly in Poland and to lesser extents in Estonia, Slovakia, Bulgaria, Hungary, Lithuania and Slovenia. As regards gross average replacement rates, for the few NMS for which projections are available, the table points to expected substantial declines in the area of public pensions. Accounting for private pensions, the picture is less clear, as in several countries the gross average replacement rate is projected to rise slightly. Generally, declines in these indicators over time need to be assessed against their starting levels. In this respect, for example, the declines in the public and private benefit ratio in Estonia from a low level in 2007 to the lowest level across this section of countries in 2060 may point to very low pension levels, potentially raising pressure on government budgets in the future.

## 4 Pension fund performance und risks

This chapter surveys pension fund performance in the new EU Member States and captures

several risks to these systems that have increasingly emerged since their implementation. Many of these risks are not unique to the new EU Member States and apply to other countries as well. These risks include in particular the inflation risk, namely the fact that inflation grows faster than nominal returns on assets, as well as the financial market risk, which is associated with exposure of the pension assets to stock market developments. The global financial and economic crisis in 2008-09 has shown that in particular the financial market risk and the associated melt-down in pension assets worldwide has become a major concern for policy makers.[9, 10]

Before we provide some evidence on pension fund performance in the NMS, the next section first briefly discusses the available data.

### *4.1 Data*

The availability of homogenous data on pension funds in the NMS is limited. First, as shown above, the 2nd and 3rd pension pillars were introduced only recently in many NMS – the time series have therefore only a few observations. Second, data is only available on an annual basis. Third, while publicly accessible data on pension funds from national sources, such as pension funds associations or supervisors, are often richer and available at higher than annual frequencies, they are not fully comparable across countries.

The main two sources of homogenous data that we use in this paper are from the OECD (the Pension Funds database) and from Eurostat. Both include annual data on pension funds developments. However, the available time series for the countries considered here are short, with the number of observations depending on the indicator chosen. For example, several indicators cover the period 2000 to 2007, while some cover only the years 2003-06. The data cover all pension funds and similar vehicles (*i.e.,* pension funds, book reserve arrangements and pension insurance contracts), thus both mandatory and voluntary schemes that are either occupational or personal.[11] The OECD Pension funds database provides a comprehensive set of indicators on pension. However, the OECD database does not cover all NMS, but only its members: the Czech Republic, Hungary, Poland and Slovakia. Data provision for some of the other NMS, while sometimes provided, is rather limited.

The Eurostat database provides a dataset on pension funds performance that in principle covers all NMS, but misses many observations, especially for the period before 2004. This is likely due to the fact that the systemic pension reforms were implemented often only recently and that the pension fund segments of financial markets played a relatively limited role in the financial intermediation in the NMS.

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9 See also IMF (2009b).

10 There are various measures of pension funds performance, for example, Amir-Benartzi (1998) examine the correlation between the expected rate of return on pension assets as reported in the financial statements and the composition of the pension portfolio measured as the percent invested in equities. They find that these variables are related, but the relation is rather weak. Impavido and Rocha (2006) investigate the performance of the Hungarian second pillar and claimed that its performance since inception has been mixed. They concentrate on growth, portfolio and investment return, costs and fees. In terms of investment return, they find that government securities accounted for 73 per cent of the portfolio in 2004. They also find that the real rate of return net of fees was negative in some years and the annualized average net real rate return in the 1998-2005 period amounted to only 3.9 per cent p.a., lower than the average real wage growth of 5.3 per cent. Tapia (2008, p. 25) provides estimates of the financial performance of privately managed mandatory and voluntary pension funds in the Czech Republic, Estonia, Hungary, Poland and concludes that the average annual real investment rates of return has been positive for all, ranging from 1.0 per cent in the Czech Republic to 8.8 per cent in Poland, since the implementation of the 2nd or 3rd pillar. In addition, the average annual real investment rates of returns show important fluctuations for the entire period since the pension reform has been in place. The uneven performance could be, according to Tapia (2008), explained partially by the very high proportion of assets held in government bonds (around 60 per cent) and the irregular trends in government securities yields over the past years.

11 For the classification of pension funds see, e.g., OECD (2009), *Private Pensions Outlook 2008*, p. 32.

**Table 4**

**Assets of Pension Funds in 2007**
*(percent of GDP)*

| Country | AT | BE | DE | DK | ES | FI | FR | LU | IE |
|---|---|---|---|---|---|---|---|---|---|
| Assets | 4.8 | 4.0 | 4.1 | 32.4 | 7.5 | 71.0 | 1.1 | 1.0 | 46.6 |

| Country | IT | NL | PT | SE | UK | CZ | HU | PL | SK |
|---|---|---|---|---|---|---|---|---|---|
| Assets | 3.3 | 138.1 | 13.7 | 8.9 | 78.9 | 4.7 | 10.9 | 12.2 | 4.2 |

Note: In Denmark, France and Sweden, the significant fraction of pension savings is held in the form of pension insurance contracts which are not reflected in this table.
Source: OECD.

Despite these caveats, the available data nevertheless provide important information regarding pension fund developments in the NMS. However, the small number of observations prevents a more sophisticated empirical analysis. The next section provides some findings based on the available data.

### *4.2 The size and structure of private pension fund assets*

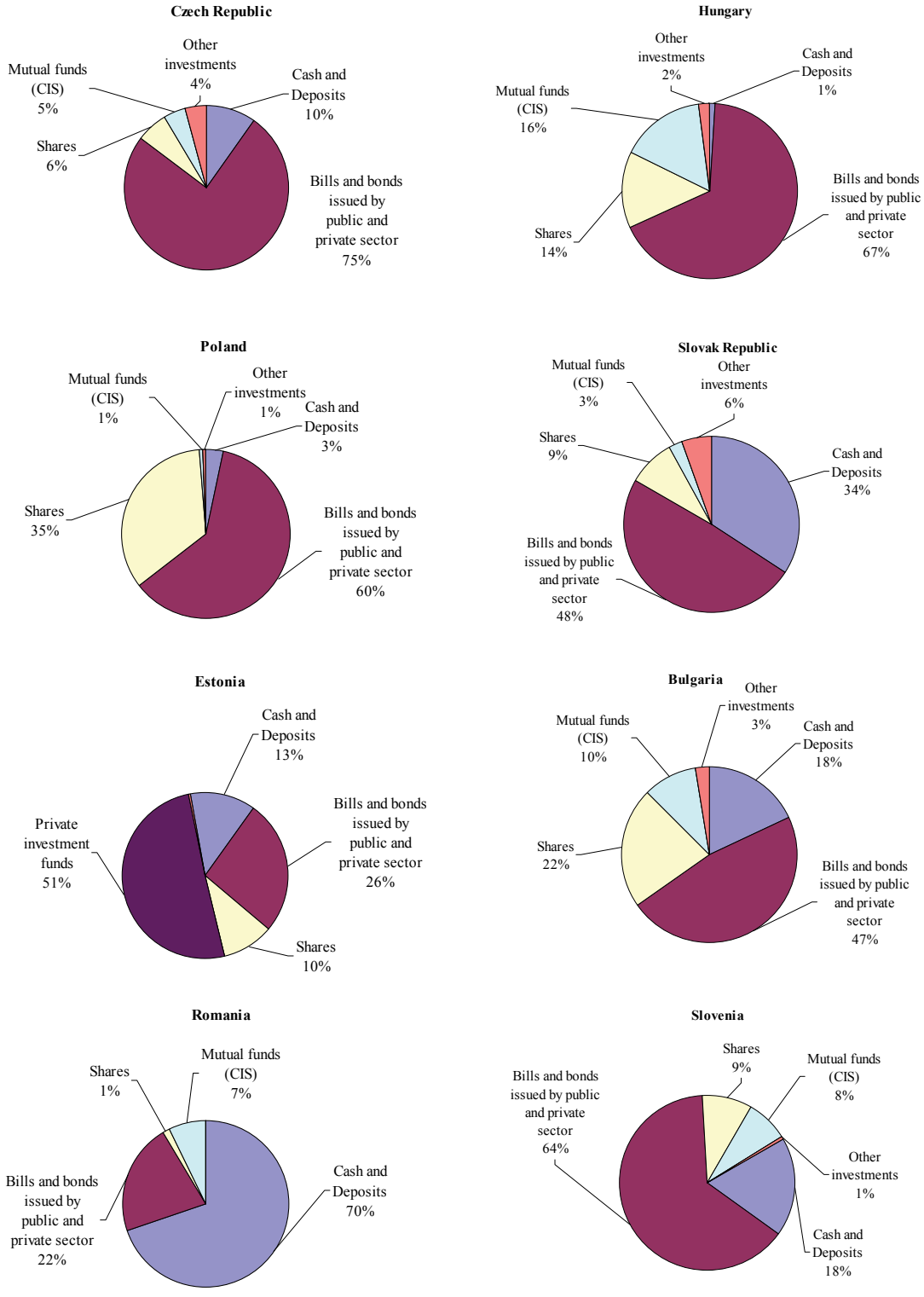
The savings cumulated in the pension funds increased sharply in the NMS, but still remained at low levels when compared to many of the old EU Member States. For example, the pension funds assets as a share of GDP represented only about 4.7 per cent in the Czech Republic in 2007 (2.3 per cent in 2001), 10.8 per cent in Hungary (3.8 per cent in 2001), 12.2 per cent in Poland (2.4 per cent in 2001) and 4.2 per cent in Slovakia (0 per cent in 2001), while they were about 79 per cent in the United Kingdom or 138 per cent in the Netherlands (see Table 4). Consequently, only a limited amount of pension income currently comes from private pensions in these countries. OECD (2009a) finds that compared to the OECD average of 19.5 per cent of retirement income coming from private pensions, this share is 2.9 per cent in Hungary, 1.2 per cent in Poland, 1.1 per cent in Slovakia and 0.7 per cent in the Czech Republic.

The impact of inflation and financial market developments on pension fund performance is determined by the structure of pension fund portfolios. Private pension fund assets consist of (1) bills and bonds issued by the public and the private sector, (2) mutual funds, (3) shares, (4) cash and deposits as well as (5) other investment (e.g. mutual funds). The distribution of private pension fund assets across these categories varies widely across countries, reflecting, inter alia, differing risk aversion, existing country-specific investment regulations and available investment opportunities in domestic capital markets.

As they should secure income for their members in their post-retirement period, pension funds in the NMS have often (but not always) opted for investing rather conservatively. As indicated by Figure 5, in 2007, the share of pension fund assets invested in cash and deposits, associated with low returns and low risks, varies from 70 per cent in Romania to 1 per cent in Hungary. In contrast, the share of pension funds assets invested in shares, which are associated with sizeable risks against the background of stock market volatility (that, from the historical perspective of developed economies, paid off in higher yields in the long run), range from 35 per cent in Poland to 1 per cent in Romania. Finally, as Figure 5 also shows, apart from Estonia

**Figure 5**

## Structure of Pension Funds Assets as of 2007




Source: OECD.

and Romania, bills and bonds issued by the public and the private sector formed the largest share of private pension assets in 2007. The majority of these debt securities were issued by the public sector (at the central government or municipal level). The corporate sector is mainly financed through loans from the banking sector in the NMS; and only a limited number of larger financial and non-financial private corporations issue corporate bonds. This limits to a certain degree the domestic investment opportunities for pension funds.

The large share of bills and bonds issued by the public sector indicates that these pension fund assets are an important source of financing for the government. Against the background of the 2008-09 crisis and the arising financing problems for the government, in Hungary, for example, the private pension schemes have been obliged to invest a larger share of their funds in government bills and bonds. On the one hand, investment in debt securities issued by the public sector increases in principle the security of pension funds' investments due to a generally lower sovereign default risk when compared to the default risk of the financial and non-financial corporate sector. On the other hand, if government bonds represent a large fraction of total pension funds assets, it is questionable whether pension funds improve the overall efficiency of resource allocation. In the extreme case, if pension funds invested 100 per cent of their total assets in government debt securities they would act in principle as the first PAYG pillar; however, likely at higher administrative costs. One can assume that such a system would be more costly than a typical PAYG with implicit liabilities, due to administrative and other costs related to pension funds' maintenance, marketing, remunerations of pension funds' managers and owners.

According to Eurostat data, the geographical structure of pension fund investments differed substantially in 2006 and 2007 (the latest data available). For example, 100 per cent of pension funds' total assets were invested domestically in Poland in 2006 and Slovakia in 2007, while it was about 80 per cent in Bulgaria and the Czech Republic in 2007. On the contrary, this ratio was only 16 per cent in Lithuania in 2007.

The currency breakdown shows that a high share of investment is denominated in euro. This is particularly the case for the ERM-II countries and countries with a currency board exchange rate regime. In this respect, the share of pension fund assets denominated in euros was about 70 per cent of total investments in Lithuania, 46 per cent in Latvia and 38 per cent in Bulgaria in 2007. On the contrary, euro-denominated investment was only about 6 per cent in the Czech Republic in the same period.[12]

The limited diversification of assets in some of the New EU Member States, as shown in Figure 5, and especially the relatively high fraction of total assets held in government debt securities limit to some extent the possible positive impact from systemic pension reforms. If pension savings are allocated mainly into public sector debt securities, and if one assumes that the public sector is allocating financial resources generally less efficiently than the private sector, the funded pension pillars do not contribute to a higher economic efficiency via a better allocation of available resources. All in all, if the funded pillar is mandatory and used mainly to finance government deficits via purchasing government bonds, one can consider the pension funds' contributions as a special form of taxes, rather than voluntary savings.

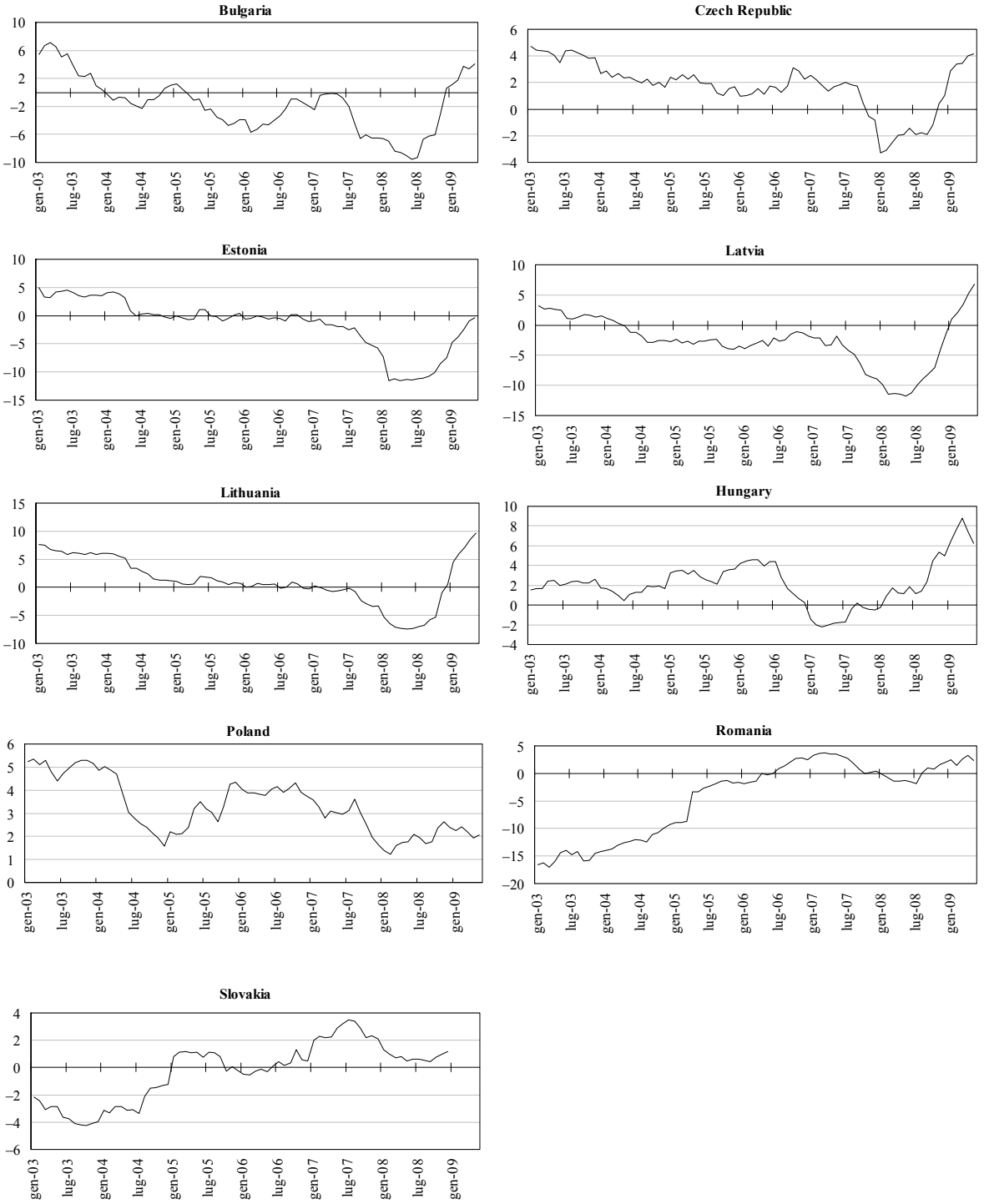
### *4.3 The exposure to inflation risk: some indications*

For an assessment of the inflation risk, Figure 6 depicts the estimates of real yields on long-term year government bonds between January 2003 and May 2009. They indicate that in several of the NMS, the catching-up process observed over the last decade was associated with

[12] In Estonia and Poland, it was 60 and 0 per cent, respectively, in 2006.

**Figure 6**

**Real Yields on Long-term Government Bonds**
*(percent)*




Note: The real interest rates were calculated as a difference between the (observed) nominal yields on ten year government bond yields and the HICP annual rate of change. Latest observation: May 2009 (Slovakia: December 2009), monthly data.
Source: ECB.

partly high rates of inflation that lowered the investment real yields. In these Figures, the real yields were approximated by the difference between the nominal yields on ten year government bonds (or a similar instrument if no government bond was available) and the annual rate of change in the harmonised index of consumer prices (HICP). In some of the countries, the historical real yields from investments into government bonds were close to zero or even negative for protracted periods of time. For example, in Bulgaria and Latvia, past investments in government bonds were generally generating losses in real terms so that the contribution of these investments to the accumulation of pension assets tended to be negligible. However, the ongoing economic contraction brought inflation down. At the same time, the nominal interest yields on government bonds increased due to several factor including e.g. worsened fiscal outlook, pushing real yield further up.

Also other forms of investment are exposed to inflation risk. In particular, holdings of cash or investment in financial instruments with a fixed interest rate (such as bank deposits) were eroding in real terms in the inflationary environment.

Against this background, the question can be posed whether a move to funded pension systems in catching-up economies is helpful in the long-term. The Balassa-Samuelson hypothesis would lead to the conclusion that price levels in less productive economies will increase as the productivity increases to equalize with productivity levels in more developed economies. As a consequence, the catching-up process is often accompanied by a higher inflation (or a currency appreciation). The instability of prices creates difficult conditions for all savers, pension funds included. For example, the double digit inflation rates in the Baltic countries have damaged significantly the real value of savings accumulated until 2008. If the funded pension pillars were supposed to reduce the burden of the PAYG pillar in the future, low and stable inflation together with a savings-friendly environment is required in order to accumulate sufficient savings under the funded pillars with a positive real return.

In principle, establishing funded pension pillars before providing a stable (low-inflationary) macroeconomic environment brings about the risk that funded pillars may loose credibility and thus not attract sufficient voluntary savings in the future. In addition, if the real value of savings would be destroyed by high inflation, the establishment of pension funds does not improve the long-term sustainability of public finances.

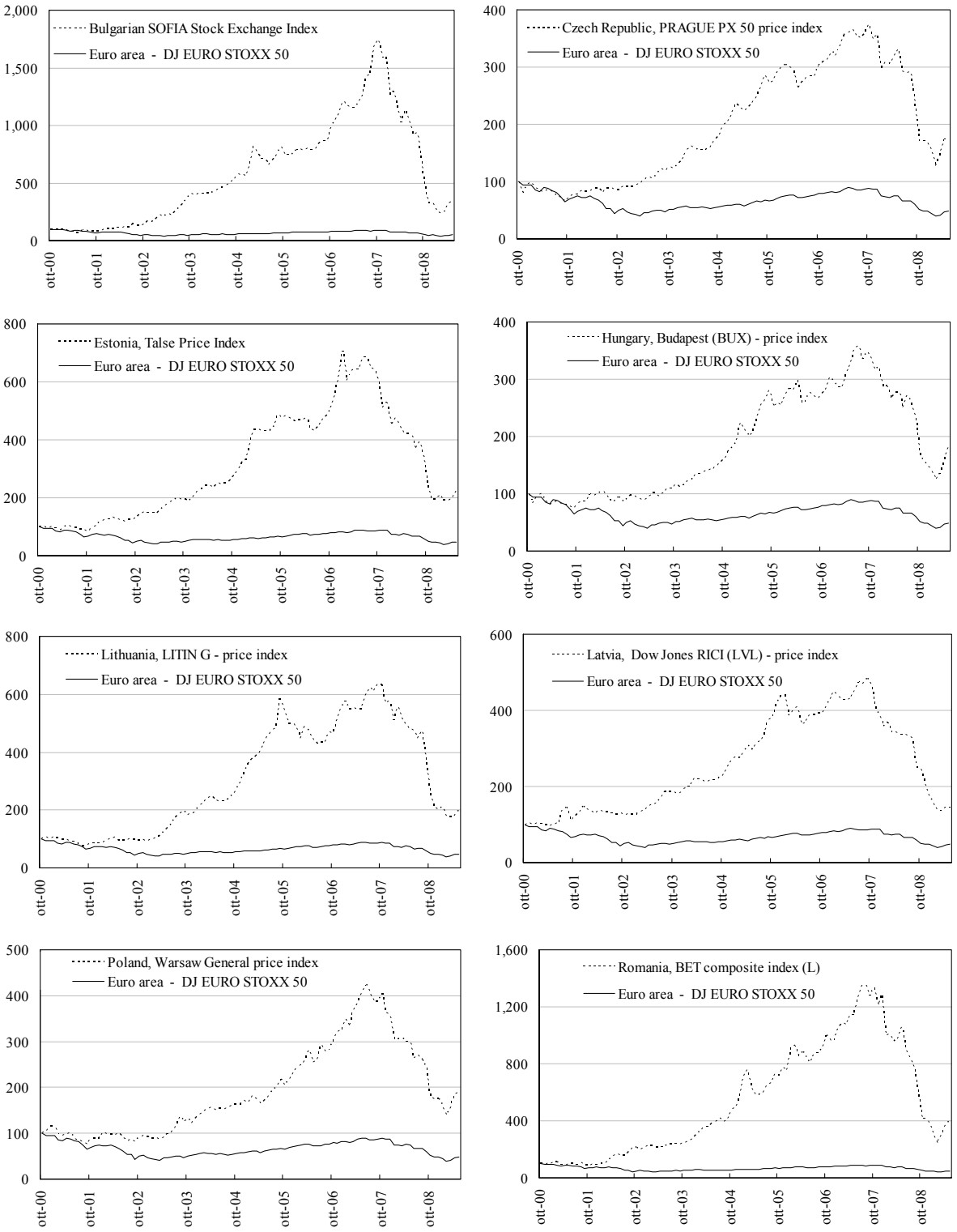
### *4.4 The exposure to the global financial crisis: some early indications*

The OECD (2009b, p. 16) estimates that the total investment loss worldwide of private pension plans due to the 2008 turmoil in financial markets was around USD 5 trillion (out of which USD 3.3 trillion in the United States). According to OECD (2009b, p. 15), pension funds in the OECD countries experienced a negative return of about 20 per cent in nominal terms between January and October 2008 (22 per cent in real terms), amounting to a loss of about USD 3.3 trillion. Against this background, the question may be posed how the economic crisis has affected the NMS, bearing in mind that, as indicated above, the pension funds segment is still rather small in the NMS.

Figure 7 shows how the stock markets in the NMS developed between October 2000 and May 2009. In particular, the stock market indices in Bulgaria and Romania had grown substantially faster since August 2007 than what would have been in line with economic fundamentals. By February 2009, the NMS stock market indices dropped to about 20-45 per cent of their values in August 2007, but since then started to recover somewhat, in particularly in Hungary, Poland and the Czech Republic. All in all, the global financial market turmoil has negatively influenced the stock markets in all NMS and many of the stock market indices returned down to levels observed before 2003.

**Figure 7**

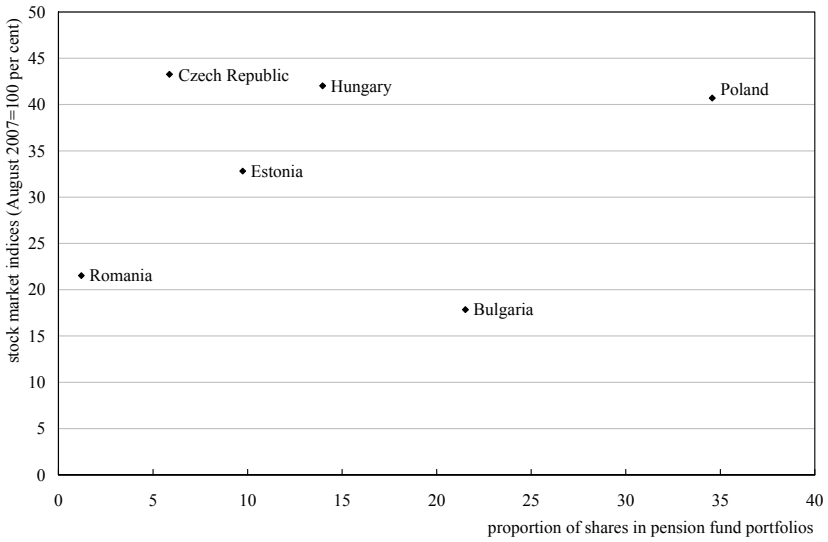
**Stock Market Indices**
*(October 2000 = 100 per cent)*




Note: Monthly data. Latest observation: May 2009.
Source: Datastream.

**Figure 8**

**Exposure to Domestic Stock Market Developments**




Source: Datastream, OECD.

As many of the pension funds profited from the substantial increase in stock prices in the past, the decline in stock prices implies losses for the stock holders in the short term. Figure 8 shows that particularly pension funds in Poland and Bulgaria would tend to be affected due to the relatively larger shares of stock in their portfolios. In the Czech Republic, Estonia and partly also Hungary, the adverse impacts of the economic crisis and the related stock market deterioration on pension fund assets were to some extent limited by a relatively modest representation of stocks in pension fund portfolios (less than 10 per cent, respectively 15 per cent of total assets).

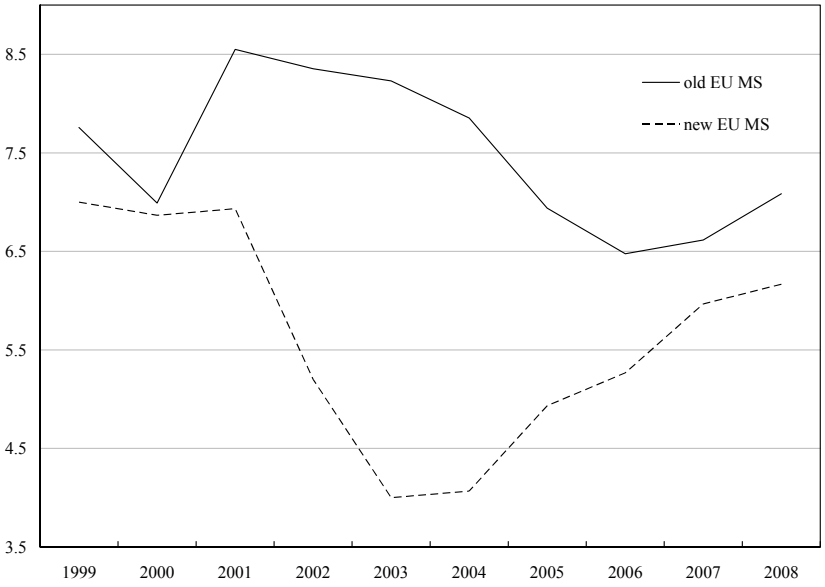
Consequently, indeed, also pension funds in the NMS faced significant losses stemming from the ongoing crisis. However, due to their relative short history, the absolute amounts of assets cumulated in the pension funds are rather limited in the NMS. Also, the NMS pension funds' exposure to stock markets is, except Poland and Bulgaria, rather limited. At the same time, pension funds that invested previously mostly in bonds may have benefited from the flight-to-quality that tends to lead to a higher demand for bonds associated with low risk. The higher demand tended to increase the prices of these bonds compared to other assets and thus may have mitigated to some degree the negative impact of the crisis on pension fund portfolios. This notwithstanding, many foreign investors pulled out of the NMS financial markets so that the liquidity of these markets declined significantly.

### *4.5 Convergence of New Member States to the old EU Member State levels*

This section outlines developments in household savings, profitability of pension funds and funds' contribution rates in order to highlight differences or common trends in the NMS and the old EU Member States. To overcome the problem of missing observations at the country level in the NMS, we pooled available data on relevant macroeconomic, financial and pension fund variables. Figures in this section show an aggregated view on how the household savings rate evolved over time in these two groups of countries. In this respect, Figure 9 indicates that the household savings rate has on average been higher in the old Member States. In the NMS, the household savings rate was between 4 and 7 per cent of disposable household income – it declined from levels broadly comparable with the old Member States in 2001 to just about 4 per cent in 2003 and 2004 and since then it started to rise to about 6 per cent in 2008. On the contrary, in the old Member States, the household savings rate was on average between 6.5 and 8.5 per cent in the period from 1999 to 2008.

**Figure 9**

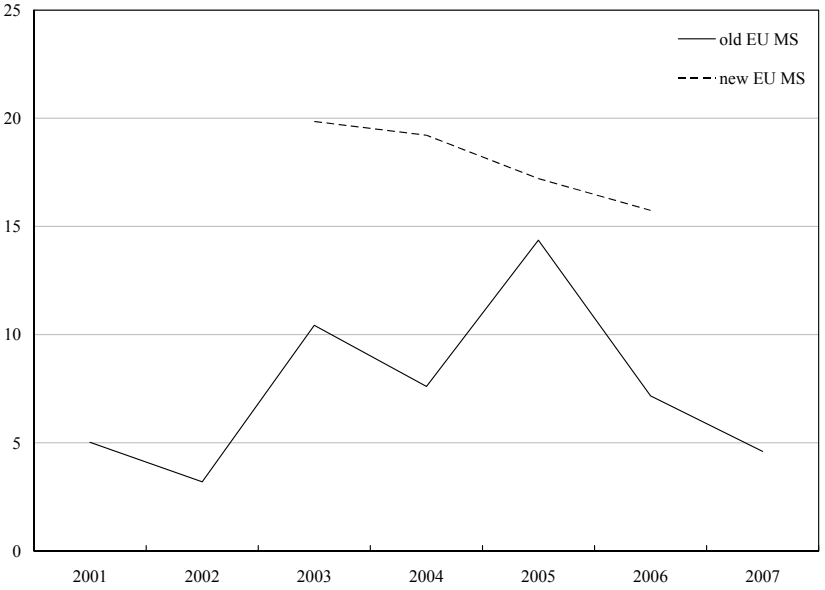
**Household Saving Rate**
*(percent of disposable income)*




Source: OECD, own calculations.

**Figure 10**

**Profitability of Pension Funds Investments**
*(net investment income divided by total investments * 100)*




Source: OECD, own calculations.

Figure 10 shows a declining trend in the nominal yields of pension funds between 2003 and 2006 in the NMS. The nominal yields of pension funds were higher in the NMS than in the old EU Member States; they declined from about 20 per cent in 2003 to about 16 per cent in 2006 in the NMS, while they fluctuated in the old Member States. The explanation of higher returns in the NMS may be higher inflation and more profitable investment opportunities in the NMS, e.g. related to their lower GDP per capita.

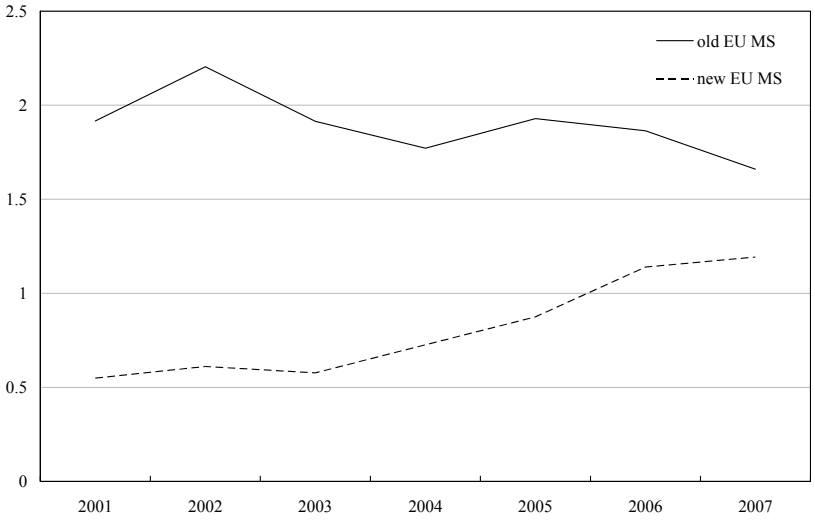
Employees' and employers' contributions to pension funds have been rising sharply in the NMS since 2003; however, their level remained below that in the old Member States in 2007, reaching only 1.2 per cent of GDP while it was about 1.7 per cent of GDP in the old Member States. This, together with the lower households saving rate shown in Figure 9, could potentially be an indication that the population in the NMS is not accumulating sufficient savings for the post-retirement period.

All in all, the NMS seem to be catching up with the savings patterns observed in the old Member States. Both the household savings rate

and contributions to pension funds are at lower levels in the NMS, but are converging to the levels observable in the old Member States.

**Figure 11**

**Contributions to Pension Funds**
*(percent of GDP)*




Source: OECD.

## 5 Conclusion

By way of a stock-taking exercise, this paper is an attempt to assess the multi-pillar pension systems and the associated budgetary risks in the new EU Member States. We find that the assets of pension funds are not well diversified in all countries that we consider here. In fact, to a large extent the pension funds in some of the NMS are invested in government bills and bonds. On the one hand, this increases in principle the security of pension funds' investments due to a generally lower sovereign default risk when compared to the default risk of the financial and non-financial corporate sector. On the other hand, if government bonds represent a large fraction of total pension funds assets, pension funds are in fact mimicking the first pension pillar. In addition, we find that pension fund assets have been subject to inflation risk, with real yields on government bonds having turned negative for several years for some of the NMS. This implies that the real value of the assets has been vanishing and the return has been lower, increasing the risk to the government that the future pensioners might not be able to sustain a living on the (meagre) return of their assets. This problem may be compounded by the effects of the ongoing global financial and economic crisis. We find that, indeed, pension funds in the NMS (as well as elsewhere) also faced significant losses stemming from the crisis. However, mainly due to their relative short history, the absolute amounts of assets cumulated in the pension funds have been rather limited in the NMS. Also, the NMS pension funds' exposure to stock markets was, except for Poland and Bulgaria, rather low. On the other hand, the relatively newly established funded pension schemes in the NMS face generally a higher risk of loosing credibility than schemes established earlier in the old Member States that already have a solid track record. A severe underperformance relative to previous expectations may hamper a further development of this financial segment in the NMS.

The adverse impacts of inflation and financial market volatility on the performance of pension funds that has been witnessed in recent years in several NMS underlines the fact that the problems concerning the sustainability of pension systems are not solved, yet. Of course, any assessment of this kind must distinguish between persons, who would now lose in such an environment (e.g. pensioners that need to buy annuities out of melt-down private pensions funds) or young persons, who, in times of deteriorating stock markets, buy equities cheaply at depressed prices and may profit from the increase of their prices in the future (see, for this argument, OECD,

2009b). However, not withstanding this argument, the witnessed volatility of financial markets and the impact of inflation give rise to the question who would pay the pension if pension funds fail to deliver what they were set out to deliver.

In addition, the available option of different investment strategies of pension funds that imply different risks call for an increased financial education of the population. Sufficient financial knowledge is necessary to enable responsible and qualified decisions about risks to future pension income. Only sufficiently educated pension savers are able to identify possible risks related to a particular investment strategy.

This basic stocktaking exercise has shown that the assessment of long-term sustainability of public finances in the presence of an increasing importance of private pension systems is important. A proper empirical assessment, however, requires first an improvement in the data situation in this area. From a policy point of view, portfolio and risk diversification remain an issue as does capturing the role of minimum pensions and social assistance.

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# COMMENTS ON SESSION 2
# PENSION REFORM AND CAPITAL MARKETS

*António Afonso*[*]

## 1 Introduction

I was asked to comment on three of the papers presented in the session that addressed the issue of pension reform and capital markets. More specifically, I will comment on the papers by Draper and Westerhout; Gillingham, Leive and Tuladhar; and Rezk, Irace and Ricca. These three studies cover related issues – pensions and savings – although in a different setting. For instance, the first paper is a theoretical paper presenting simulation results, based on a model capturing life-cycle behaviour of households. The second paper is a descriptive analysis of the consequences of the financial crisis on funded pension saving. On the other hand, the third paper offers an empirical analysis of the effects on saving from the substitution of PAYGO systems by fully funded pension schemes.

## 2 On "Privatizing Pensions: More than an Interesting Thought?" by Nick Draper and Ed Westerhout

The paper by Draper and Westerhout assesses the privatization of pension systems in an OLG life-cycle behaviour model. The sources of income include labour, capital and intergenerational transfers. One assumption is that equity as a percentage of wealth is roughly constant over time (implying constant return risk aversion).

According to the results, an economy with a defined benefits scheme can see an increase in utility of around 63 per cent and the privatization of pension funds would imply a 48 per cent decrease of utility at the steady state. In addition, in the presence of an annuity market there is a negative effect of 4.5 per cent at the steady state, and precautionary saving for longevity risk is no longer necessary. Finally, considering either endogenous or exogenous labour supply, there only very small differences in terms of utility.

From my reading of the version presented in the workshop, the privatization message and its implications were not too clear from the paper. On the other hand, are there significant changes if perfect capital markets are absent? For instance, short-selling is not always possible (may not even be allowed).

Regarding the calibration of some of the parameters in model I would see it as an added value if the authors are clearer on their sources and possible sources. For instance, the authors use an intertemporal substitution elasticity of 0.5, a rate of time preference of 0.0125 and an expected excess return on equity of 0.01. For example, in order to assess the magnitude of the excess return on equity, we can observe such measure for the U.S. and Japan (see Figure 1 and Table 1). During the period 1970:1-2008:3, the average equity excess return was 0.8 and 3.2 per cent respectively for the U.S. and for Japan, which is somewhat different from the working hypothesis of the model

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simulation. Therefore, some sensitivity analysis with the calibration parameters would be useful to see to what extent some results still hold.

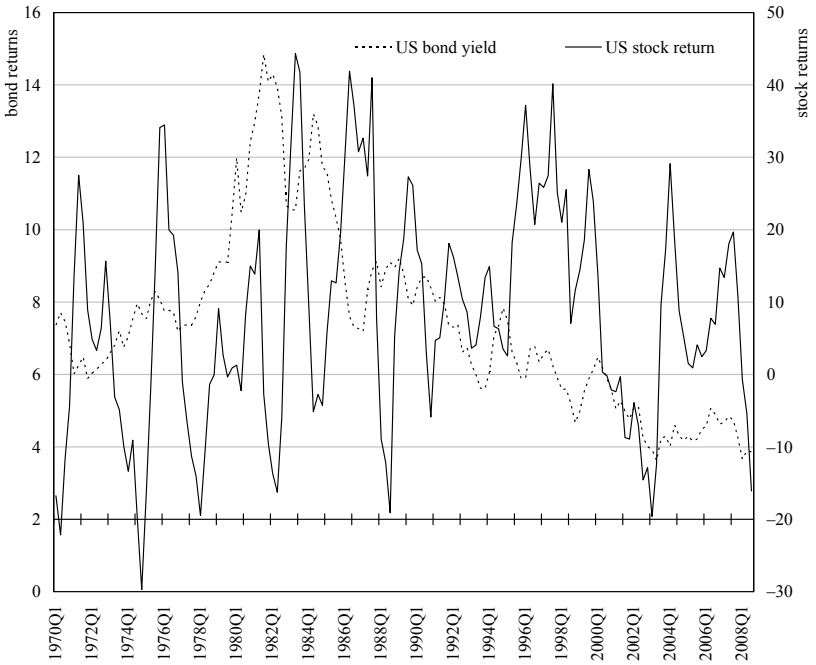
## 3 On "The Impact of the Financial Crisis on Funded Pension Saving" by Robert Gillingham, Adam Leive and Anita Tuladhar

As already mentioned, the paper by Gillingham, Leive and Tuladhar is a descriptive study of the effects of the financial crisis on pension funds. According to the evidence reported equity is a relevant part of pension funds assets (45 per cent in 2007), and pension funds in the U.S., the U.K., Australia, the Netherlands, Canada and Sweden, seem more prone to the effects of the 2008 crisis, while there is a broader predominance of defined benefits PAYGO systems in the EU. Moreover, and not surprisingly, the richest income quintiles are more exposed to a crisis situation and the ensuing loss in market value of assets in the capital markets. Still, government assistance to pension plans in a situation of crisis should be targeted to

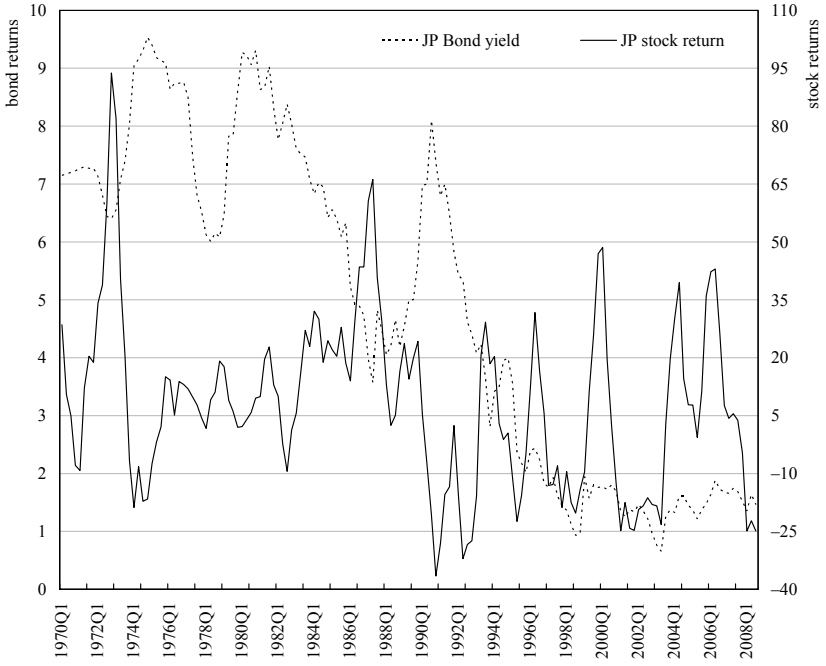
**Figure 1**

**Excess Equity Return**

**a) United States**




**b) Japan**




Source: International Financial Statistics, IMF. Quarter-on-quarter stock returns.

**Table 1**

**Excess Equity Return Statistics, 1970:1-2008:3**

| | U.S. | | | Japan | | |
|---|---|---|---|---|---|---|
| | **Average** | **Maximum** | **Minimum** | **Average** | **Maximum** | **Minimum** |
| Bond return | 7.4 | 14.8 | 3.6 | 4.9 | 9.5 | 0.7 |
| Equity return | 8.2 | 44.3 | –29.7 | 8.1 | 93.7 | –36.5 |
| Excess equity return | 0.8 | 29.5 | –33.3 | 3.2 | 87.3 | –43.9 |

Data source: International Financial Statistics, IMF.

lower-income households. Finally, a natural concern of such government interventions is how the fiscal impact of the financial crisis may impinge on fiscal sustainability.

This paper provides us input for some questions and further thinking on how governments should react under a crisis in terms of supporting the losses suffered by pension funds. For instance, should the government step in to assist depleted pension funds, if they are privately owned and run? On the other hand, if the existence of such pension schemes was mandatory, then the authorities cannot disregard lightly the losses in portfolios. Moreover, if higher (current and future) taxes are needed to finance such assistance, does it matter how big was the share of non-risk free assets in the pension funds' portfolios? In the end, if higher income households are more represented in such pension funds doesn't government help distort income distribution policies?

What policy makers and the public face are, to some extent, alternative ways of thinking government intervention. The simple, somewhat demagogical query seems to be: do we want to pay taxes to finance minimum subsistence social networks or to bail out private business, be it pension funds or not, as for instance in the financial hiccups of 2008? In the end, and after full consideration, pragmatism should help and prevail when dealing with the problem of allowing past private profits to become current of future public losses.

## 4 On "Pension Funds' Contribution to the Enhancement of Aggregate Private Saving: A Panel Data Analysis for Emerging Economies" by Ernesto Rezk, Mariano Irace and Vanina Ricca

The paper by Rezk, Irace and Ricca assesses the effect of pension fund assets on private saving rates. The main intuitions in the paper draw on Feldstein (1974) well-known study, which discussed how the introduction of social security impinges on private saving. The paper estimates a private saving reaction function in a panel of six Latin American countries for the period 1995-2006. The thesis of the study and the conclusion from the empirical results is that mandatory pension fund regimes have a positive impact on private saving. Interestingly, different results can be found in other studies (see Freitas and Martins, 2009, for OECD countries).

For the simple rationalisation of the issue at end, the standard text-book relationship between external and budgetary imbalances, investment and saving is useful (see the Appendix), in order to recall that the two main sources of saving are private domestic saving and foreign capital inflow (due to the current account deficit), which are used to finance the two main sources of demand for financial capital: private investment and the government budget imbalances.

One alternative way to address the question studied by the authors would be to use a consumption specification as in Feldstein (1974, 1982) to assess how pension funds' assets

impinge on private consumption. In addition, the authors could also link to the current account balances, on the basis of its relationship with private saving, government saving and investment (Afonso and Rault, 2008, provide panel evidence for the EU).

Other points that came to my mind when reading the paper, relate to the need to check formally whether indeed a fixed effects specification is superior (different) to simple OLS or random effects; how to deal with the endogenous behaviour from pension funds; and that instead of short-term interest rates, long-term interest rates (or eventually excess equity returns), could be used in the analysis. In addition, instead of the demographic variable used, the authors could use the old-age dependency ratio, which more clearly proxies the aging burden on saving decisions. Finally, given the rather small sample size (around 60 observations) used in the panel, one necessarily needs to read the results with some care.

## APPENDIX

The identity for GDP, *Y*, in an open economy can be written as:

$$Y = C + I + G + X - M \tag{1}$$

where:

*C* = private consumption

*I* = private investment

*G* = government expenditure

*X* = exports of goods and services

*M* = imports of goods and services

Private saving *S* is given by disposable income net of consumption expenditure and taxes, *T*:

$$S = Y - C - T \tag{2}$$

Equations (1) and (2) relate the current account balance (*CA=X–M*) to the difference between national investment and national saving, the sum of private and public saving and the government balance (*BUD=T–G*). Thus, the current account balance is usually written as:

$$(X - M) = (S - I) + (T - G) \tag{3}$$

$$CA = (S - I) + BUD\,, \tag{4}$$

and it is evident that the current account (*CA=X–M*) balance is related to the budget balance (*BUD=T–G*) through the difference between private saving and investment. In other words, the current account balance of a given country is by definition identical to the difference between national saving and domestic investment.

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# COMMENTS ON SESSION 2
# PENSION REFORM AND CAPITAL MARKETS

*Laura Muriel Cuccaro*[*]

## 1 Comments on "Pension Systems in EMES: Implications for Capital Flows and Financial Markets" by Ramón Moreno and Marjorie Santos

The first paper, "Pension System in Emerging Economies: Implications for Capital Flows and Financial Markets", written by Mr. Moreno and Mr. Majorie Santos, explores the effects of the pension system on capital flows, saving and investment, and the deepening of financial markets.

The authors analyze three relevant aspects: the stage in the demographic transition, the pension system design and the pension fund asset accumulation and financial deepening. One of the most important conclusions of the paper is that the implications of demographic changes for saving and investment would depend on the stage in demographic transitions. However, according to the ambiguity of some results, the authors conclude that other factors than demographic can play an important role in influencing national saving and investment.

As a second conclusion, it is not clear the expected effects with a funded pension scheme. One of the statement used to justify the introduction of a funded pension system is that could increase the incentive to save and reduce the evasion. The authors list several factors that may have limited the impact of pension reforms on national saving: the lack of financial literacy, the reduction of precautionary saving, the transitional costs, the declining pension coverage of workers and the high administrative costs.

Finally, the authors analyze the assets accumulation and the financial deepening and conclude that in spite of the growth of accumulated assets in emerging economies, the levels in terms of GDP are still lower than in develop economies. At the same time, the portfolio composition of the managed funds in emerging economies is limited, with an important participation of public debt. According to the authors, as pension fund assets have grown, emerging securities markets have deepened in recent years. However, financial markets in emerging economies are still not as deep as in developed countries.

The paper explores in an interested way the effects of the pension reforms on national saving and investment and on domestic capital markets. Most of the explanations provided by the authors help to understand the developments after the 1994 pension reform in Argentina.

In spite of the authors' mention of the relevance of the informal labor sector to explain the declining in pension coverage of workers, it is important to emphasize this effect, taking in account that the informal labor sector has an important participation in the majority of emerging economies.

In addition, the lack of the institutional framework in some emerging economies is important to understand the portfolio composition of the pension managed funds. In this sense, for example, the fiscal cost of the transition has covered in part through the pension funds, explaining the high composition of government debt on the total pension managed funds.

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[*] Central Bank of Argentina.

## 2 Comments on "Reforming the Pension Reforms: The Recent Initiatives and Actions on Pension in Argentina and Chile" by Rafael Rofman, Eduardo Fajnzylber and German Herrera

The paper "Reforming the Pension Reforms: the recent initiatives and actions on pension in Argentina and Chile", written by Rofman, Fajnzylber and Herrera, is a very complete description of the recent pension measures that have been adopted in Argentina and Chile and a compared analysis of the institutional and political framework in both countries. The paper describes the most relevant components of the recent reforms, explaining why and how they were introduced, discussing their impacts and the remaining challenges.

According to the authors, the introduced reforms during the recent years in Argentina and Chile recognize similar origin: the concerns about coverage, equity and efficiency of the systems, as well as a renew interest in defining the role of the state in the system. However, the measures and the process were very different in both cases. While in Chile there was a wide public debate, in Argentina the reforms were adopted through decrees or through laws whit little discussions about the contents and the goals. This difference reflects the disparity in political and institutional framework of the countries. Therefore, the expected results of recent reforms are also different.

The authors provide an incredible summary of the pension measures introduced in Argentina during the recent years. Since 2002, the minimum benefit has been increased to compensate for inflation and also increase the real value. The government has introduced increases in other benefits than the minimum up to the year 2006. The minimum pension benefit rose more than 70 per cent in real terms from 2002 to 2008, meanwhile the average pension benefit lost real value of around 4 per cent during the same period. As a result, the benefit pyramid has been reduced.

The constitution of Argentina obligates the authorities to adjust the pension benefit according to the evolution of the market wages. However, the government, up to the year 2008, had adjusted the pension benefit using discretionary decisions due to the historical tightening fiscal position. However, in August 2006 the supreme court ruling for a specific beneficiary (called "Badaro case") ordered that the pension benefit of that beneficiary be adjusted for the period between January, 2002 and December, 2006 on the basis of the annual changes in the level of the wage index (formal and informal wages) published by the national official statistics institution (INDEC). A class action ordering the extension of the benefit adjustments to all beneficiaries was approved in June 2008.

In this context, the government introduced a mobile adjusted rule on the basis of the minimum result of the simple average between the six-monthly increase in wages for the registered workers and the year over year evolution of tax revenue for the National Social Security Institution (ANSES) and the year over year rate of the total resources of ANSES. As it was indicated in the paper, originally the index had some technical mistakes because it was estimated using a semiannual rate together with an inter-annual rate.

After the decision of introducing the mobile index of pension's adjustments, the government changed the annual for a semi-annual rate to estimation. Nevertheless some details of the index's estimation have not been provided yet by the government. At the present, there are some doubts regarding the calculation. For example, the updated number of beneficiaries of the pension system is unknown and it is key information to estimate the mobile index.

The anticipated retirement and the moratorium plans are two of the most important measures that have been taken during recent years. The plans were closed at the beginning of 2007, however according to the administrative steps; some new beneficiaries were registered into the pay-as-you-go system during 2008. According to the official information, as of March 2008 more than 1.8 billion people entered to the pay-as-you-go system through these plans.

In 2007, the government introduced a pension system reform. According to the government, the main goals of that reform were to: increase the pension coverage rates, increase the replacement rates, allow contributors to choose between the two schemes, reduce the commission of the funded system and improve the portfolio composition of the managed funds by the pension administrators. However, the voluntary transfers to the pay-as-you-go system were limited and the composition of the pension funds has not registered significant changes.

In spite of the lower rate of voluntary transfers from the funded scheme to the pay-as-you-go scheme, in 2008 the congress approved the nationalization of the funded pension scheme proposed by the executive branch, introducing marginal changes to the original plan. The recent pension measures have had fiscal impacts in the short-term but also in the medium and long-term. As the paper describes, there are not enough official information of the total fiscal impacts.

The anticipated retirement and the moratorium plans generated a net fiscal cost in 2007 (when the majority of people were registered) of 0.7 per cent of GDP. Under the design of the plans, after five years, people will receive the total pension benefit, so the estimated net fiscal cost of these measures will increase during the next years with an important impact on the year 2012 of around 1.3 per cent of GDP.

The 2007 pension system reform included non-voluntary transfers from the funded scheme to the unfunded scheme for some professionals and old-age people that had low levels of accumulated assets in their individual capital accounts. The transfer of the accumulated assets generated extraordinary resources for the government by around 1.0 per cent of GDP during 2007. As of the end of the year 2008 the managed funds by the pension fund administrators were transferred to the National Social Security Institution (ANSES), but this transfer was not accounted as fiscal revenues such as was the case in 2007. The managed funds represent around 8 per cent of GDP. At the same time, during 2009 the government will receive in net terms 4 billion dollars (more than 1 per cent of GDP) of additional cash funds from the nationalization of the pension system.

It is important to explain the fiscal framework in which these measures were implemented. The authors cite that the improvement in the fiscal position in Argentina and Chile during the recent years has permitted to the governments adopt the described pension measures. However, the introduction of a briefly analysis of the fiscal framework could be provide a most complete description of the context in which pension reforms were adopted.

In Argentina, tax collection has increased at unprecedented rate during the last six years (2003-2009) helped by the economic expansion, the increase in exports volumes, the high commodities prices and the local inflation. Tax resources represented 25.9 per cent of GDP in 2008, the highest level during the last fifteen years. At the same time, the primary fiscal expenditures of the Non-financial National Public Sector have been increased too, but at a lower rate, and represented in 2008 24.5 per cent of GDP.

According to the evolution of tax collection, the transfers to the provinces, that include the tax share, have accounted for the highest increase during the last few years. At the same time, the current transfers to the private sector have risen 1.6 percentage points of GDP from 2002 boosted by the subsidies to some key sectors (such as energy and public transport) to reduce the impact of the high commodity prices on local inflation.

The third primary expenditure item that has registered the highest increase has been the pension benefits, increasing from 2.8 per cent of GDP in 2002 to 4.4 per cent in 2008. As a result, of the evolution of the fiscal revenues and expenditures, the primary fiscal balance and the overall fiscal balance of the Non-financial National Public Sector have reached a historical surplus, representing 3.1 and 1.4 per cent of GDP, respectively, in 2008.

During the last few years, the National Social Security Institution (ANSES) has increased their composition of the total primary surplus of Non-financial National Public Sector from 0.1 per cent of GPD in 2002 to 0.7 per cent of GDP in 2008. This increase has been helped by the evolution of tax collection. In particular, by the increases in vat and income taxes, both of which are shared with the pension public system. However, considering only the resources of the pay as you go system (that is the pension contributions) and the pension benefit expenditures, the chronic pension system deficit has not eliminated. The participation of the resources other than contribution to the pension system has increased during the last few years.

Regarding the pending challenges, all the challenges described by the authors are very important and constitute part of the core. However, Argentina has been characterized by a pro-cyclical fiscal policy. The recent pension measures are reflecting the pro-cyclical behavior of the fiscal policy. Therefore, one additional challenge is the reduction of the pro-cyclical behavior of the policy makers. For the short-term, the challenge is the management of the pension system in a less favorable fiscal environment. Additionally, the government has had limited access to the capital market, responding to some local factors, such as the absence of a final solution of part of the defaulted public debt, and the external financial crisis.

In this context, the national treasury has financed their gap through other public entities such as the National Social Security Institution (ANSES). Therefore, the intra public sector debt has increased during the last few years. At the same time, the nationalization of the private pension scheme increased the composition of the intra public sector debt. As of October 2008, more than 50 per cent of total managed funds by the private scheme was allocated to public debt corresponding to the national treasury. As a result, the composition of the pension funds are concentrated in national treasury's debt. In this sense, the fiscal solvency and the improvements in public debt management are important challenges to preserve the real value of the pension contributions and to guarantee the sustainability of the system.

Finally, the enhancement of the institutions and the independency of the social security institutions are the most important long-term challenges. Legal framework to guarantee the transparency, efficiency and predictability of the pension fund administration are other pending issues.

**COMMENTS ON SESSION 2**
**PENSION REFORM AND CAPITAL MARKETS**

*Frank Eich*[*]

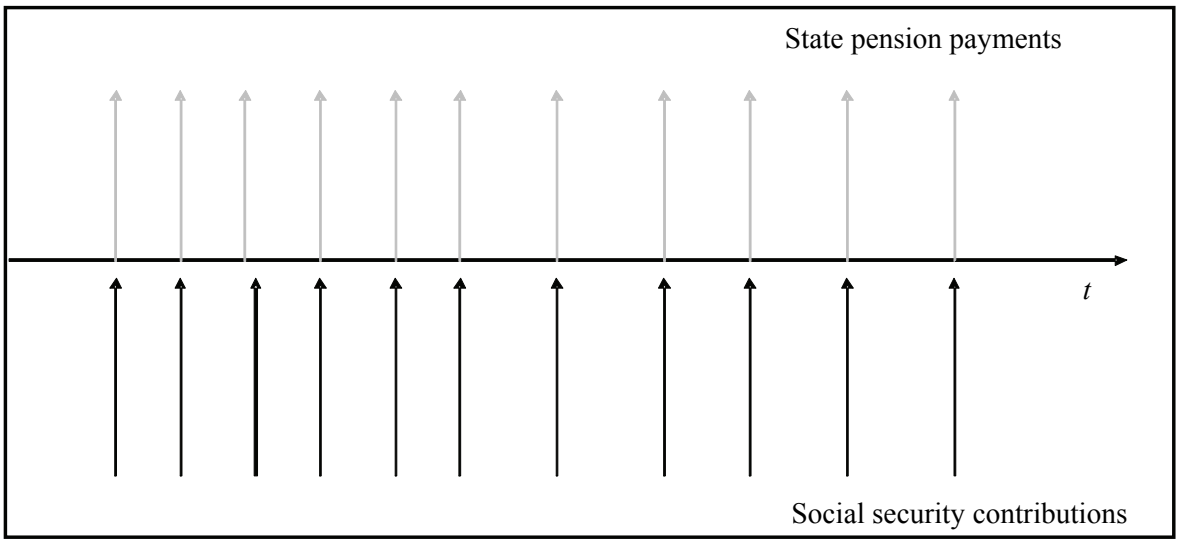
## 1 Comments on "Pension Privatization and Country Risk" by Alfredo Cuevas, María Gonzáles, Davide Lombardo and Arnoldo López-Marmolejo

### *1.1 Brief summary and motivation*

The paper looks at how rating agencies factor in explicit government debt and implicit pension debt (IPD) in their assessment of country risk. The motivation for the paper is that rating agencies could change risk assessment during the transition phase from unfunded pay-as-you-go (PAYG) to funded private pensions, requiring counter-balancing actions from governments to maintain their ratings. Figure 1 illustrates the set up of the simple unfunded pay-as-you-go system.

**Figure 1**

**A Simple Illustration of a (Sustainable) Unfunded Pay-As-You-Go Pension System**




The paper argues that the issue under consideration has arisen in the context of unsustainable PAYG pension systems but the basic story holds even when the PAYG system is sustainable, as is illustrated in Figure 1. To see this, assume that the unfunded PAYG arrangement is mature and sustainable, with population stable and parameters set in a way that revenue meets spending at any point in time. In Figure 1 the black lines are the contributions to the PAYG system made by today's workers. At any point in time the inflow equals the outflow to pensioners, depicted by the grey

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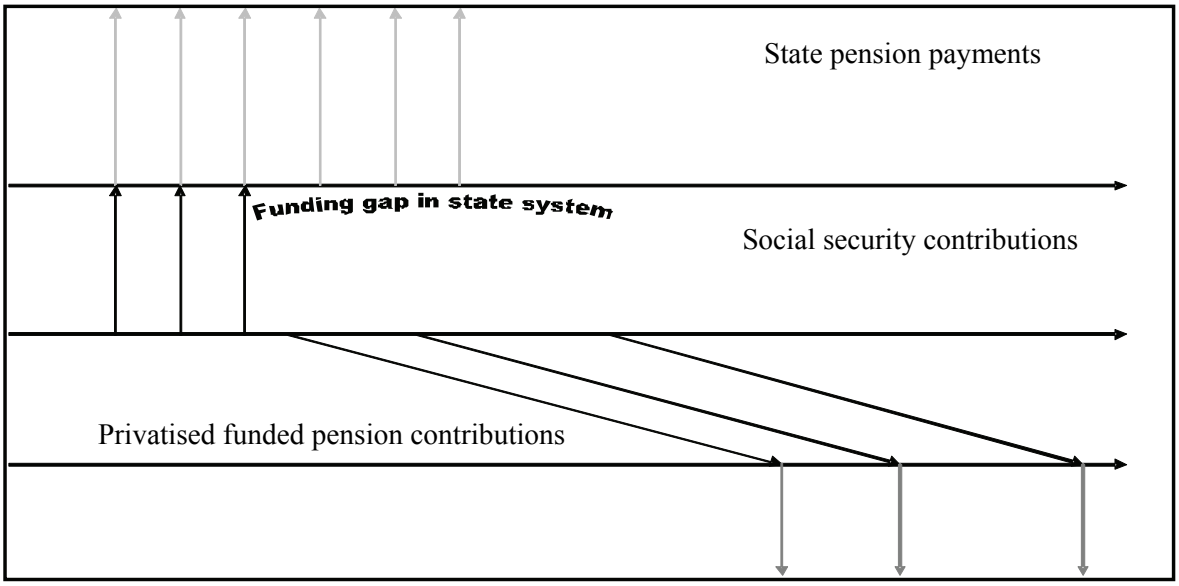
The opinions expressed herein are those of the author and do not necessarily reflect those of the European Central Bank or the Eurosystem.

**Figure 2**

**Transition from Unfunded PAYG to Funded Arrangements**




arrows. Overall the PAYG pension system is neutral for the public finances. It could be part of general government finances or a closed system as in some countries.

Now assume that the government introduces pension reforms and closes the unfunded PAYG system in favour of a funded defined contribution scheme in the private sector. During the transition phase, the government would have to continue to pay the state pension for several cohorts of actual pensioners or those who have build up entitlements to receive a state pension in the future.

During the transition phase funds will be diverted away from financing these state pensions and a funding gap in the social security system will emerge. Everything else equal, the public finances would deteriorate. Eventually accrued liabilities in the state scheme will be unwound and there would be no longer a funding gap but in the meantime the public debt will go up. So while the pension reform reduces future government exposure to pension liabilities, in the short to medium term the government will have accumulated additional debt. Figure 2 shows the inflows and outflows into the system during the transition phase towards a funded regime.

### *1.2 Explicit debt versus implicit pension debt*

The paper finds that rating agencies care more about explicit debt than IPD when assessing risk, which could be due to:

- myopia, with agencies focussing primarily on short term; and/or
- explicit debt being qualitatively different to implicit pension debt, reflecting hierarchy of spending commitments.

At the top of the hierarchy of spending commitments is non-discretionary spending (legal obligations) such as debt interest payments, which a government will have to honour. Breaking these commitments would generally come with an extreme loss in reputation (e.g., debt defaults).

Second are the social/moral obligations such as state pensions, which can and are being renegotiated unilaterally by government. Renegotiating these social obligations might be unpopular with the electorate – and hence might be difficult to do in practice – but unlike with non-discretionary spending, the government is at least not legally bound. Third is discretionary spending, which governments frequently alter as policy objectives and priorities change, or which are made possible by generous tax revenues (or conversely impossible by weak tax revenues).

### *1.3 Short-term versus long-term considerations*

Rating agencies are not alone facing the challenge of translating long-term trends into an assessment of the public finances. Following the reforms of the Stability and Growth Pact, the European Commission for example has put greater emphasis on long-term budgetary developments in its assessment of EU public finances. One innovation over recent years has been to incorporate implicit pension liabilities into medium-term public finance objectives for the member states. To derive its assessment, it uses quantitative and qualitative indicators, e.g. to weigh up potential long-term benefits of reforms against potential short-term fiscal costs. Admittedly, many countries have not been very successful themselves deriving clear policy objectives from the analysis of long-term trends.

## 2 Comments on "Pension Funds and Financial Markets: Evidence from the New EU Member States" by Nadine Leiner-Killinger, Christiane Nickel and Michal Slavík

### *1.1 Brief summary and motivation*

The paper studies the role of funded private pensions in pension provision in new EU member states (NMS). It finds that all NMS have funded private pension schemes and minimum pension/social assistance but only a few have occupational pensions. It shows that investment strategies vary across NMS, e.g. in Hungary private schemes have been obliged to invest in government bonds and bills. The paper seems motivated by the authors' concerns about credibility of multi-pillar pension.

### *1.2 Private pensions in NMS*

Funded private pensions in NMS are exposed to inflation and investment risk, which:

- existed before current crisis but which latter has crystallised; and
- raises question regarding feasibility & credibility of pension strategy and regarding efficiency, fairness and sustainability of the structures created in the NMS (longevity risk important too).

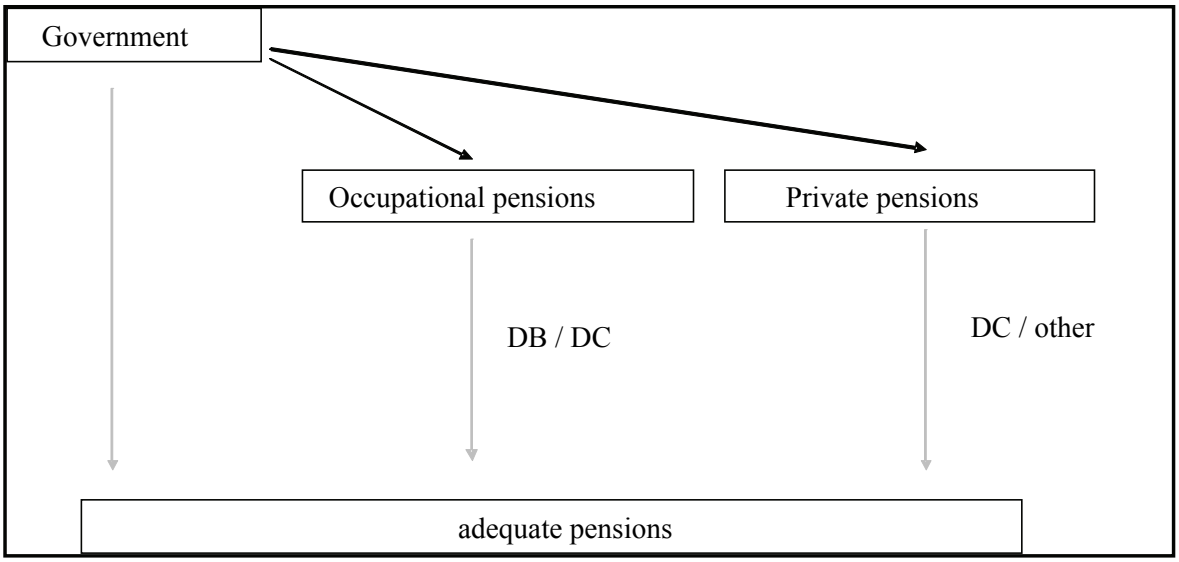
The paper concludes that shifting the burden to the private sector has not been without its problems and that an assessment of fiscal sustainability needs to take account of private sector arrangements. This is because the role of government in providing pensions in the future will to a large degree depend on the future role of occupational and private pensions. All these points seem valid for other countries too.

### *1.3 Some reflections on moving to three pillar pension provision…*

Over the last decade governments have tried to reduce future exposure to pension spending by making state pensions less generous, for example by raising retirement age, encouraging more

**Figure 3**

**Providing for Adequate Pensions: The Three-pillar Approach**




generous occupational pensions and incentivising individuals to save more themselves for their retirement.

International organisations such as the OECD supported (or even encouraged) the move to three pillar pension provision and have assessed fiscal sustainability based on this formal allocation of responsibilities. Figure 3 shows the three-pillar approach to pension provision.

### *1.4 ...but who really owns the future liabilities/how credible is the arrangement?*

Is it realistic though for a government to disown itself from future pension spending? It might seem fine *ex ante* on paper but will the outcome look similar? This will to a large extent depend on the performance of occupational and private pensions over the coming decades.

The current economic crisis shows that occupational pensions – whether defined benefit or contributions – are under immense pressure and private pensions have also done badly in most countries. The crisis has also demonstrated the usefulness of a strong mixed system, with unfunded social security pensions complementing funded occupational or private pensions. With pensioners representing an ever larger share of the electorate (and the baby boom cohorts considered to be particularly demanding), can a government realistically assume that future pensioners would accept disappointing pension incomes if and when occupational and private pensions fail to perform as expected/hoped for? Would the electoral process not put pressure on the political system to make up for potentially disappointing pension incomes? Indeed, how efficient, fair and sustainable are these arrangements? Starting today, as a minimum it appears that governments ought to be determined to ensure that occupational and private pensions can be long-term successful.

**Session 3**

**PENSION REFORM, REDISTRIBUTION, MACROECONOMIC IMPACT**

# DISTRIBUTIVE EFFECTS OF ISRAEL'S PENSION SYSTEM

*Adi Brender*[*]

*This paper examines several aspects of Israel's restructured retirement benefits system, focusing on distributive effects. We characterize 10 stylized representative prototypes of Israeli households, reflecting common demographic, wage and employment profiles. These prototypes are used to examine the joint effects of tax benefits for pensions and the public Old Age Allowances program's contributions and disbursements on the lifetime income distribution, net replacement rates at retirement and lifetime consumption smoothing. We find that the system is neutral in terms of its effect on lifetime income distribution, except for the top income decile which gains less than the others. We also find that pension savings result in a net loss for many low-income households, unsmooth their consumption and lead to "too high" post-retirement net replacement rates. Furthermore, evidence from a unique dataset point to rational and active behavior of households with respect to these incentives, raising questions about the necessity of compulsory pension savings which were enacted in Israel recently.*

## 1 Introduction

Israel's pension and social-security Old-Age-Allowance (OAA) systems have undergone substantial reforms since 1995 dealing predominantly with their solvency. The reforms, resembling those in many OECD countries (Salomaki, 2006; Dang *et al.*, 2001), included a rapid increase of the legal retirement age, substantial cuts in the terms offered by the defined-benefits occupational pension-funds for their existing members and closing these funds for new members. Additionally, new entrants to public-sector employment were moved from employer-fully-funded arrangements to defined contribution – unsubsidized – private pension funds.

After the solvency risks were alleviated, policy-makers' focus shifted to poverty among the elderly. The high and rising overall poverty rates in Israel drew attention to the large proportion (about 22 per cent) of old people living below the poverty line – in contrast to most OECD countries.[1] Additionally, the government was concerned with the fiscal costs of Social Security's means-tested income supplement program and wanted to ensure that retirees will be able to provide for themselves instead of relying on public funds; there also was a concern that retirees take advantage of the means-tested support.[2] The main factor pointed-out as responsible for the limited availability of own-resources to employees was too-small pension savings among those in the lower part of the income distribution (Table 1). Consequently, the structure of tax incentives for long-term savings was altered to support almost exclusively pension savings (defined as savings towards the payment of a retirement age annuity). Furthermore, against the background of pending legislative intervention, employers and the trade-unions agreed to adopt a national pension accord from 2008, which was extended by government decree to cover all the employees.

Pensions offer two key advantages for individuals: 1) consumption smoothing over a

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[*] Bank of Israel, Research Department.

Superb research assistance by Anna Brodeski is gratefully acknowledged.

[1] Forster and Mira D'Ercole (2005) find that only in 7 OECD countries poverty rates among the elderly are higher than for the whole population.

[2] Part of this concern is that non-pension savings are not effectively accounted for in the calculation of the means-tested support, due to misreporting by applicants.

**Table 1**

**Pension and Employment when Reaching the Retirement Age**
*(percent of the employees in each quintile)*

| Income Quintile in 2000* | Work and Pension Status in 2005 | | | Status in 2007 |
|---|---|---|---|---|
| | Does not Work and Has No Pension | Works and Does Not Collect a Pension | Collects a Pension** | Does Not Work and Has No Pension*** |
| **Working Men aged 60-65 in 2000** | | | | **Working Men Aged 64-66 in 2005** |
| 1 | 44.8 | 29.8 | 25.5 | 37.0 |
| 2 | 31.3 | 38.0 | 30.7 | 24.9 |
| 3 | 24.1 | 39.3 | 36.6 | 18.3 |
| 4 | 19.9 | 30.3 | 49.9 | 14.4 |
| 5 | 15.5 | 26.5 | 58.0 | 15.8 |
| **Total** | **25.8** | **31.2** | **43.0** | **22.1** |
| **Working Women aged 55-65 in 2000**** | | | | **Working Women Aged 59-65 in 2005***** |
| 1 | 48.0 | 42.0 | 10.0 | 36.9 |
| 2 | 27.5 | 48.0 | 24.4 | 21.7 |
| 3 | 16.2 | 38.6 | 45.2 | 12.1 |
| 4 | 14.1 | 35.7 | 50.2 | 9.4 |
| 5 | 14.1 | 37.0 | 48.9 | 9.8 |
| **Total** | **27.3** | **40.3** | **32.4** | **19.0** |

Source: calculations based on the tax records panel dataset for 2000, 2005 and 2007.
* The income quintiles are calculated for the entire population and not for each group separately.
** Either work or not.
*** Based on the income quintiles in 2005.
**** Excluding those over 60 who already received a pension in 2000.
***** Excluding those over 60 who already received a pension in 2005.

lifetime span, including insurance for longevity;[3] 2) potential financial gains due to direct government subsidies and tax breaks (financed by general taxation). With respect to the first advantage, it was argued that people may not save enough for retirement due to myopia about their needs at that age (Kotlikoff, 1987). This myopia can reflect either "wrong" discount rates or ignorance/passiveness regarding future needs.[4] On the other hand, mandatory savings can result in "too much" savings for various types of workers and in sub-optimal distribution of disposable income through life (e.g, as related to balancing pension savings and the costs of raising children and paying mortgages), especially if individuals are rational and informed (Martin and Whitehouse, 2008). Rational individuals are also expected to respond to the net financial benefits from pension savings reflecting the various tax and subsidy incentives. These incentives, however, may also generate "too much" savings and might significantly affect the cross-section lifetime income

[3] Insurance for longevity and its pricing is a major determinant of pension-benefits' value and a source for potential failures in the annuities market (Finkelstein and Poterba, 2002 and 2004).

[4] Beschears *et al.* (2006) and Choi *et al.* (2004) discuss the inertia and passiveness of individuals with respect to their pension savings.

distribution.[5] While the desired level of income redistribution is primarily a matter of social and political preferences it is important that decision-makers be aware of the consequences of various decisions, because in the case of pensions the results may not be fully visible.

This paper examines the distributive effects of Israel's pension system from several angles related to the individual's point-of-view, as related to the potential effects of "mandatory pensions". First, we estimate the distributive effect of the pre-legislation pension system by calculating the net lifetime financial gains from participating in the compulsory social-security OAA system and from choosing to join a pension fund (accounting for the interactions between them). To make the analysis as realistic as possible we focus on typical lifetime employment and income profiles depicted for prototypes derived from labor market and demographic data. This approach differs from various previous studies.[6] Then we point-out the potential effects of pension-savings on these net gains. Consumption smoothing is examined by analyzing pension replacement rates for various types of workers and the ratio of disposable income per "standardized' person in the household during the families' life. A unique dataset – containing a panel of randomly selected 300,000 Israeli tax payers (10 per cent of the population) in 2000, 2005 and 2007 – is used to examine the individual and household characteristics associated with the decision to save for retirement and the degree to which individuals and households responded to the changes in pension regulations in recent years. Specifically, one of the implications of moving to a fully-funded defined contribution system is that low-income individuals (those below the income-tax threshold) no longer have direct financial gain from participating in the system. Their response to this change can provide some insights as to whether individuals are indeed passive with respect to their pension savings.

The paper is organized in the following way. Section 2 provides a short description of Israel's pension system and of the changes implemented since 1996. Section 3 provides information on characteristics of the Israeli labor force that were used to generate wage profiles and behavior patterns for the different household types used in the analysis. In Section 4 we calculate the net financial benefits from participating in Social-Security's OAA and saving for pension. We then calculate the joint impact of the programs on the size and spread of lifetime income of various household types. Section 5 evaluates the arguments in favor of mandating pension savings and Section 6 concludes by discussing the potential impact of the "mandatory pension" decree and highlighting issues and options for policy adjustment.

## 2 Characteristics of the Israeli pension system

Israel's retirement income system is based on a universal social-security pillar, augmented by a means-tested income-supplement program, and on individual savings in pension funds. Until 2008 pension-fund savings were optional, but a government decree has now made such savings mandatory for incomes up to the average wage (an income level exceeded by roughly one third of all employees). This legislation complements an overhaul of Israel's pension system that began in 1995. To set the ground for the analysis this section briefly describes these changes and the current characteristics of the system.[7]

Until 1995 Israelis' retirement savings were concentrated in occupational pension funds which offered generous defined-benefit schemes. Public sector employees, as well as those in large organizations such as the banks and the utility companies, were offered similar benefits in

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5 Diamond (2009) points-out the need to account for the interactions between the tax and pension systems.

6 See, e.g., Martin and Whitehouse (2008), OECD (2005 and 2007) and Bank of Israel (2008).

7 This section relies to a large extent on Achdut and Spivak (2008).

employer-funded programs with no direct employee contribution. Individuals could also enjoy tax benefits for depositing a portion of their uncovered salaries into private savings accounts – provided that the amounts were not withdrawn for at least 15 years from the date the account was opened.

Government support for pension saving took two forms: tax allowances at the times of deposit and withdrawal and preferential yields for the deposited amounts. The pension funds received special non-tradable government bonds at above market yields (5.57 per cent plus indexation to the CPI) to cover 93 per cent of their deposits. Still, by the early 1990s it became clear that the generosity of benefits made the funds operations unsustainable – in line with developments in other developed countries (The World Bank, 1994; Martin and Whitehouse, 2008). Therefore, in March 1995 the funds were closed to new members and the rights of their existing members were somewhat reduced. New pension funds were launched which were required to be actuarially balanced. These funds still received preferential government bonds to cover 70 per cent of their deposits, although the yield was reduced to 5.05 per cent. The government also guaranteed a real return of 3.5 per cent for the remaining 30 per cent of their assets and assumed the risk of changes in longevity.

The 1995 reform was only a first step in the pension system's restructuring. Between 1995 and 2002 the government stepped away from the guarantee to the new pension funds' yields and for the risks associated with changes in life expectancy.[8] After 2001 new public sector employees were not eligible to participate in the employer-funded pension scheme and were placed in the new pension funds. These modifications were, however, only a prelude for the 2003 reform.

In 2003, as part of the fiscal consolidation program, the government significantly reduced the benefits for pension savings at all levels. First, the retirement age was raised from 65 to 67 for men (phased-in until 2009) and from 60 to 64 for women (to be completed in 2017). At the same time tax benefits for early retirement were reduced and the preconditions for receiving early pensions toughened. The "old" pension funds were nationalized, the benefits for their existing members were substantially reduced and their contributions increased. The share of special government bonds issued for these funds was lowered to 30 per cent of their assets, and instead the government offered a substantial one-off subsidy to cover the existing estimated actuarial deficits of the funds.[9] The government also removed its guarantee for the rights of the existing members.

The terms of pension savers in the "new" pension funds were also downgraded. The coverage of special government bonds was reduced to 30 per cent of the funds' assets and the yield was lowered. Combined with raising the management fees the preferential return in the funds was essentially eliminated. The funds were also transformed to a pure defined-contribution setting which implied that the only financial benefit for investing in the funds is due to tax incentives.

Another policy change implemented gradually since 2003 was the removal of tax benefits for long-term savings not directly designed towards retirement-age annuities. Since 2008 individuals are required to save in an annuity-oriented account a sufficient amount to ensure a pension equal at least to the minimum wage in order to qualify for tax benefits for additional savings towards a lump-sum payment upon retirement.

Finally (so far) in 2008 the trade unions and the employers' organizations agreed on "mandatory pensions". This agreement was extended by government decree to all the employees. It mandates that each employee working for at least 6 months with the same employer will be insured in a pension fund. Employees that already have an account with a pension fund will be insured after the 3rd month. Coverage under this decree applies to amounts up to the average national wage, and

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[8] The costs associated with this move for savers are discussed in Yosef and Spivak (2008).

[9] The actual payment will be phased-in over 35 years.

the legislation does not pertain to employees that were in a better scheme before the decree was issued. The contributions are set to rise gradually and reach 15 per cent (10 per cent by the employer and 5 by the employee) by 2013.

Following the various reforms the current benefits for pension savings by the young cohorts in Israel are composed of four tax incentives:

1) employer deposits into a pension fund or an employer-funded program up to 7.5 per cent of the insured salary are non-taxable for the employee. This provision covers salaries up to 4 times the average wage. These amounts are also exempt from social security contributions;
2) employee contributions on the portion of their salary for which the employer also deposited are eligible for a 35 per cent tax credit. This credit is provided for deposits of up to 7 per cent of the insured income, for incomes up to the average wage. A credit of 5 per cent is granted for the portion of income between the average wage and twice the average wage. Similar provisions exist for employees whose employers do not share in their pension savings;
3) the return on amounts deposited in pension funds is exempt from taxation;[10]
4) the annuity payments are taxed as regular income at the time they are disbursed with an additional exemption of 35 per cent of the annuity, up to a level of about 30 per cent of the average wage. Additionally, pensioners are eligible for a supplementary credit point (197 NIS monthly) if their spouse does not work and has no pension.

In addition to pension savings individuals are eligible for OAA from Social Security. The monthly contribution for these benefits is 0.22 per cent of incomes below 60 per cent of the average wage and 3.85 per cent for the portion of income above this threshold (capped at 5 times the average wage). Employers also contribute 1.45 per cent on wages up to 60 per cent of the average wage and 2.04 per cent on higher incomes. The benefits offered by the system include three components:

1) a monthly lump-sum amount of about 16 per cent of the average national wage for a single person and 24 per cent for a couple. The amounts are indexed to the CPI;
2) an addition of 2 per cent for each year of contribution – beyond the first 10. This addition is limited to 50 per cent of the basic amount. Couples of two workers are eligible for the benefit based on the sum of their individual rights;
3) a means-tested income-guarantee scheme providing a minimum income of 30 per cent of the average wage for individuals and 45 per cent for couples. The eligibility is not affected by pensions up to 13 per cent of the average wage for individuals and 20 per cent for couples.[11]

## 3 Typical income and employment profiles

An analysis of the lifetime effects of retirement savings and benefits on income distribution requires information on the income and employment patterns of individuals, on the persistence of their rank in the income distribution, on the typical household characteristics and on the incomes of other members of the household – particularly the spouse. To identify the most common prototypes we combine three datasets, each with a unique contribution:

1) the annual national Incomes Surveys which allow tracing changes in the wages of various *types* of individuals over time. Although the surveys do not follow a fixed panel they do facilitate a

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[10] The general tax rate on interest and capital gains for individuals is 15 per cent on indexed assets (on the real yield) and 20 per cent on non-indexed assets (on the nominal yield).

[11] The latest increase in the means-tested benefits for people over the age of 80, implemented since late 2008, is not accounted for in the calculations.

comparison of the wages of individuals with similar characteristics over long periods. The surveys also contain data on education, and additional household and demographic characteristics;

2) the Social Survey of 2002, which focused on pensions and lifetime employment, provides information about the number of years worked by individuals with various characteristics during their adulthood;
3) a dataset including a random sample of 10 per cent of all the tax payers in Israel in 2000, 2005 and 2007. This unique dataset was constructed to include the tax records of the same individuals in these years (provided that they worked or received a pension in at least one of them), as well as the tax records of their spouses. The data are augmented by additional variables from the official state registry such as the number and dates of birth of their children, including those who passed the age of 18. This facilitates tracing the pattern of births over the individual's life – particularly important data for identifying potential breaking points in female careers as well as per capita income of the household.

The key characteristics identified with the various datasets are the following:

1) working people are typically married. More than three quarters of all the working individuals in the tax dataset were married; this share is quite stable across age groups (Table 2). Therefore, meaningful analysis of pre-retirement income patterns and post-retirement standard of living has to center on couples;
2) more than 90 per cent of working adults between the ages of 40 and 65 have children (including those over the age of 18). More than 50 per cent have at least three offsprings (Table 2). The larger number of parents compared to married individuals is mostly accounted for by divorced parents and widows (Table 3);
3) more than 75 per cent of working men, and 89 per cent of working women have a working spouse. There is a positive correlation between own-income and the probability that the wife is working (Table 4);
4) the average age difference between male workers and their wives is about three years among couples in which both spouses work. Given the existing and planned official retirement ages this implies that married couples typically reach the retirement age at about the same time (Table 5);
5) from the Social Survey we find that men typically worked with few interruptions throughout their adulthood. However, those with low incomes experience somewhat longer breaks (Table 6A). A specific and quantitatively important sub-group is Arab (mostly manual) workers that tend to retire relatively early; this tendency is somewhat reflected in the persistently low share of work years among Arabs over the age of 40 (Table 6B). However, on average Arab men are likely to meet the 35-years minimum requirement for full tenure at social security because they can start working at age 18;
6) working woman tend to have much longer interruptions of their working life. This is correlated with having a large number of children (Table 6C) and with their income: those who reach monthly salaries of over 5,000 NIS work a proportion of their adult life that is only moderately lower than that of parallel men[12] – but they are less than a half of the working women (Table 6A). We also find the reverse phenomenon –the more experience women accumulated during their working lives – the higher their average income (Table 6D). Additionally a positive correlation exists between working years and education, but quite a few women with high education work part-time or quit the labor force for significant periods. Only a small fraction of Arab women works;
7) using the Incomes Survey we simulate the lifetime wage patterns of various individuals. We do that by examining the change in the prototypes' wages between 1988 and 2007 (looking at a

[12] Since the purpose of this examination is to identify common patterns the question of causality is not discussed here.

**Table 2**

## Family Structure by Age Group and the Lifetime Number of Children Working Individuals in 2005

*(percent of all working families)*

| Age | Married | With one child | With 2 children | With 3+ children | With Children under 18 |
|---|---|---|---|---|---|
| 25-29 | 53.7 | 16.7 | 10.7 | 6.2 | 33.6 |
| 30-39 | 75.6 | 17.3 | 27.9 | 29.6 | 74.2 |
| 40-49 | 79.9 | 9.9 | 23.7 | 57.7 | 78.7 |
| 50-59 | 79.5 | 10.6 | 22.7 | 58.1 | 32.3 |
| 60-64 | 78.7 | 9.7 | 19.6 | 58.9 | 6.5 |
| 65-69 | 74.2 | 12.7 | 14.8 | 47.7 | 2.1 |
| 70-74 | 72.7 | 11.7 | 17.4 | 45.6 | 1.1 |
| 75+ | 59.9 | 16.5 | 19.6 | 28.3 | 14.9 |

Source: Calculations based on the tax records dataset for 2005.

**Table 3**

## Marital Status of Working Single Mothers*

*(percent of all working women)*

| Age | Single | Divorced | Widowed |
|---|---|---|---|
| 25-29 | 3.5 | 4.7 | 0.1 |
| 30-34 | 2.6 | 7.4 | 0.3 |
| 35-39 | 3.2 | 12.2 | 0.9 |
| 40-44 | 3.2 | 14.3 | 1.4 |
| 45-49 | 2.2 | 16.3 | 2.6 |
| 50-54 | 2.1 | 16.4 | 4.1 |
| 55-59 | 2.1 | 15.9 | 6.6 |
| 60-64 | 1.7 | 15.5 | 11.7 |
| 65-69 | 1.1 | 12.1 | 23.9 |
| 70-74 | 2.7 | 8.2 | 34.6 |
| 75+ | 3.2 | 3.8 | 39.6 |
| Total | 2.7 | 12.4 | 3.0 |

* The term "single mothers" refers here to women that had children during the course of their lives and were not married in 2005.
Source: calculations based on the 2005 tax records dataset.

**Table 4**

## Work Status Given the Spouse's Income

*(percent of spouses in the quintile)*

| Spouse's Income Quintile | Wife | | Husband | |
|---|---|---|---|---|
| | Works* | Doesn't Work | Works* | Doesn't Work |
| 1 | 68.2 | 31.8 | 86.2 | 13.8 |
| 2 | 67.9 | 32.1 | 89.2 | 10.8 |
| 3 | 73.6 | 26.4 | 89.6 | 10.4 |
| 4 | 80.0 | 20.0 | 88.2 | 11.8 |
| 5 | 84.3 | 15.7 | 91.5 | 8.6 |
| Total | 76.9 | 23.1 | 88.8 | 11.2 |

* Either the observed individual reported that the spouse works or the spouse appears in the dataset with positive labor income.
Source: calculations based on the 2005 tax records dataset.

20 years older age group in 2007) as well as by looking at a cross-section of individuals in 2007. We find clear and consistent patterns for men, which differ between education levels. Those with high education move up the wage ladder early in their careers and enjoy large wage increases for about 30 years before their wages stabilize. The pattern is similar, although more moderate, for those with post-secondary education up to – and including – a bachelor's degree. In contrast, those with lower education have an initial low wage which is rising by less than the national average wage over the course of their employment (that is, they have no premium for tenure);

8) women's wages rise more moderately than men's, especially at the ages 30-45. This reflects the interruptions in their career and shorter working hours, especially in the periods of raising children (Brender and Gallo, 2008). Even at the high education level a significant share of women work part-time (Table 7). The wages of women with low education tend to increase at a similar, or even higher, rate than men in these ages – but this may be due to a statistical artifact, since a large share of the women in this group does not work;

9) consistent with the wage profiles identified above, in the tax dataset we find significant persistence of individuals' rank in the income distribution in the main working age (30-55). While these data only cover a 5 years period they have the advantage of being based on a panel (Table 8A). We also find that the dropout rate among those at the bottom deciles is double that of those at the top. The same type of persistence is observed between 2005 and 2007 (Table 8B);

10) there is a strong correlation between workers' incomes and those of their spouses. It is also much more common to find non-working wives of men with low incomes (Table 9).

Based on these observations we set up several prototypes of individuals which share the most common characteristics of the Israeli population in order to analyze the pension system. These are described in Table 10 and their detailed characteristics appear in Appendix A.

## 4 Loss/Benefit from Social Security and Pension Savings

The analysis of the net gains or losses from participating in the social security OAA program and from contributing to a pension plan was based on the simulated wage profiles of the various types described in Table 10. At the first stage we calculated the contributions and potential benefits in the – compulsory – OAA program; then the marginal benefit from choosing to save in a pension fund, accounting

**Table 5**

**Age Differences between Spouses***
*(years)*

| Age | Age difference | |
|---|---|---|
| | Men | Women |
| **25-29** | 0.4 | –3.3 |
| **30-34** | 1.6 | –2.9 |
| **35-44** | 2.5 | –3.2 |
| **45-54** | 3.0 | –2.7 |
| **55-64** | 3.5 | –2.9 |
| **65-74** | 4.9 | –3.6 |

* Calculated as the individual's age minus the spouse's age.
Source: calculations based on the 2005 tax records dataset.

**Table 6**

**Accumulated Years of Experience* Compared to Potential****
*(percent of potential working years)*

**a) by Income and Gender**

| Income | Male | | Female | |
|---|---|---|---|---|
| | Experience/ Potential | Percent of the Group | Experience/ Potential | Percent of the Group |
| up to 1500 | 83.8 | 2.3 | 63.6 | 6.1 |
| 1501-3000 | 87.7 | 6.0 | 67.6 | 17.7 |
| 3001-5000 | 88.9 | 22.4 | 81.5 | 32.7 |
| 5001-7000 | 94.0 | 19.2 | 89.2 | 20.3 |
| 7001-9000 | 95.9 | 12.3 | 85.0 | 8.9 |
| 9001-12000 | 94.7 | 14.0 | 89.7 | 7.6 |
| 12000+ | 92.1 | 23.9 | 87.4 | 6.6 |

**b) by Gender, Religion and Age**

| Age | Male, Jewish | Male, Arab | Female |
|---|---|---|---|
| 30-34 | 88.8 | 79.3 | 70.0 |
| 35-39 | 89.5 | 84.8 | 70.8 |
| 40-44 | 91.0 | 75.9 | 73.7 |
| 45-49 | 93.7 | 79.9 | 72.8 |
| 50-54 | 90.0 | 75.6 | 68.4 |
| 55-59 | 93.4 | 79.1 | 65.4 |

**c) Females by Age and Number of Children**

| Age | No Children | 1 Child | 2 Children | 3+ Children |
|---|---|---|---|---|
| 35-39 | 75.1 | 82.2 | 81.4 | 66.1 |
| 40-44 | 73.2 | 88.6 | 81.1 | 71.8 |
| 45-49 | 71.8 | 80.5 | 84.4 | 69.4 |

**d) Monthly Income by Percent of Potential Years Actually Worked and Age**

| Age | The Ratio of Actual Years of Experience Accumulated to Potential | | | | |
|---|---|---|---|---|---|
| | up to 30% | 30%-50% | 50%-70% | 70%-85% | 86%+ |
| 35-49 | 2,245 | 3,381 | 4,816 | 5,208 | 6,179 |
| 50-59 | 2,427 | 3,382 | 4,565 | 4,931 | 6,383 |

* Defined as the self-reported number of years worked by the individual. The figures used here are based on averages of the reported categories.
** Potential years are age less 21 for Jewish Men, age minus 18 for Arabs and age minus 20 for Jewish women. The tables include individuals over the age of 25.
Source: Calculations based on the 2002 *Social Survey*.

**Table 7**

**Employment of Women, by Education**

| Years of Schooling | Age | | | |
|---|---|---|---|---|
| | 25-29 | 30-39 | 40-49 | 50-59 |
| | *(percent working from all the women in the group)* | | | |
| 0-10 | 21.7 | 20.6 | 28.9 | 27.9 |
| 11-12 | 49.1 | 58.0 | 67.3 | 58.9 |
| 13-15 | 76.3 | 74.6 | 80.8 | 74.2 |
| 16+ | 78.8 | 86.3 | 88.6 | 82.4 |
| | *(percent working less than 30 hours per week)*[*] | | | |
| 0-10 | 35.2 | 35.2 | 32.9 | 32.4 |
| 11-12 | 37.7 | 36.4 | 35.9 | 34.8 |
| 13-15 | 36.3 | 37.3 | 37.8 | 35.9 |
| 16+ | 35.4 | 37.7 | 36.8 | 36.2 |

[*] Among those working at least 5 hours.
Source: Calculations based on the 2007 *Incomes Survey*.

**Table 8**

**Persistence of Income Distribution**

**a) between 2000 and 2005**[*]

| Income Quintile in 2000[***] | Quintile in 2005[***] | | | | | Not Working in 2005[**] |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | *(percent of all the workers in the quintile)* | | | | | |
| 1 | **32.2** | 21.4 | 8.4 | 3.1 | 0.8 | 34.1 |
| 2 | 16.0 | **36.6** | 22.3 | 5.0 | 1.1 | 19.1 |
| 3 | 7.7 | 12.1 | **41.2** | 22.5 | 2.1 | 14.3 |
| 4 | 4.1 | 4.6 | 9.3 | **48.5** | 17.1 | 16.4 |
| 5 | 2.9 | 2.1 | 2.7 | 8.0 | **66.6** | 17.8 |
| **Total** | **12.4** | **15.3** | **16.8** | **17.5** | **17.7** | **20.3** |

**b) between 2005 and 2007**[****]

| Income Quintile in 2005[***] | Quintile in 2007[***] | | | | | Not Working in 2007[**] |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | *(percent of all the workers in the quintile)* | | | | | |
| 1 | **37.2** | 18.7 | 7.0 | 2.2 | 1.0 | 34.0 |
| 2 | 15.0 | **48.1** | 14.9 | 3.9 | 1.1 | 17.1 |
| 3 | 5.1 | 14.0 | **55.2** | 12.7 | 1.4 | 11.7 |
| 4 | 2.3 | 3.1 | 12.6 | **62.4** | 8.6 | 11.0 |
| 5 | 0.8 | 0.8 | 1.2 | 9.0 | **72.4** | 15.7 |
| **Total** | **12.0** | **16.8** | **18.2** | **18.1** | **17.0** | **17.8** |

[*] For the age group 35-50 in 2000 and 40-55 in 2005.
[**] "Not working" is defined as not being reported in the dataset for that year.
[***] Quintiles are defined across the relevant group (e.g., individuals aged 35-50 who worked in 2000).
[****] For the age group 35-55 in 2005 and 37-57 in 2007.
Source: calculations based on the tax records panel dataset for 2000, 2005 and 2007.

**Table 9**

**Correlation Between Spouses' Income Quintiles in 2007**

| Husband's Income Quintile* | Doesn't Work** | Wife's Income Quintile | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | 45.8 | 17.6 | 12.9 | 10.1 | 7.9 | 5.7 |
| 2 | 34.0 | 16.3 | 16.7 | 15.4 | 10.7 | 6.9 |
| 3 | 25.9 | 14.7 | 16.6 | 17.6 | 14.8 | 10.4 |
| 4 | 20.6 | 11.5 | 14.0 | 15.8 | 18.9 | 19.3 |
| 5 | 22.1 | 9.2 | 10.0 | 11.9 | 18.4 | 28.5 |
| **Total** | **29.6** | **13.9** | **14.0** | **14.2** | **14.2** | **14.2** |

Source: calculations based on the 2007 tax records dataset.
* based on data for married men aged 30-55 with minimum annual income of 12,000 NIS and women with a minimum income of 6,000 NIS.
** The share of those who do not work includes women whose husband's state that they work but they do not show-up in the tax authorities' records.

**Table 10**

**Description of the Household Types Used in the Pension Analysis**

| | Type | Net Lifetime Income* |
|---|---|---|
| 1 | Manual worker, married to a non-working wife, 4 kids, retires at age 60 | 5.9 |
| 2 | Secondary education, married to a non-working wife, 3 kids | 7.2 |
| 3 | Secondary education, wife working part-time when the children are in pre-school age: 0.7 of full-time when the first child is born and 0.5 when the second is born. Three kids | 10.3 |
| 4 | Bachelor, post-secondary education | 9.3 |
| 5 | Post-secondary education for both husband and wife, 2 kids | 16.0 |
| 6 | Single (divorced mother) with post-secondary education, two kids. Working part-time until the kids reach age 18. Housing costs are covered by alimony until the children reach age 18 | 5.3 |
| 7 | Academic degree for both husband and wife, 3 kids. Wife works 50 per cent of a full-time job all her adult life | 17.1 |
| 8 | Post secondary education, wife has secondary education and works 20 years. Three kids | 11.8 |
| 9 | Academic degree for both husband and wife, 3 kids | 21.0 |
| 10 | "Fast-track" successful couple, both with tertiary education and working full-time. Two kids | 30.4 |

* In millions of NIS capitalized to the retirement date.

for potential offsets with the OAA. We focus on three parameters: 1) net lifetime financial gain or loss from participating in a program, 2) the net replacement rate offered by the program relative to the last income earned by the employee, 3) the path of the ratio of disposable income to the "poverty line" over the course of the individual's life.

### *4.1 Old-age allowances*

The OAA program's three main components are the universal basic amount, the tenure-based supplement and the means-tested income supplement. For two-worker couples with tenure of at least 35 years for each spouse (regardless of the hours worked or income during these years) the means-tested program is irrelevant because the sum of their regular benefits slightly exceeds those of the means-tested income supplement. This latter program has disregard boundaries for labor income and pensions that differ between individuals and couples. Once the disregard level is exceeded the phase-out rate of the allowance is 60 per cent, until it reaches the basic – universal – amount (which includes the tenure supplement). Contributions to the OAA are based on a two-level schedule with a cap at 5 times the average wage. Direct contributions are not expected to cover the full cost of the program and the balance is covered by pre-specified government contributions.

To calculate the net benefits from the program each "type's" OAA annual contributions were simulated and accumulated using a real interest rate of 3.5 per cent.[13] Then the accumulated contributions were compared to the value of the benefits the individual (or couple) are eligible for if they do not have a pension. For two-worker couples this typically means that they would receive the sum of their individual benefits (except if one of them did not work for at least 35 years). For other couples and for singles the potential benefits include the means-tested supplement. The calculated potential benefit is then capitalized by using pension fund conversion coefficients for the equivalent amount and conditions.[14]

Columns 1 and 2 of Table 11 report the lifetime contributions and potential benefits of the OAA. It is evident that the program is very progressive and provides a large subsidy for low-income households. For higher-income households it offers a much smaller subsidy, but they still enjoy a net benefit from participating. Only at the very top of the income distribution – about 15 per cent of all households which are represented by "type 10" (and those on the range between types 9 and 10) – do the program contributions exceed the benefits.[15]

Table 12 shows that the OAA provides quite an adequate replacement rate for low-income households: the replacement rate is close to 100 per cent for "type 1" which represents about one fifth of the working population. "Type 2" also enjoys quite adequate replacement when accounting for job-related costs during their employment years. In contrast, the replacement rates appear to be insufficient for higher-income households. This is hardly surprising as the program's purpose is to protect the elderly from poverty, rather than provide a standard of living consistent with their employment income – especially when compared to the top of their earnings which is typically reached prior to retirement.

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[13] This is an assumed long-term net return accounting for management fees of pension funds. As discussed in Whitehouse (2000 and 2001) differences in administrative fees may have significant impact on the real return. Such differences seem to have emerged between funds in Israel but we abstract from this issue here.

[14] Specifically, we use the coefficients applied to individuals who are currently 25 years old. Notwithstanding the uncertainty of these numbers, as discussed by Whitehouse (2007), the current coefficients do not vary significantly between cohorts and the results are not qualitatively sensitive to changes in the magnitudes of those prevailing between cohorts.

[15] The comparison between income groups abstracts from the possibility, discussed in Cutler *et al.* (2006) and Breyer and Hupfeld (2007) that life-expectancy is positively correlated with income.

**Table 11**

**Life-time Benefits from Social Security's Old-age Allowance Program and from Pension Savings**
*(thousands of NIS at 2009 prices)*

| Type | Social-security OAA Program | | Life-time Tax Benefits for Pension Savings | Net Gains from Pension Savings** | | |
|---|---|---|---|---|---|---|
| | Life-time Contribution | Value of Potential Benefits* | | Only Husband | Household | Total Net Benefit from OAA + Pension*** |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1 | 94 | 1,148 | 29 | –143 | … | 1,054 |
| 2 | 138 | 1,148 | 190 | –82 | … | 1,010 |
| 3 | 187 | 1,161 | 198 | 190 | 198 | 1,172 |
| 4 | 336 | 643 | 463 | 308 | … | 615 |
| 5 | 447 | 1,161 | 500 | 463 | 500 | 1,214 |
| 6 | 95 | 685 | 32 | … | –165 | 591 |
| 7 | 703 | 1,161 | 729 | 719 | 729 | 1,187 |
| 8 | 371 | 1,161 | 468 | 463 | 468 | 1,258 |
| 9 | 845 | 1,161 | 850 | 719 | 850 | 1,166 |
| 10 | 1,711 | 1,161 | 1,443 | 1,196 | 1,443 | 893 |

* The capitalized benefit if the post-retirement income of the individual/household is below the means-tested program's threshold, where relevant.
** Accounting for offsets of old-age allowances.
*** Assuming that households losing from pension savings do not contribute to a pension fund.

### *4.2 Pensions*

The placement of all new pension savers in Israel in pure defined contribution programs implies that the only net financial benefits from such savings are due to tax incentives. These benefits are granted in Israel mostly at the contribution stage but also at the time the annuities are disbursed. However, to enjoy these tax benefits one has to reach the income tax threshold – an income level which 45 per cent of all employees (30 per cent of working men) fall below.[16] Upon retirement, the annuity payments are taxed at the regular brackets with an additional discount on pensions up to about a third of the average wage. An additional tax benefit is granted to pensioners whose spouses have no pension and Social security's OAA are tax-exempt. This implies that many of those who enjoyed tax advantages at the contribution stage enjoy a substantial – or full – exemption at the withdrawal stage as well.

[16] The cap on tax-exemptions for employer contributions is at 4 times the average wage – an income level reached by only 3 per cent of all employees.

To calculate the net benefits from pension savings we simulated the contributions of the employees (or households) through their (assumed) entire working life.[17] The hypothesized contribution rate for those who contribute was the maximum allowed by the tax authorities, regardless of whether the individual's income is above the threshold for affecting tax benefits. This assumption is in the spirit of the "mandatory pension" decree and consistent with the current practice; it will be revisited below.

**Table 12**

**Net Replacement Rate at Retirement***
*(percent of pre-retirement income)*

| Type | No Pension | With Pension |
|---|---|---|
| | (1) | (2) |
| 1 | 94.2 | 171.1 |
| 2 | 74.8 | 141.4 |
| 3 | 54.4 | 145.1 |
| 4 | 33.8 | 116.5 |
| 5 | 31.1 | 113.2 |
| 6 | 49.8 | 112.9 |
| 7 | 29.4 | 112.1 |
| 8 | 35.7 | 100.6 |
| 9 | 24.4 | 108.7 |
| 10 | 15.5 | 87.9 |

* The ratio of post-retirement income to the last net income before retirement. Pre-retirement income is calculated net of pension contributions.

Column 3 of Table 11 shows the capitalized value of the lifetime pension tax benefits granted to the household. These amounts include the capitalized sum of the tax benefits during the contribution period reduced by the taxes paid on the annuity – net of the tax benefits at that stage. The benefits are quite small for the low-income types, reflecting their low income-tax rates – if they pay at all – throughout their working lives.[18] This is particularly true with respect to women who enjoy extra tax credits for their children.[19] In contrast, the tax benefits for high-income households are large and may even exceed the value of the OAA.

While all households may gain from the pension tax benefits, these gains can be offset, or even reversed, by a phase-out of the means-tested component of the OAA. As discussed above this offset is relevant only for couples in which at least one spouse did not work 35 years and for singles. In such cases the magnitude of the offset depends on the joint annuities amount. Columns 4 and 5 show that this offset can be quite substantial. Household types 1, 2 and 6 – in which there is only a single worker with low income – actually lose from saving for a pension. These types represent a substantial share of households in Israel, especially in the populations targeted by the "mandatory pension" decree.[20] The mid-high income bachelor (type 4) loses about a third of the pension tax benefits but retains a positive incentive for savings. All the household types that represent two fully working spouses are not affected by the offset and retain their tax benefits (although in the case of the relatively low-income type 3 these are quite small).

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[17] The hypothesized alternative to pension savings is not saving at all. In this way we abstract from the tax exemption on the pension accumulation return.

[18] The benefit is always positive due to the exemption of employer contributions from social-security.

[19] The Israeli tax unit is the individual. Women receive an additional 0.5 tax credit (2.75 compared to 2.25 for men) and one more for each child. As a result only a relatively small fraction of working women – especially of working mothers – actually reaches the tax threshold (Brender, 2005 and 2009).

[20] Individuals with higher income at relatively old ages who lack the 35 years tenure and did not save for a pension may also lose from the legislation, but such individuals are quite rare.

Column 6 presents the net combined benefits from the OAA program and joining a pension fund (if yielding a net gain). We find that there are only small differences between the various household types: low income ones enjoy a large net surplus in the OAA while the others replace these benefits with tax incentives.[21] The only, somewhat different household type is 10, which enjoys a smaller benefit due to high taxes on the annuities. Household types 4 and 6, which include singles, have similar benefits to the others, proportionally reduced to their size. Therefore it appears that, in their pre-mandatory pension design, Israel's joint OAA and pension systems are neutral in terms of lifetime income distribution.[22]

Column 2 of Table 12 shows the net replacement rates for the various types of households if they contribute to a pension fund through their entire working life. These rates are calculated relative to the pre-retirement income, net of taxes, social-security charges and pension contributions. It is evident that for low-income households full pension savings create replacement rates that are too high, especially given that they also lose out on a net basis from pension savings. For higher-income households the lifetime savings produce a more moderate replacement rate, although still substantially higher than 100 per cent. This may suggest that lifetime savings at the maximum permitted rates are too high, at least at the assumed real net return of 3.5 per cent. It should be noted that the mandatory contribution rate from 2013 will be slightly higher than those assumed here. Furthermore, the tax-records data indicate that in practice the pensions of the current retirees that do collect a pension typically provide a replacement rate of about 40 per cent (for the top 4 quintiles, excluding OAA). These rates are much lower than those mandated by the current law and similar to the prevailing rates in most OECD countries.

### *4.3 Pension contributions and income allocation through life*

While the discussion of pensions is often focused on the need to secure an adequate standard of living for the elderly there is also the opposite concern: does the pension system produce "too much" savings? When decisions take place freely between market-priced pension alternatives such a result is unlikely. However, the presence of tax-subsidy incentives and mandatory savings may lead to different outcomes.

The main reason why pensions can actually "unsmooth" consumption is that tax benefits are typically granted with an annual cap based on gross income, attempting to smooth contributions. This approach ignores the distribution of other expenses during a families' life – most notably on raising children and mortgages. Although a family could ideally spread mortgage payments over its entire life, typically it is paid during a limited period – while the "residence" consumption continues deep into retirement. This problem is intensified in Israel (as in several other countries) because there is no tax relief for mortgage payers. The costs of child raising are particularly relevant in Israel where families typically have 2 or 3 – and in many cases more – kids, child allowances are significantly lower than in most developed countries, and tax benefits for parents are small and limited to women.

To estimate the household's "appropriate" consumption level its simulated income (including child allowances) was divided by the number of "standard" persons, using the scale employed in the calculation of the "poverty line". We also deducted the simulated mortgage payments for those household types that are expected to have one – based on the national Expenditures Survey conducted by the Bureau of Statistics (Table 13).

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[21] The benefits for non-working individuals and households are of the same magnitude as those for working ones.

[22] Although the taxes used to cover the residual cost of the OAA program are paid disproportionately by those at the top life-time income levels. Also, high-income households have to actually save for pension in order to enjoy the same benefits provided to low-income ones by the OAA.

Table 14 provides some evidence on the level of net income per "standard person" relative to the poverty line (27 per cent of the average wage per "standard person"). For each household type this ratio is calculated under the alternative assumptions of saving for pension and not saving. The results show that for all family types full pension savings tend to exacerbate the phenomenon of relatively low disposable income at the early stages of a family's life. This phenomenon is most notable in the low-income types where the already low disposable income in younger ages is further reduced in order to generate high post-retirement income. It therefore seems quite rational for low and median-income families to postpone pension savings, especially if their salaries trend towards higher tax brackets.[23]

**Table 13**

**Mortgage Payments by Age Group**

| Age of Head of Household | Has Mortgage* | Monthly Mortgage Payments** |
|---|---|---|
| 25-29 | 24.8 | 30.7 |
| 30-34 | 34.0 | 23.4 |
| 35-44 | 48.5 | 18.7 |
| 45-54 | 43.4 | 20.1 |
| 55-64 | 28.5 | 36.7 |

* Percent of all households in the age-group.
** Among those paying a mortgage, in percent of gross labor income.
Source: Calculations based on the 2007 *Household Expenditure Survey*.

## 5 Myopia, passivity and irrationality of savers

Some of the arguments for government intervention in the pension market relate to households' myopia with respect to post-retirement savings. It is argued that young persons underestimate their pension needs and are consequently "stuck" with too little resources when they retire. An observationally similar argument is that even if individuals are aware of these needs they tend to postpone action with respect to their pensions, so by the time they start saving it may be too late to accumulate sufficient funds to pay for a decent annuity.

While distinguishing between optimization based on individual discount rates and myopia is not a trivial analytical issue, this section tries to examine the saving behavior of Israeli workers in this light. The analysis above suggests that saving for pension is a poor financial move for low-income individuals and for families with one earner – both in the present and during the course of adulthood. We also find that consumption smoothing would suggest that younger families that pay mortgages and those with children are likely to be less inclined to save at that stage of their life.

Figure 1 shows that pension contributions are indeed positively correlated with income.[24] In the bottom deciles of the employment-income distribution less than one fifth of men and less than a third of working women save for pension while at the top deciles pension contributions are almost universal. In the lower deciles the larger share of women saving for pension compared to men is consistent with the fact that nearly 90 per cent of working women have a working spouse (Table 4),

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[23] The tax incentives in Israel are granted in the form of non-refundable tax credits; many employees spend a significant share of their working lives under the tax threshold and cannot use these credits. Moreover, the value of the exemption for the employer contributions directly depends on the tax bracket.

[24] The figure is based on the 2007 tax-records dataset. The figures for earlier years are similar.

**Table 14**

**Disposable Income Per "Standard Person" Relative to the Poverty Line**
*(percent of the "poverty line" in that year)*

| Type | | Age | | | | |
|---|---|---|---|---|---|---|
| | | **30** | **40** | **50** | **60** | **Retirement** |
| 1 | With pension | 71 | 65 | 84 | 101 | 152 |
| | No pension | 81 | 74 | 97 | 118 | 98 |
| 2 | With pension | 82 | 71 | 92 | 115 | 160 |
| | No pension | 92 | 80 | 105 | 133 | 98 |
| 3 | With pension | 103 | 79 | 126 | 161 | 207 |
| | No pension | 121 | 92 | 145 | 185 | 99 |
| 4 | With pension | 241 | 261 | 280 | 288 | 295 |
| | No pension | 271 | 294 | 315 | 325 | 104 |
| 5 | With pension | 171 | 147 | 292 | 294 | 294 |
| | No pension | 199 | 172 | 333 | 335 | 99 |
| 6 | With pension | 126 | 71 | 84 | 186 | 203 |
| | No pension | 145 | 82 | 97 | 216 | 104 |
| 7 | With pension | 169 | 135 | 208 | 317 | 316 |
| | No pension | 196 | 157 | 235 | 359 | 99 |
| 8 | With pension | 142 | 72 | 162 | 258 | 235 |
| | No pension | 167 | 83 | 184 | 293 | 88 |
| 9 | With pension | 196 | 154 | 254 | 384 | 373 |
| | No pension | 231 | 182 | 288 | 433 | 99 |
| 10 | With pension | 268 | 290 | 400 | 616 | 490 |
| | No pension | 310 | 336 | 447 | 683 | 99 |

so they are less likely to fall into the position of net losers from savings due to an offset of the means-tested component of the OAA. Women are also more commonly employed in the public sector, banks and large corporations where pensions are almost universal.

**Figure 1**

**Pension Contribution by Income Deciles, 2007**

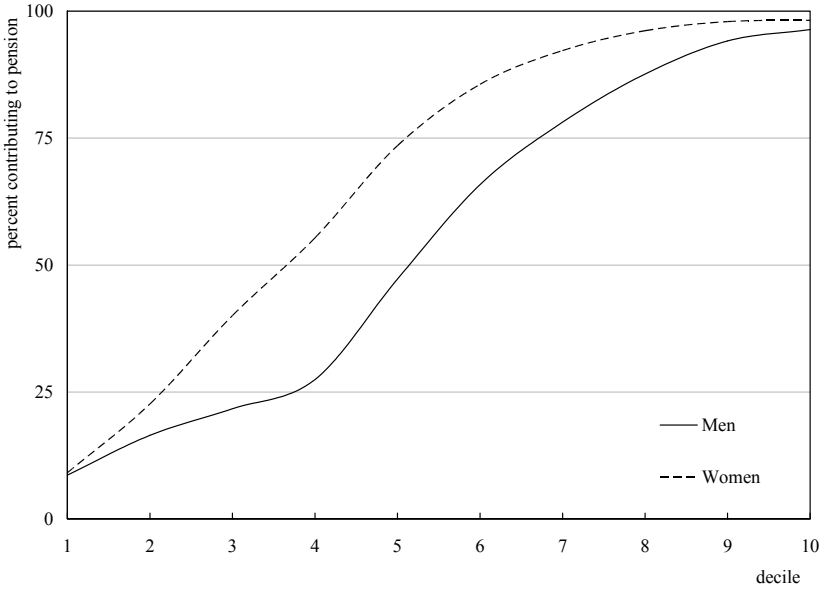


Table 15 examines the savings decisions of households in a more detailed and formal way. The table reports the results of a Probit equation where the dependent variable was whether the individual contributed to a pension fund or not. This analysis is based on more the 100,000 tax files of males in 2007 (the coefficients are similar for the 2005 data) and the results are quite consistent with the expectations discussed above.[25]

- Income has a strong and positive effect that rises throughout the relevant incomes range.[26] Consistent with expectations there is a strong a distinct negative effect for individuals with salaries below the income-tax threshold. Having a working wife also has a strong positive effect – as it reduces the potential loss from the phase-out of the income supplement.
- Having a wife that contributes to a pension fund has an additional strong effect on the choice to save. Given the other variables in the equation this quantitatively important variable (0.36) is likely to reflect two factors: 1) the lower probability to be at the phase-out level of the OAA income supplement which is based on the joint pension income, 2) the wife's work experience: it is required to reach 35 working years to receive the full tenure supplement in the OAA, and women who contribute to pension have, on average, longer working spells than those who do not.
- The equation also points to the liquidity effect: the presence of children, especially young ones, in the household reduces the tendency to save for retirement.
- Age has a positive effect until retirement. This effect may be due to the phase-out of mortgage payments (Table 13). It may also be associated with the reduction of pension benefits for those who started to work after 1995, but the continuing increase of the probability to save at the pre-retirement cohorts is more consistent with the former explanation.

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[25] Equations estimated for women showed similar results. The noticeable difference was that the coefficient for young children was positive. This non-intuitive result is likely to reflect a selection bias: mothers for young children are more likely to quit work if their employers do not accommodate their special needs. The employers that would typically do that are large and established organizations (e.g., the public sector and the banks) where pensions are universal.

[26] The joint *effect* of the coefficients of income and squared income begins to decrease at incomes more than 65 times the average wage.

**Table 15**

**Probit Equation for the Probability of a Working Men to Contribute to a Pension-Plan**

| | Coefficient | *Z* | |
|---|---|---|---|
| Age | 0.01786 | 4.4 | * |
| Age squared | –0.00009 | –1.9 | *** |
| Single *(binary variable)* | –0.03465 | –2.2 | ** |
| Divorced/Widowed *(binary variable)* | –0.03808 | –1.8 | *** |
| Annual income *(thousands)* | 0.00736 | 94.7 | * |
| Squared annual income *(thousands)* | 0.00000 | –66.9 | * |
| Annual income <45,000 *(binary variable)* | –0.85144 | –61.1 | * |
| Number of jobs during the year | –0.06455 | –12.0 | * |
| Months worked *(up to 12)* | 0.01968 | 9.7 | * |
| Does the spouse work *(binary variable)* | 0.50414 | 28.8 | * |
| Spouse contributing to pension *(binary variable)* | 0.35625 | 24.7 | * |
| Annual income of Spouse *(thousands)* | –0.00093 | –8.4 | * |
| Number of children | –0.03552 | –6.7 | * |
| Number of Children aged 0-3 | –0.02785 | –2.9 | * |
| Number of Children aged 4-8 | –0.02909 | –3.5 | * |
| Number of Children aged 9-18 | –0.01566 | –2.2 | ** |
| Age of spouse | –0.00854 | –17.5 | * |
| Constant | –0.89339 | –10.16 | * |
| Number of observations | 117,107 | | |
| Pseudo *R* squared | 0.34520 | | |

[*] Significant at the 1 per cent level, [**] significant at the 5 per cent level, [***] significant at the 10 per cent level.
Source: calculations based on the 2007 tax records dataset.

- Single individuals (including divorced) tend to contribute less. This may reflect their larger probability to be eligible to the means-tested part of the OAA compared to married working couples.

The analysis so far has focused on the snapshot of individuals' behavior in 2005. We do find however that this behavior is quite reflective of their longer term choices as reflected in the correlation between the decision to contribute in 2000 and 2005 (Table 16). It turns out that those who already contributed in 2000 continued to do so in 2005, while those who did not, have not started. Nevertheless, about half of the males and a third of females in the lowest income quintile stopped contributing (the comparison relates only to individuals who continued working).

**Table 16**

**Percent of Workers Contributing to Pension Savings in 2005, by Gender, Age, Income and Whether they Contributed in 2000**

| Age | Men | Women | Men | Women |
|---|---|---|---|---|
| | Contributed in 2000 | | Did Not Contribute in 2000 | |
| 25-29 | 76.5 | 80.3 | 42.0 | 47.0 |
| 30-44 | 82.3 | 85.7 | 31.2 | 37.8 |
| 45-54 | 84.1 | 84.1 | 26.9 | 27.4 |
| 55-64 | 75.2 | 66.1 | 17.8 | 10.8 |
| **Total** | **80.7** | **81.7** | **29.3** | **29.5** |
| **Income Quintile*** | | | | |
| 1 | 51.5 | 64.5 | 30.8 | 34.9 |
| 2 | 60.9 | 79.0 | 31.0 | 41.9 |
| 3 | 76.1 | 87.9 | 39.7 | 48.5 |
| 4 | 86.2 | 91.7 | 40.6 | 51.2 |
| 5 | 91.7 | 92.7 | 38.9 | 48.8 |
| **Total** | **81.7** | **84.1** | **33.6** | **38.7** |

* For men aged 25-60 and women aged 25-55 in 2000.
Source: calculations based on the tax records panel dataset for 2000 and 2005.

One of the proposed justifications for government intervention in the pension market is that individuals may be passive with respect to their retirement. As discussed above, the pension reforms between 2000 and 2005 eliminated the financial benefits from pension savings for workers at the bottom 5 deciles of the income distribution (since they do not reach the tax threshold and because the funds were converted to pure DC schemes – with no subsidy). Table 17 examines the response of workers to the changes that took place in the tax system between 2000 and 2005. It shows a marked decrease in the share of contributing individuals at the bottom 5 deciles and a much milder decrease at the higher ones.[27] There was also quite a noticeable decrease in employer contributions, suggesting that this component of savings also responded rapidly to the changes. Finally, the drop in contributions was much larger among the young cohorts, while among the older ones – in which many still belong to the pre-1995 schemes or to employer-funded programs – the decrease was milder.[28]

Table 18 shows that too little pension savings is not necessarily the dominant problem. It reports the share of individuals in post-retirement ages that collect a pension, have no other income and continue to contribute to pension-related schemes. We find that about a third of the men and

[27] Overall, the per cent of contributing employees in Israel – 62 per cent – is quite similar to those in Germany, Canada, Ireland the UK and the US (Antolin and Whitehouse, 2008).

[28] While the members of the old funds also suffered a substantial downgrading of their benefits, these funds still offer much better terms than any available alternative.

**Table 17**

## The Change in Contribution Between 2000 and 2005*

| Income Quintile in 2005** | Percent Contributing in 2005 | Change from 2000 | Only Employer Contributes in 2005 | Change from 2000 | Employee Contributes with the Employer in 2005 | Change from 2000 |
|---|---|---|---|---|---|---|
| 1 | 21.0 | –14.9 | 12.5 | –5.1 | 7.2 | –8.9 |
| 2 | 40.1 | –18.6 | 15.8 | –4.1 | 23.4 | –14.1 |
| 3 | 67.6 | –13.5 | 19.7 | –2.1 | 47.6 | –11.1 |
| 4 | 88.1 | –4.5 | 19.5 | 0.9 | 68.4 | –5.1 |
| 5 | 96.1 | –1.1 | 11.8 | –1.6 | 84.1 | 0.5 |
| **Total** | **62.6** | **–10.5** | **15.9** | **–2.4** | **46.2** | **–7.7** |
| **Age** | | | | | | |
| 21-24 | 16.0 | –22.2 | | | | |
| 25-29 | 46.8 | –18.0 | | | | |
| 30-44 | 64.5 | –9.2 | | | | |
| 45-64 | 68.7 | –8.5 | | | | |
| 65+ | 45.5 | –15.5 | | | | |
| **Total** | **51.9** | **–12.5** | | | | |

* The change is expressed in percentage points from the 2000 level.
** Ages 25+.
Source: calculations based on the tax records panel dataset for 2000 and 2005.

**Table 18**

## Post-Retirement* Pension Contributions by Type of Income and Income Level

| | Men | | Women | |
|---|---|---|---|---|
| | Percent Contributing | Percent of the Group | Percent Contributing | Percent of the Group |
| **Source of income** | | | | |
| Receives a pension on account of a late spouse | 21.1 | 1.7 | 44.2 | 21.1 |
| Has labor income and no pension | 30.6 | 22.4 | 47.5 | 24.2 |
| Has pension and no labor income | 56.6 | 64.7 | 36.4 | 47.7 |
| Has both labor income and pension | 74.3 | 11.2 | 63.5 | 7.0 |
| **Total** | **52.2** | **100.0** | **42.6** | **100.0** |
| **Income quintile in 2005**** | | | | |
| 1 | 63.3 | … | 44.4 | … |
| 2 | 65.1 | … | 30.8 | … |
| 3 | 59.4 | … | 29.1 | … |
| 4 | 53.0 | … | 35.6 | … |
| 5 | 49.0 | … | 42.9 | … |
| **Total** | **56.6** | **…** | **36.4** | **…** |

* Men over the age of 65 and women over 60.
** Among those that have only income from pension.
Source: calculations based on the 2005 tax records dataset.

half of the women continue to save after retirement[29] and that this phenomenon covers individuals at all (post-retirement) income levels. These findings suggest that many individuals reach their pension age with an income level beyond their immediate consumption needs. It should be noted that these retirees saved in a period where pension savings were optional. Therefore, it seems that these – perhaps – excessive savings reflect a response to the high and unsustainable returns offered in the old system. Nevertheless it is indicative that individuals do respond to financial incentives for post-retirement savings, an indication that received further support by the sharp decline in the share of post-retirement savers between 2000 and 2005 (Table 17), as the incentives for such contributions were eroded.

Overall the behavior of workers with respect to their pension contributions seems to be rational and active: employees seem to adjust their saving choices in a way that is consistent with the financial incentives. It appears that the low contribution rates of low-income employees reflect the meager financial incentives for pension savings, and the undesired consumption path in which such savings result.

## 6 Conclusion

Government intervention in the pension market is often justified by a need to protect the public from miscalculating and underestimating the advantages of saving for retirement. A similar argument is that young cohorts are too passive with respect to their post-retirement needs and may therefore act too late to ensure sufficient resources for that age. Another argument – to some extent an analytical opposite of the previous ones – is that individuals optimize their lifetime income profiles by taking (unfair) advantage of old-age income-support programs. All these arguments were used in the debate preceding the recent adoption of "mandatory pensions" in Israel.

The current paper studied the reality of the Israeli pension system in its post-reform pre-mandatory pension structure. Using stylized representative prototypes of the most common Israeli household compositions and employment profiles it examined the potential benefits of pension savings for each "type". The findings suggest that mandating pension savings imposes a net loss on low-income households. Moreover, this loss breaks the egalitarian feature of the current system: while at present all family types (except those at the top lifetime income decile) roughly enjoy the same subsidy/tax incentive, compulsory contributions will make the benefits for low-income households smaller than those of the others. This loss results from eroding their entitlement for the means-tested income supplement without offering offsetting effective tax incentives.[30] These calculations make the argument that low-income households take an excessive advantage of the means-tested income support program less convincing.

The disadvantage of mandatory savings for low-income households is also evident in its impact on their lifetime income distribution. The post-retirement replacement rates offered by the new system are over 140 per cent, and for quite a significant group they exceed 150 per cent. These high incomes come at the expense of low disposable income at younger ages, when households have to care for children and pay mortgages.

The analysis therefore shows that, given the existing level and structure of OAA, saving for retirement is not beneficial for low-income households while it is for higher-income ones. An examination of the households' behavior suggests that they indeed act in line with these

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[29] The figures relate only to pension-related savings that require reporting to the tax authorities. Other savings, such as bank deposits, bonds and stocks, are not recorded in this dataset.

[30] The recently adopted plan to raise the means-tested benefits for retirees at the oldest cohorts increases the loss inflicted on low-income families by mandatory pensions, but its magnitude does not qualitatively change the analysis.

calculations. Moreover, households' response to the restructuring of pension incentives between 2000 and 2005 suggests that they are not indifferent to developments in this area – notwithstanding that the magnitude of change in this period was quite extreme.

The disadvantages of "mandatory pensions" are not limited to lifetime low-income households. Many middle-income households begin their careers at income levels below the tax threshold. For these families it may be preferable to postpone savings until their income grows due to consumption smoothing and to yield considerations (losing the tax credit of 35 per cent is equivalent to 9 years of – assumed – net returns in the pension fund). The current decree forces them to contribute in each month regardless of their income. Moreover, there is no provision for partial contributions which would allow couples to optimize their contributions with respect to their eligibility for tax credits – e.g., when women work part-time post-partum. This is a substantial restriction in the decree because half of those who did not contribute to pension before it was affected had a spouse that did. These individuals are also highly unlikely to need assistance from the OAA income supplement.

The initial concerns that led policy makers to adopt the "mandatory pension" had to do with the income distribution and the low-standard of living of the elderly. It seems, however, that the policy action they adopted only harms further the weakest segments among the working population. The high income inequality appears to be a reflection of labor market outcomes and not a result of the restructured pre-compulsory pension system. While the pension decree may reduce future fiscal expenses of the OAA's income supplement, it will do so at the cost of increasing lifetime inequality and the effective tax rate on the lifetime poor. A potential positive outcome of that may be raising labor market participation of non-working spouses from low-income households' to avoid the reduction in their allowance. However, this participation can be minimal as there is no floor for the necessary monthly working hours to meet the tenure requirement.[31] Working couples may actually reduce their labor supply, due to the substitution effect; although Brender and Strawczynski (2006) and Brender and Gallo (2009) show that the elasticity of labor supply to wages is quite small in Israel.

Finally, if policy makers are concerned with reducing the number of income supplement recipients, this target may be achieved in a way that is more consistent with retaining the lifetime neutrality of the pension system. One way of achieving that is by making the tax credits refundable while financing the additional cost by reducing the size of the credit to about 30 per cent. Such a scheme will split the cost of reducing the income supplement more evenly.

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[31] While one could suggest that families will raise their participation in order to offset the loss in their permanent income, the smaller increase is sufficient to prevent the reduction in the OAA and avoid the loss.

## APPENDIX

### Characteristics of the Various Household Types

| Male | | | Female | | Children | Mortgage |
|---|---|---|---|---|---|---|
| **Type** | **Initial Monthly Salary** | **Wage Profile*** | **Employment** | **Monthly Salary** | | |
| 1 | 4,400 | 1% annual rise, quits work at age 60. | No | … | 4, Born at ages 25, 28, 31, 34 | No |
| 2 | 5,200 | 0.9% annual rise | No | … | 3, Born at ages 28, 30, 33 | No |
| 3 | 5,200 | 0.9% annual rise | Full up to age 30, 70% up to age 33, 50% thereafter | 3,850, rising by 2% annually when working FT. rising with the average wage thereafter | 3, Born at ages 30, 33, 35 | 15% in ages 28 to 47 |
| 4 | 6,300 | 2.1% up to age 46, 1.8% up to age 60, no increase thereafter | … | … | … | … |
| 5 | 6,300 | 2.1% up to age 46, 1.8% up to age 60, no increase thereafter | Full time until retirement | 5,250, rising by 0.6% annually up to age 46 and by 1% thereafter | 2, Born at ages 28, 32 | 15% in ages 27 to 46 |
| 6 | … | … | Full time until the first child is born and after the youngest reaches 18. 75% of FT in between | 5,250, rising by 0.6% annually up to age 46, by 1% up to age 52 and like the average wage thereafter | 2, Born at ages 30, 33 | … |
| 7 | 8,700 | 2.6% up to age 46, 2.1% up to age 56, no increase thereafter | 50% of a FT job throughout her career | 3,000, rising by 1.6% annually up to age 46 and does not change thereafter | 3, Born at ages 30, 33, 36 | 15% in ages 27 to 46 |
| 8 | 6,300 | 2.1% up to age 46, 1.8% up to age 60, no increase thereafter | Works FT at ages 25-30 and 50-64 | 3,850, rising by 1.9% annually up to age 30. At 50 starts with the same wage she had at 30, rising like the average wage thereafter | 3, Born at ages 30, 33, 36 | 20% in ages 27 to 46 |
| 9 | 8,700 | 2.6% up to age 46, 2.1% up to age 56, no increase thereafter | Full time until retirement | 6,000, rising by 1.6% annually up to age 46 and does not change thereafter | 3, Born at ages 30, 33, 36 | 20% in ages 27 to 46 |
| 10 | 10,000 | 2.5% up to age 45, a 35% raise at 30 and another 50% at 35. From 44 to 60 annual wage increase of 2.3% and no increase thereafter | Full time until retirement | 7,050, rising by 1.6% annually up to age 46 and does not change thereafter | 2, Born at ages 30, 33 | 15% in ages 27 to 46 |

* The average wage in the economy is assumed to rise by 1.1 per cent annually.

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# "SO PENSIONS IN EUROPE WILL REMAIN SUSTAINABLE. BUT WILL THEY REMAIN ADEQUATE?" AN ASSESSMENT OF THE CONSEQUENCES OF THE AWG PROJECTIONS ON THE ADEQUACY OF SOCIAL SECURITY PENSIONS IN BELGIUM, ITALY AND GERMANY

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## Introduction

Europe faces important demographic changes in the coming decades. These will have profound consequences on both the sustainability and adequacy of social security, including pensions. In Europe, the focus was primarily on securing the financial sustainability. Indeed, the long-term sustainability of public finances was considered an important part of the Stability and Growth pact. Already in 1974, the European Council decided to set up the Economic Policy Committee (henceforth EPC) to contribute to the work of the Ecofin Council, by focussing on structural policies for improving growth potential and employment. The EPC established the Ageing Working Group (henceforth AWG), which was assigned among other things to assess the long-term sustainability of public finances. It does so by presenting a set of public expenditure projections for all Member States, including the spending on pensions. These projections are based on demographic forecasts provided by Eurostat and agreed assumptions on key economic variables. Table 1 presents public pension expenditures as a percentage of GDP in Belgium, Germany and Italy, as well as for the EU15 and EU25 as a whole.

In 2004, public pension expenditures amount to 10.6 per cent of GDP in the EU15 Member States. The share is lowest in Ireland (4.7 per cent) and highest in Italy (14.2). Public pension spending in Belgium is roughly on the EU15 average, whereas spending in Germany is somewhat higher. In the EU15 Member States, the share of public pension expenditures of GDP is projected to increase by 2.3 percentage points. The strongest decrease is projected for Poland with 5.9 percentage points the strongest increase will be observed for Cyprus with 12.9 percentage points (EC, 2006, p. 71). In Italy, the increases are very small because of the introduction of an NDC scheme. Like many EU15 Member States, public pension spending in Germany show a relatively moderate increase. Projected increases are larger in Belgium (5.1 percentage points), but this is still far from the rates reported for the countries that face the largest challenges. This includes Portugal (9.7 percentage points of GDP), Luxembourg (7.4 percentage points of GDP) and Spain (7.1 percentage points of GDP).

To date, the projections that Member States produce for the AWG include only a limited notion of adequacy, being the benefit ratio. However, the sustainability and adequacy of pensions

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**Table 1**

**Gross Public Pension Expenditures between 2004 and 2050**
*(percent of GDP)*

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 | 2040 | 2050 | Change 2004-2050[(2)] |
|---|---|---|---|---|---|---|---|---|---|
| Belgium | 10.4 | 10.4 | 11.0 | 12.1 | 13.4 | 14.7 | 15.7 | 15.5 | 5.1 |
| Germany | 11.4 | 10.5 | 10.5 | 11.0 | 11.6 | 12.3 | 12.8 | 13.1 | 1.7 |
| Italy | 14.2 | 14.0 | 13.8 | 14.0 | 14.4 | 15.0 | 15.9 | 14.7 | 0.4 |
| EU15[(1)] | 10.6 | 10.4 | 10.5 | 10.8 | 11.4 | 12.1 | 12.9 | 12.9 | 2.3 |
| EU25[(1)] | 10.6 | 10.3 | 10.4 | 10.7 | 11.3 | 11.9 | 12.8 | 12.8 | 2.2 |

(1) Excluding Greece.
(2) Percentage points of GDP.
Source: EC (2006) Table 3.3, page 71.

are two sides of the same coin. The assessment of sustainability may not be very meaningful without considering current or prospective developments in adequacy, and vice versa. This paper aims to set a first step into integration by assessing the consequences of the AWG projections and assumptions on the adequacy of social security pensions in Belgium, Germany and Italy.

The setup of this paper is as follows. The second paragraph of this paper will give a flavour of the MIDAS model, without however going too much into its nuts and bolts. The third paragraph will present and discuss some simulation results, insofar as they pertain to the adequacy of pensions. The fourth and final paragraph will conclude. For a more detailed discussion of this project, the model and a broad range of simulation results, the reader is invited to read the report of the project (Dekkers *et al.*, 2009). We will refer to this report as the *MIDAS Report* in the remainder of the text.

## 1 The MIDAS model for Belgium, Germany and Italy

Lusardi *et al.* (2008, p. 8) define a pension system to be adequate when it provides means for individual consumption smoothing, and reduces inequality and poverty. To assess the adequacy of pensions, a model is needed that allows for the simulation of inequality, poverty and (re)distribution. A micro simulation model is the most obvious candidate for this, since it starts modelling at the level of the individual. As the conclusions of the AWG pertaining to sustainability are prospective, so should the model be dynamic. Finally, since the simulation of pension benefits and eligibility conditions, as well as the simulation of poverty and inequality require the modelling of households, the model needs to be a dynamic, closed, cross-sectional micro simulation model. These are the broad characteristics of the model MIDAS, (an acronym for "Microsimulation for the Development of Adequacy and Sustainability"). This model is designed to simulate future developments of the adequacy of pensions in Italy, Germany and Belgium,[1] following wherever possible the projections and assumptions of the AWG.

MIDAS starts from a cross-sectional dataset representing a population of all ages at a certain point in time, in this case the PSBH dataset for Belgium in 2002, the SOEP for Germany in 2002

[1] In the remainder of this paper, the specific Belgian, German and Italian versions of the model will be denoted MIDAS_BE, MIDAS_GE and MIDAS_IT. The name MIDAS without the country-specific suffix is used for general descriptions of the model.

and a compound dataset based on the ECHP, for Italy in 2001.[2] From that starting year up to 2050, the life spans of individuals in the dataset are simulated, together with their interactions. Events simulated include birth, receiving schooling, marriage or cohabitation, divorce or separation, entering the labour market, work, unemployment, disability, retirement and death. During their active years, individuals build up pension rights, which result in a pension benefit when they retire.

MIDAS is developed in the programming language LIAM (the Life-cycle Income Analysis Model). One of the strong points of LIAM is that it allows for extensive alignment, which ensures that aggregates from the micro model match AWG projections. Mortality and fertility as well as the labour market participation decision are aligned to AWG projections in each country model. Thus, for example, the activity rates that result from a behavioural equation are aligned with the AWG activity rate projections differentiated by age and gender. In MIDAS_IT, also the unemployment rates are aligned to AWG projections, while disability rates are aligned to national data. In MIDAS_BE, alignment is used for unemployment, disability, retirement, and conventional early leavers' scheme ("prépension conventionnelle", henceforth CELS). Besides via alignment, AWG assumptions and projections are also included through the development of aggregate earnings (assumed to follow the growth rate of productivity) and the social policy hypothesis pertaining to the relation between the growth rate of wages and of social security benefits.

MIDAS consists of different modules, the demographic module, the labour market module and the pension module. The structure of the demographic module is identical in the three country-specific versions of the model; the labour market modules are based on a common general setup, but take some country-specific characteristics into account, mostly depending on the information necessary to run the pension module. Finally, the three development teams had complete freedom in the development of the pension module.

## 2 The demographic module

The demographic module consists of four different parts: The birth process, the survival process, the education process and the marriage market. The first two processes are essentially alignment-driven random selection processes, and are based on the 2004 demographic projections created by Eurostat and used by the AWG.

The education submodule consists of two serial steps. First, using observed education levels on data from the Labour Force Survey, OECD, every ten-year old individual is by chance "assigned" a level of education. Given the assigned or observed level of education, the second step of the education submodule determines if an individual is still in education or not. This status will depend on the level of education. An age of education ending will be associated with each education level. The average age of education ending is computed on AWG participation rates for each level of education.

The third demographic sub module is the partnership formation process or "marriage market". Figure 1 overleaf describes this module.

This process links candidates eligible to marriage as well as cohabitation. It is therefore better to speak of it as the "partnership formation process". It is a three stage process, which starts with a simple random selection procedure selecting males and females in the population who are eligible for marriage or cohabitation. In the second step and for each of the selected females, a vector is constructed that contains the probability that she will become partner with any of the

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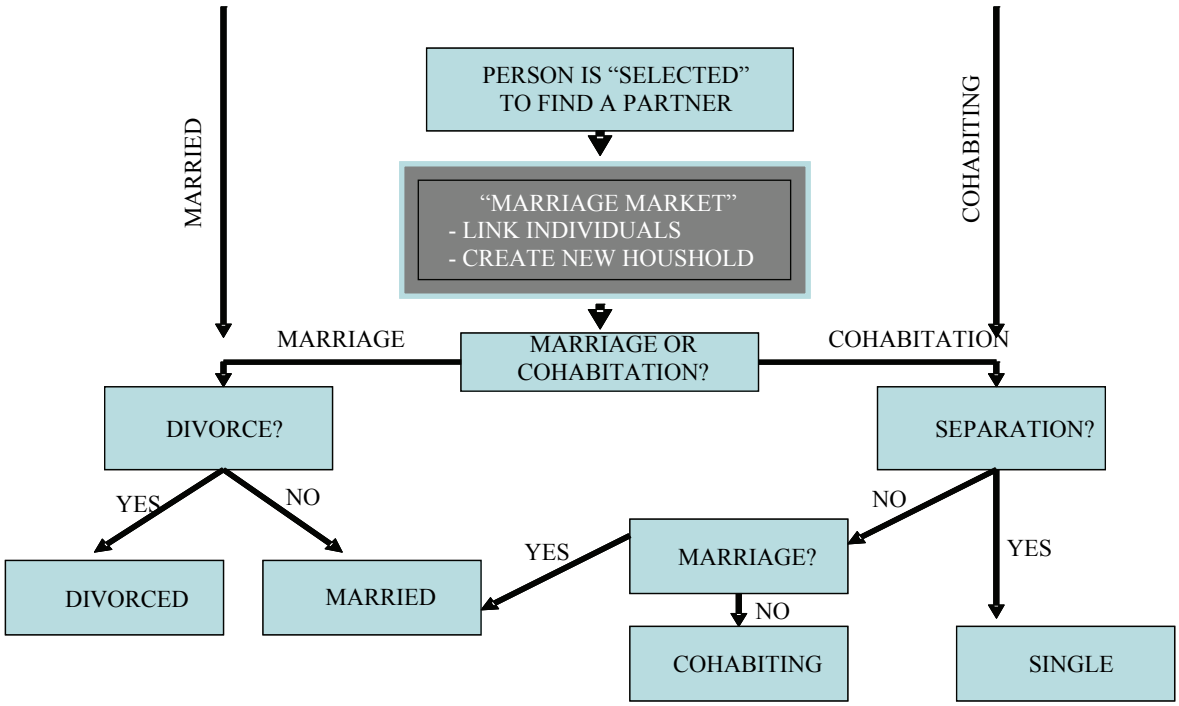
[2] See Doutrelepont *et al.* (2004), Wagner *et al.* (2007), and Nicoletti (2005), for a discussion of the PSBH, the SOEP, and the ECHP, respectively. Istat (2002) describes specifically the Italian ECHP.

**Figure 1**

**The Marriage Market Module**




males eligible. These estimated probabilities are a function of the difference between the two potential partners with respect to several variables, such as age, education level, having a job, and so forth. The third step in this process is the selection procedure itself. This selects each female in turn, and matches her with a male. When a female is to be matched, the male with the highest probability calculated from the regression and still available, is selected to form a partnership. Links are then created between the new partners, and they receive the same household number.

Once two individuals are linked into a couple, a simple logit regression determines whether these individuals are married or cohabiting. Another logit regression is used to model the probability that cohabiting couples later decide to enter into marriage.

Note that marriage or cohabitation is just one way in which a new household can be formed. By default, individuals that reach the age of 24 without being married "leave the nest" and start a new household of their own.

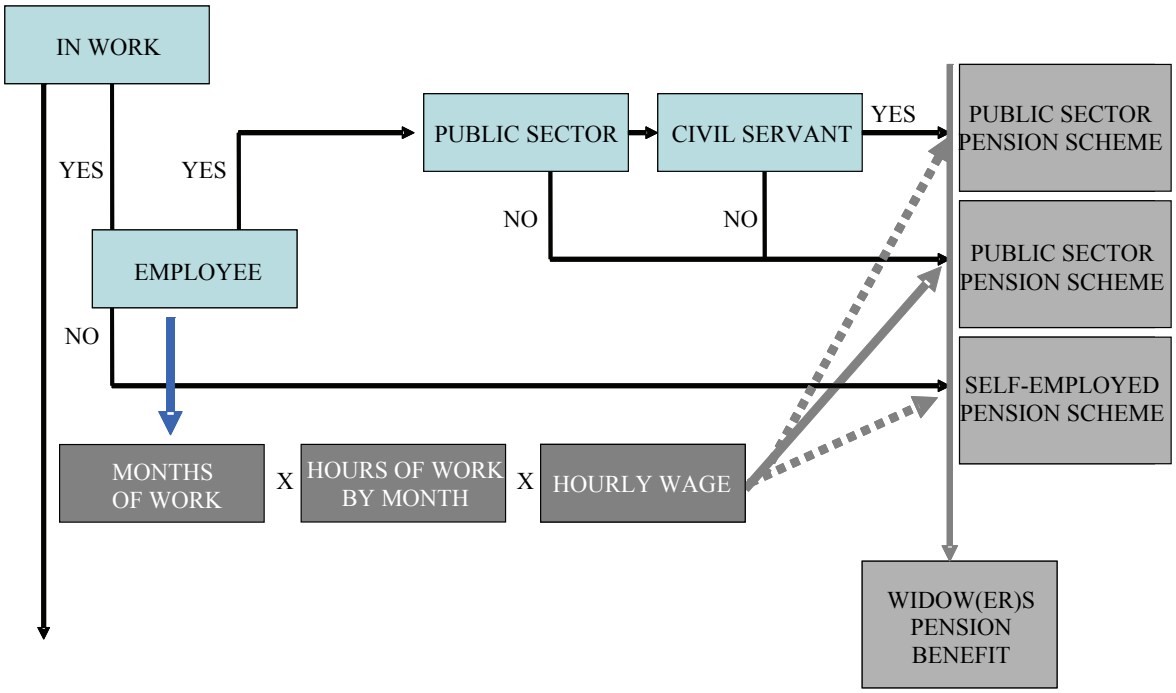
Any routines describing household formation obviously come with routines describing household dissolution. Indeed, all couples are subject to a certain risk of divorce (in case of marriage) or separation (in case of cohabitation). The probabilities of this happening are again the result of logits, with among other things the duration of the marriage or cohabitation as explanatory variable.

## 3 The labour market module

The general setup of the labour market module, and the relation with the pension module, is described by two figures. Figure 2 describes the labour market states of individuals that are

**Figure 2**

**Labour Market Module – Working Individuals**




"selected" to be in work.

The process of being in work is modelled by a logit regression whose results are aligned to AWG prospective data. If an individual enters the active state, then the next decision is whether or not he or she is an employee or a self-employed. In the first case, the next decision is whether or not he or she works in the public sector, and – if so – whether he or she does so as a civil servant.[3] Given the labour market state one occupies in a certain period, logit regressions describe the probability that one moves to another labour market state, or leaves the labour market for one of the inactive states (see Figure 3). Figure 2 also shows that for wage-earners and civil servants, separate regressions are used to simulate months of work, hours of work per month (conditional on working full time) and the hourly wage. This results in the annual wage, which, together with annual increases of the length of career, is the information on which the future pension benefit is based. When working, individuals build up a virtual pension claim in the pension module, and they therefore become eligible to a pension benefit once they enter retirement. In MIDAS_BE and _IT, the pensions module includes wage-earners' pensions, self-employed pensions and civil servants' pensions, early retirement pensions, disability pensions and widow(er)s pensions. In MIDAS_GE, employees' pensions, including civil servants and widow(er)s pensions are simulated. Figure 3 overleaf presents the decisions for those that are not active in the labour market.

Given that a person does not work in a given year, it is simulated sequentially whether the person is unemployed, retired or in a residual inactivity category which comprises all remaining inactive states. Else and specific to the Belgian case, one may be eligible for Conventional Early Retirement' Benefit (CELS). In MIDAS_BE, all of these states, use age and gender to align to AWG labour market projections. In MIDAS_IT, unemployment and disability are aligned.

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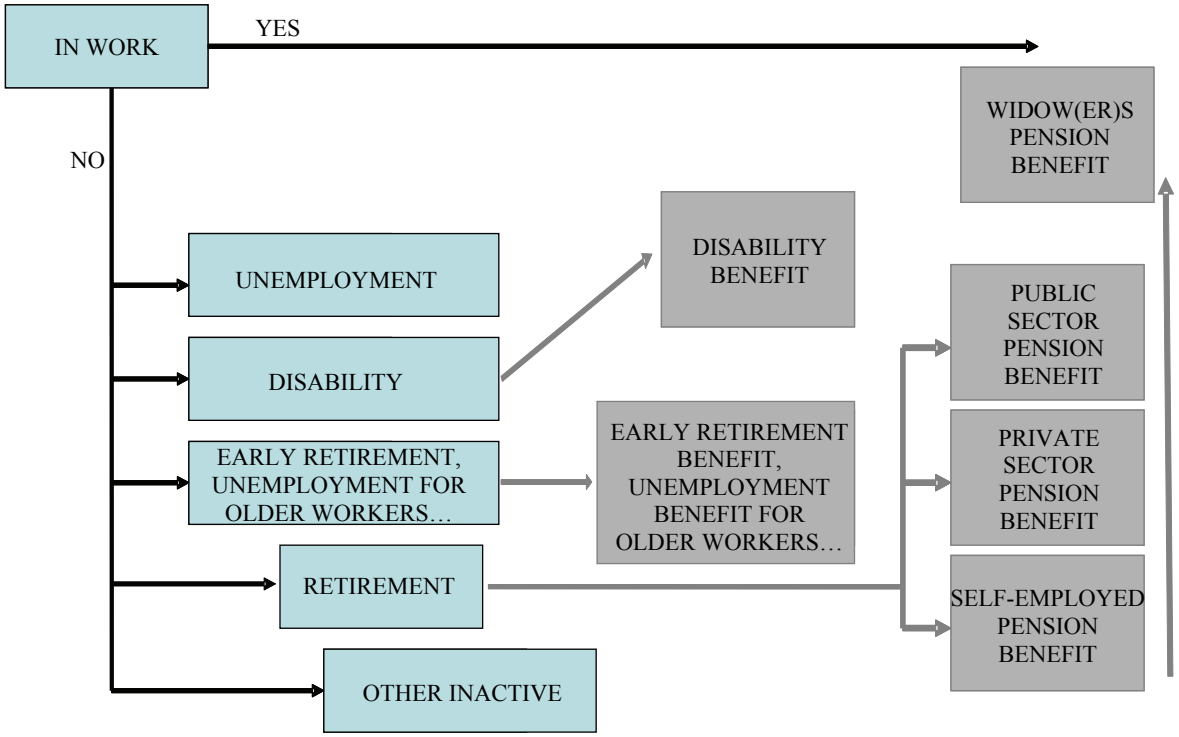
[3] In MIDAS_IT, this last decision does not occur, because there is a full overlap between civil servants and workers in the public sector.

**Figure 3**

**Labour Market Module – Inactive Individuals**




In the inactive states, one can still build up a (virtual) pension claim, for example via a prolongation of the career. For example, in Belgium, unemployed build up an "equivalent period" in the sense that the length of the career increases, and that the pertaining income is based on the income of the last year employed. For disabled persons and retirees (also CELS), MIDAS simulates the amount of social security pension benefits.

## 4 The pension module

Of the three modules of the model, the pension module is the most country-specific. It will therefore be described for each country separately. Given the scope of this paper, the description will be limited to social security pensions.

### *4.1 The Belgian pension module*

As in most countries with a Bismarckian pension system, social security pension benefits in Belgium have an occupationally tied character that is toned down by diverse minimum provisions and ceilings. The first-pillar retirement system for wage-earners provides former private sector employees and public-sector employees that were no civil servants a pension benefit that essentially is a function of the past career. The mandatory age of retirement is 65 for males. For females it is gradually increasing from 61 years of age (1997) up to 65 (from 2009 on). However, one can become eligible for early retirement from the age of 60 on, if one has a career of minimum 35 years.

The pension benefit is calculated as:

Benefit = (.60 or .75)*(length of career / length of career for full pension)*wage-base

The wage-base essentially is the average of past salaries, indexed on the development of prices and with additional discretionary adjustments for the development of wages between the years of receiving the salary and the year of retirement. This modified average of corrected salaries is then multiplied by the length of the career and divided by the length of the career needed for a full pension. The latter equals the age at which one becomes eligible to a full pension benefit minus 20. So, for males, it is 65–20=45 years. For females, it is gradually increasing to 45 years. This wage-base is then multiplied by either 60 or 75 per cent. If the individual is single, the 60 per cent is used. If (s)he is married to someone with a very low pension entitlement, the couple can opt for a "family pension benefit", based on of 75 per cent of the wage-base of the high-earning partner. In this case, the low-earning partner loses his or her own pension entitlement.[4]

Redistributive solidarity elements are embedded in the pension system in several ways. First of all, pensions are a function of lifetime earnings up to a ceiling. Inversely stated, the wage one earns in a certain year during ones career is taken into account only up to a certain limit or ceiling. Those earning a higher income therefore face a lower replacement rate. Moreover, there are two ways in which a minimum benefit is implemented in the pension benefit: the minimum right by career year and the minimum pension.

The conventional early leavers' scheme (CELS) for employees is essentially an unemployment scheme for private-sector workers of 58 and older. Unlike the retirement benefit, the CELS benefit does not depend on the number of working years. Furthermore, when one enters the CELS, the career length, on which the future old-age pension will be based, continues to increase.

The disability scheme for wage earners is also considered as a pathway of withdrawal out of the labour market. Indeed, disability is in practice an absorbing state for workers aged 50 and older. The disability benefit is equal to 40 per cent of the last wage when the individual is cohabiting and 50 per cent of the last wage when he or she is not. This amount also is subjected to a minimum and maximum.

Civil servants are subject to a first-pillar pension system that is separate to that of the private sector. Retirement is compulsory as of age of 65 for both men and women. Early retirement is possible from the age of 60 if at least 5 years of work as civil servant is proved. Public sector pensions are based on the income earned by an individual during the last five years before retirement. Benefits are computed according to the following formula:

$$\text{Benefit} = n/N * \text{reference earning}$$

where $n$ is the number of eligible years spent in the public service, $N$ is a benefit accrual factor and the reference earning is the average wage over the last five years. The benefit accrual factor $N$ is in general equal to 60, but there are many exceptions.

Self-employed retirement benefits are not modelled using exact regulation as it is done for civil servants and wage-earners. Data describing earnings of the self-employed are often missing or unreliable, so we assume that self-employed retirees receive the minimum pension for self-employed. This minimum is adjusted for those that do not have a full career. As 78 per cent of "pure" self-employed benefit from the minimum pension (Scholtus 2008), the error introduced by this simplification might be limited.

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[4] Actually, the "family pension benefit" is divided over the two partners. The high-earning partner receives 60 per cent of the wage-base, so an amount equal to the individual pension, and the low-earning partner receives 15 per cent of the wage-base of the high-earning partner. Together, they get 75 per cent of the wage-base.

Summarizing, the Belgian pension module of MIDAS simulates first-pillar old-age pension benefits for private sector employees, civil servants and self-employed. Furthermore, it simulates the Conventional Early Retirements (CELS) benefit, the disability pension benefit for private sector employees, and – finally – the widow(er)s' pension benefit, again for private sector employees, civil servants as well as self-employed.

As said in the previous section, hourly wages increase with productivity over time, and the speed of this increase is the hourly productivity growth rate assumed by the AWG. Social policy hypotheses used in MIDAS for other pension systems are those used to produce the 2005 AWG projections for Belgium. These growth rates are defined as a difference relative to the productivity growth rate.

- Wage ceiling: difference of 0.5 per cent with productivity growth
- Welfare adjustment: difference of 1.25 per cent with productivity growth
- Welfare adjustment for civil servants: difference of 0.5 per cent with productivity growth
- Lump-sum benefits: difference of 0.75 per cent with productivity growth
- Minimum right by career year: difference of 0.5 per cent with productivity growth

### *4.2 The German pension module*

The vast majority of gainfully employed persons in Germany is compulsorily insured in the public pension scheme (PPS). The most important exceptions are civil servants and the majority of self-employed persons. These are not simulated by MIDAS_GE, so we will not discuss their pension systems in more detail. Furthermore, disability pensions exist and derived pensions such as surviving spouse pensions.

The PPS is a pay-as-you-go system of the Bismarck-type. Most of accumulated pension rights result from so called "earning points" which represent the relation of individual earnings to average earnings in a given year. Earnings points can also be derived from other sources, e.g. from childbearing, education, unemployment. A person becomes eligible to a pension if she has a minimum insurance record and if she reaches a threshold age (this depends on the birth cohort). At present, the regular retirement age (65) is equal for all individuals with the exception of handicapped persons.[5] Several groups are allowed to retire before the regular retirement age (up to 5 years). However, each month (year) of early retirement leads to a deduction of pensions of 0.3 per cent (3.6 per cent). Retirement before the age of 60 is only possible for disabled persons.

The old-age pension amount without deductions is given by the product of the sum of earnings points and the current pension value. The current pension value is identical for all persons and is adjusted, depending on the growth rate of the average gross wage, changes in the ratio of pensioners to employees, changes in the income share of subsidized private pension provisions, and changes in the PPS contribution rate.

The social security pension scheme also provides surviving spouse benefits. The amount of a surviving spouse benefit is a fraction of the pension of the deceased spouse. The pension is withdrawn to some extent if own income of the surviving spouse exceeds a threshold.

For the growth of gross wages, we use the assumptions of the AWG (1.6 per cent on average per year). We use a simulation of the current pension value of Buslei and Steiner (2006) to capture assumptions on the changes of all factors that enter the adjustment rule. The development of wages and current pension value are shown in the following Table 2.

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[5] The regular retirement age will gradually increase to 67 between 2012 and 2030. This reform is not modelled in MIDAS_GE.

**Table 2**

**Assumptions on the Development of Wages and Current Pension Value**

| | 2010 | 2020 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|
| Percent increase of wage compared to 2002 | 4.6 | 21.4 | 43.7 | 70.0 | 101.3 |
| Percent increase of pension compared to 2002 | 2.9 | 15.7 | 27.9 | 48.0 | 73.4 |

While wages double up to the year 2050, the current pension value increases by about 73 per cent. This lower growth rate of pensions is essentially driven by demographic ageing. Pension growth is linked to gross wages but the new adjustment formula for the current pension value takes into account changes in the ratio of pension benefit recipients and contributors. This ratio is likely to grow strongly up until 2030 which works like a discount factor and lowers the growth rate of pensions. Thus the difference between the increase of gross wages and pensions is maximized around 2030 when demographic ageing is expected to reach its peak. This adjustment mechanism is one of the core elements that are assumed to guarantee financial sustainability of the pension insurance in Germany.

### *4.3 The Italian pension module*

The Italian public pension system has been subject to many reforms during the last 15 years, changing both the age at which one becomes eligible to seniority and old age pensions and the formula for computing benefits.

In Italy two different kinds of options for retirement are allowed. The first option is the old age pension. Workers can receive an old age pension benefit when they are aged 65 (males) or 60 (females) and their contribution years exceed a specific threshold. The mandatory retirement age is 65 so women can choose to take up an old age pension benefit between 60 and 65.

The second option for retirement is called the seniority pension. One becomes eligible to this when, before being aged 65 or 60, specific requirements concerning both age and seniority are satisfied (e.g. 40 years of seniority or, since 2008, at least 58 years old with at least 35 seniority years).

The 1995 reform introduces a NDC regime for those entering the labour market after that moment. For older workers with vested rights, the old scheme rests in place, and a transitory system applies to others. Three different public pension schemes therefore currently apply in Italy. Workers' enrolment to such schemes depends on their seniority in 1995 according to the following rules:

1) individuals with a seniority of at least 18 years in 1995 receive a benefit that is fully earnings related (so called retributivo). This retributivo is compound of the "A quota" and "B quota". For private sector employees, the "A quota" is based on the average of wages earned during last five working years. For public sector employees, the "A quota" is based on the final wage. In the "A quota" wages are indexed only to inflation rate. The "B quota" is linked to the average wage over the last 10 working years for both civil servants and private sector employees. In the "B quota", pensions are indexed to inflation rate plus 1 per cent;
2) individuals entering the labour market on or after 1995 receive a benefit wholly based on the NDC scheme (so called contributivo). In the NDC regime the pension is based on contributions paid which are accumulated – receiving nominal GDP growth rate as rate of return – and are

transformed in an annuity stream through transformation coefficients depending in an actuarially fair way on retirement age. Coefficients do not differ between males and females;

3) individuals working in 1995 with less than 18 years of seniority receive a mixed benefit computed pro quota by a weighted average of pension benefits resulting in earnings related and NDC schemes, where weights are, respectively, years worked until and after 1995. The "B quota" of the earnings related part is now based on wages earned during the whole working life rather than only on last 10 working years.

In addition, for workers fulfilling the requirement concerning years of contributions for receiving an old age pension, in the earnings related (1) and mixed scheme (2), a means tested integration to a fixed minimum pension is guaranteed, taking into account income only. Individuals enrolled in the NDC scheme are eligible at 65 to a means tested social assistance benefit, amounting to less than the minimum pension. This however is not included in MIDAS_IT.

Until the 1992 reform, pension benefits were indexed to gross nominal wages. Since then, pension benefits are indexed only to prices.

The pension module simulates first pillar old age and early retirement pensions for private and public sector employees, as well as the minimum pension. In addition to "pure" pensions MIDAS_IT includes survivor pensions and disability pensions for wage earners and civil servants. Finally, like the Belgian version of the model, MIDAS_IT simulates pension benefits for the self-employed. Most self-employed in Italy pay the minimum contribution fixed by the law. As a consequence merely the minimum pension is imputed as pension benefit to self-employed enrolled (wholly or pro quota) to the earnings related scheme (and fulfilling requirements for receiving such pension). For self-employed enrolled to the NDC, the payment of the minimum contribution is instead accumulated into the model and the benefit is computed according to the usual rules of the NDC scheme.

## 5 Simulation results describing the prospective adequacy of pensions

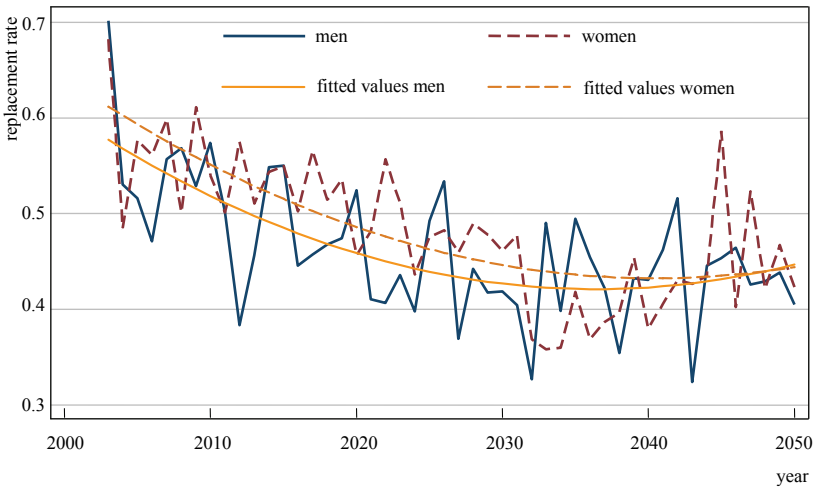
This section presents and discusses the main simulation results pertaining to retirement and the adequacy of pension benefits, as projected by MIDAS. This presentation will be limited to the bare necessities for reaching the conclusions on adequacy. These are the replacement rate, the redistributive impact of pensions and the different risks of poverty pertaining to pension beneficiaries relative to wage-earners.

When analysing retirement income in MIDAS, two problems have to be dealt with. First of all, questions on pension income in the PSBH and ECHP starting dataset do not make a difference between benefits from the first, second or third pillar of the pension system. Neither does it make a difference between pension benefits coming from the pension systems for former employees, civil servants or self-employed. So, the pension income in the starting dataset (*i.e.*, of those retired in the starting year 2002) is likely to be too high on average, and to much skewed to the right. Furthermore, it does not allow making a separate analysis of the systems for civil servants or employees.

A second problem which is common to all three versions of MIDAS is that transitions within labour market states result in many low pension benefits. This does not necessarily mean that the individuals actually have a low retirement income, because a considerable share of individuals in MIDAS receives benefits from multiple systems. Consequently, studying the benefits from the pension systems of employees and civil servants separately might result in an overestimating of the inequality of pension income, while underestimating the average retirement level.

**Figure 4**

**Replacement Rates – Belgium**




Source: MIDAS Belgium and own calculations.

Both problems cannot be solved, but we can try to surface them as much as possible so that they become explicit in the analysis.

### *5.1 Adequacy of pensions in Belgium*

Figure 4 shows the replacement rate for Belgium. Note that the development of the replacement rate is somewhat erratic, due to the sometimes low numbers of people actually making the transition into retirement. To clarify their development, quadratic trends have been estimated and the fitted values are added to the figure. In the largest part of the simulation period, the trend is decreasing. One important reason for this is that less and less pensions are allocated at the higher household rate. As it is most of the time the man who receive this family pension, it is not surprising to see the replacement rate of men decreasing. Furthermore, women that forego their own individual pension benefit in order to benefit from the household rate pension of their partner, are obviously not included in Figure 4. As more and more women apply for the individual pension benefit, the replacement rate of women decreases as well.

The growth rates of productivity that the AWG assumes for Belgium provide a second explanation of the trends in the replacement rate. However, as pensions of new retirees are based on past growth rates, the replacement rate will show an opposite development. The AWG assumes that the growth rate of productivity will increase from 1.5 (the years up to 2010) to 1.8 (from 2010 to 2030) and this implies a lowering of the replacement rate from 2010 on. From 2030 on, the assumed growth rate decreases somewhat, namely from 1.8 to 1.7, and the replacement rate hence starts to catch up from the mid-2030s on.

A third explanation pertains to the effect of the wage ceiling in the calculation of the pension benefit. This ceiling lags to the development of wages, and therefore depresses the growth of the pension benefit relative to wages. As a result, the replacement ratio decreases over time. However, following the social policy assumptions of the AWG, this lag of the development of the pension ceiling becomes smaller. As a result, the speed of decrease of the replacement rate will decline over time.

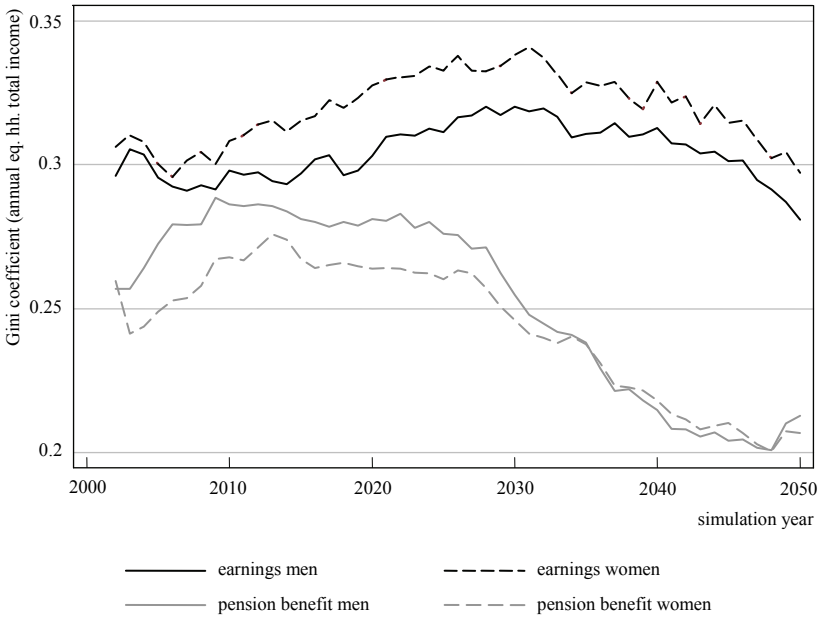
Figure 4 also shows that the replacement rate is generally higher for women than for men. This is because men have a higher wage than women. This implies that the annual wage of men more often than women exceeds the ceiling, thus resulting in a proportionally lower pension benefit. Furthermore, women more often than men see their pension being adjusted upwards to the minimum, which means that their pension increases proportionally to their wage. The replacement rates of men and women however converge, and this is mainly due to the increasing labour market participation of women, which results in an increasing length of their career.

Figure 5 specifies the redistributive impact of pensions to gender.

In general, the inequality of retirement benefits is considerably lower than that of earnings. This redistributive effect confirms the findings of Brown and Prus (2006). The figure suggests that this redistribution increases after 2020.

**Figure 5**

**Inequality of Gross Earnings and Retirement Benefits – Belgium**




Source: MIDAS Belgium and own calculations.

A first reason pertains to the comparison of the linkage between wages and benefits before and after the start of the simulation. Following the assumptions of the AWG, we assume that benefits lag behind the development of wages. The difference between the growth rate of pension benefits, for example, and that of wages is assumed 1.25 percent. Fasquelle *et al.* (2008) show that this lag was on average 1.8 percent between 1956 and 2002. Thus, the assumptions used by the AWG – and hence by MIDAS_BE – imply a reinforcement of the link between wages and pension benefits. Hence, the relative decrease of the benefit of older retirees is slowed down, not only relative to workers but also relative to younger retirees (who retired later). As a result, the inequality of pension benefits will ceteris paribus decrease over time.

A second reason that explains this decreasing inequality starts by emphasizing that the model takes only earnings and pension benefits into account. Welfare benefits, unemployment benefits and all other kinds of replacement incomes are ignored. This not only means that the levels of inequality are most likely too high, but this omission may make the simulation results dependent on the structure of households. Indeed, the larger the household, the higher the probability of observing other types of income. Or, the more individuals in the household, the more the simulation results of MIDAS will overestimate actual inequality. Consequently, when the average number of individuals in the household decreases, then the overestimation would become smaller in size, and we therefore can expect inequality to decrease as well. Figure 11 in the *MIDAS Report* indeed shows that the average number of individuals in households – restricted to households whose at least one individual is retired – is first slightly increasing until 2020 and therefore decreases a lot until the end of the period. This development coincides with the Gini index of pension benefits. Indeed, we see this inequality index increase until 2020 and decrease thereafter.

The inequality of earnings is higher for females than for males because the proportion of part time workers and workers that work only a limited number of months is higher for the former than for the latter. However, the inequality of pension benefits is lower for females than for males, and

**Figure 6**

**Incidence of Poverty Pertaining to Individuals from Working and Retired Households – Belgium**


Source: MIDAS Belgium and own calculations.

the redistributive effect of pensions is therefore stronger for the former than for the latter. As the average pension benefit is lower for women as well, these pensions more often are confronted with the various minimum benefits. As a result, the inequality is lower. Furthermore, retired men more often than women receive a pension benefit from the second or third pension pillar. Even though the effect of this is diminished by the fact that we use equivalent household income, we can expect this to increase the inequality of the pension benefit of men at least up to 2020.

Figure 6 shows the incidence of poverty among individuals with households that have only earnings, only retirement benefits, or both. The first conclusion from Figure 6 is that those who live in households that have both earnings and pension benefits, have a lower risk of poverty as compared to the other categories. These individuals have best of both worlds: they benefit from the high but unequal earnings, as well as the lower but highly redistributive pension benefits.

The advantageous position of those having both earnings and pensions relative to others who live in households with only earnings can furthermore be explained by noticing that those that live in "mixed households" often are older than those that live in households that have only earnings as income. This means that their income from work is usually higher, and their households are usually smaller in size to that welfare is ceteris paribus higher.

The lower risk of poverty of those that have household earnings relative to those that receive just pensions can be explained by the fact that one common poverty line has been used in all previous figures. The lower mean pension benefit compared to earnings (see the replacement rate in Figure 4) thus results in a higher poverty risk for those having only a pension benefit.

Next we consider the development of poverty risks and intensities over time in Figure 6. This shows a rather grim picture where both the risk and intensity of poverty of those having earnings remain more or less the same, while both the risk and intensity of poverty of those receiving only a pension benefit shows a development that can roughly be decomposed in five phases corresponding to the five decades. Poverty among pension recipients increases during the first decade. Next, it roughly stays constant between 2010 and 2020, decreases during the third decade, on average stays more or less constant between 2030 and 2040 and finally increases again during the 2040s. This evolution is mainly explained by the evolution of the household structure combined with the evolution of earnings composition into households. These are presented in Table 79 of the *MIDAS Report*.

During the 2010s, the number of two-person households with two incomes goes down at the benefit of the three other categories. The two above-mentioned effects go in the same direction and combine each other to cause poverty to increase. A second effect, works though the 4 percentage points increase of two-person households with only one income, and reinforces poverty growth: Figure 29 in the *MIDAS Report* shows that the proportion of "household rate" pensions raises until about 2010. Couples benefiting from "household rate" pensions being worse off than couples benefiting from two pensions or even than single households with a single pension,[6] this proportion increasing makes poverty rise.

The analysis of Table 79 in the *MIDAS Report* reveals only minor changes into the composition of households between 2010 and 2020. Furthermore these changes have opposite impacts on poverty and cancel each other out.

The 2020s are characterized by an important decrease in poverty among pension recipients. The number of one-individual households stays constant during that period while the number of two-person households with two incomes increases considerably at the expense of households with 2 or more individuals and two-person households with one income. As explained above, a reduction in the average number of dependent individuals in households leads to a reduction of poverty. Moreover, because they receive more often two incomes, households consisting of two individuals become wealthier. The two effects joining together result in a considerable reduction of poverty.

The 2030s do not present a significant trend in poverty. The two opposite effects explained above cancel each other out.

Finally, the 2040s show an increase of the poverty level by 10 percentage points. The effect at work here is the first one explained above. The number of single-person households increases considerably, from 57 to 68 per cent, and this at the expense of households consisting of two individuals with two incomes.

So, far, the development of poverty among pension-receiving households has been explained using developments in the structure and income composition of these households. These however are not the only factors influencing poverty. Several other important explanations will be discussed in what follows.

First of all, the poverty increase from 2002 to 2010 is also the result of a technical characteristic of the model that was discussed at length before. The observed pension benefits in the starting year 2002 indeed consist of benefits from not only the first, but also the second and third pillar of the pension system. As new generations of individuals enter retirement, the observed retirement benefits become merged with fully simulated retirement benefits. The latter do not include benefits from the second and third pension pillar, and poverty therefore increases. This, obviously, is not necessarily a realistic development, but a technical characteristic.

Figure 38 of the *MIDAS Report* shows that the average age of the recipients of pension benefits start to increase considerably from the early 2030s. Ongoing pension benefits are only partially linked to the development of wages – even though this linkage is stronger in projection than it was in the past – so a strong increase of the average age of recipients explains the increase of poverty among the recipients of pensions.

Ignoring the increase of poverty among the pensioners in the first decade of the simulation period, a contradiction between the poverty among pensioners and the replacement rate becomes visible. Between about 2020 and the first half of the 2030s, the position of retirees will meliorate

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[6] The proportional difference between the "household rate" and the "single rate" (being 25 per cent) is lower than the increase of the equivalence scale (50 per cent).

relative to that of the other categories. This development seems in contradiction with the ongoing decrease of the replacement rate in Figure 4. Furthermore, poverty among pensioners in Figure 6 increases again from the 2030s on, which is just when the replacement rate has reached its minimum and is again increasing! So the development of the poverty position of the elderly seems somewhat in contradiction to the development of the replacement rate. An answer lies in realizing that the replacement rate represents "only" the income fall at retirement. It hence represents only the youngest cohort of retirees and not all those that retired earlier. Indeed, the higher the average age of the pensioners, the lower the value of the replacement rate in explaining poverty among pension beneficiaries. This suggests that the age development of pensioners could explain the development of poverty.

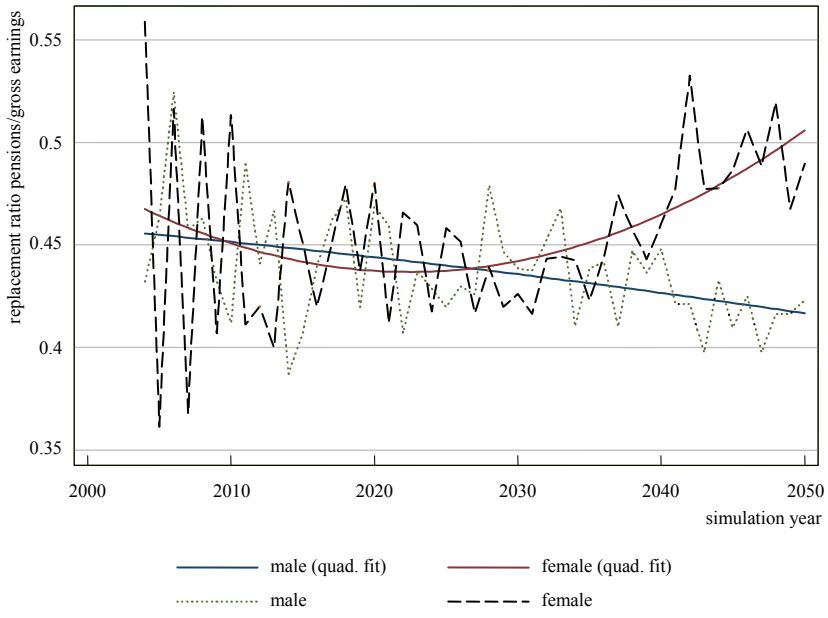
### *5.2 Adequacy of pensions in Germany*

The replacement rate takes into account our growth scenarios in which pensions are assumed to grow slower than earnings (see prior section). Pensions will grow at a slower rate than gross wages which in turn implies that the replacement rate can increase only if supplied labour increases over the cohorts which are affected. For men, it turns out to result in a slightly decreasing average replacement rate. For women, on the other hand, the increase in labour supply over the lifetime of future cohorts of female retirees more than compensates the reduction in the current pension value.

The erratic movement is caused by low sample size since we only look at new transitions to retirement in each year. A quadratic trend was added to make it easier to identify the overall development of the replacement ratios of men and women. Replacement ratios decrease significantly for men from about 45 per cent in 2003 to roughly 42 per cent in 2050. The slight negative trend can be attributed to the lower growth rate of pensions compared to wages and increasing male labour force participation. The increase in the employment rates leads c.p. to higher pensions and compensates partly the slow growth of pensions. For women, the mechanisms apply but the employment effects – *i.e.*, higher labour market attachment of women – even dominates the effect of the lower growth rate of pensions, at least after 2025. It is also important to keep in mind that replacement ratios of men and women are different in terms of levels: a higher replacement ratio of women does not mean a higher pension, after all male pensions remain

**Figure 7**

**Replacement Rates – Germany**



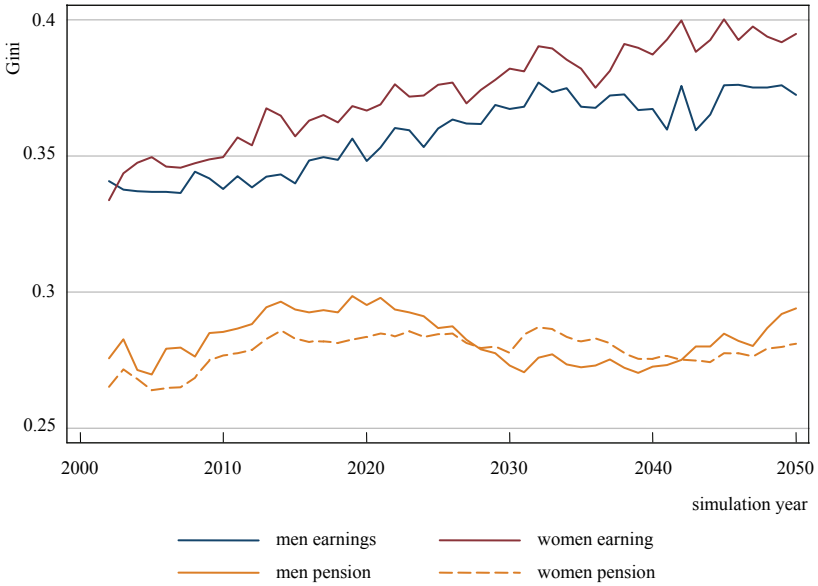

Source: MIDAS Germany and own calculations.

higher than those of females and the same holds true for wage income.

This result resembles well the ageing process of the population because – somewhat simplified – pension growth is slower the higher the old age dependency ratio is. Around 2030 demographic ageing reaches its peak and the difference in growth rates of pension and earnings shrinks. For women we also find that a higher employment rate leads to higher pensions in the future. This mitigates the downturn in the replacement rate for women.

**Figure 8**

**Gini of Individual Monthly Earnings and Pensions by Gender (age 16-64, Employees and Retirees) – Germany**




Source: MIDAS Germany and own calculations.

Figure 8 shows the development of the Gini of equivalized household earnings and pensions. Interestingly, the Gini of equivalized earnings develops like that of unweighted individual earnings.[7] This means that the household structure does not change its trend. The inequality increases up until the end of the simulation period for both men and women. For both, the Gini starts off from about 34 points and increases for men to a value of about 37 and for women to about 39. The household dimension leads to a lower difference between the Gini of men and women compared to the comparison based on individual earnings. This difference is obviously driven by single households since household income is equivalized.

A different development can be observed for households with pension benefit recipients. The Gini for male pensioners starts off with about 0.27 and increases until 2020 to about 0.3. After that it starts to decrease relatively fast until 2030 when it again starts to rise until 2050. But comparing 2002 and 2050 no large difference can be observed. The development for women is less volatile. Their Gini remains relatively stable with slight positive trend over the simulated period. That both measures do not develop as parallel as those for equivalized earnings can be attributed to a higher share of single households within the group of pension recipients. Here they even dominate the development of the Gini. And since the Gini of unweighted individual pensions develops differently for men and women, a similar development can be observed for equivalized pensions.

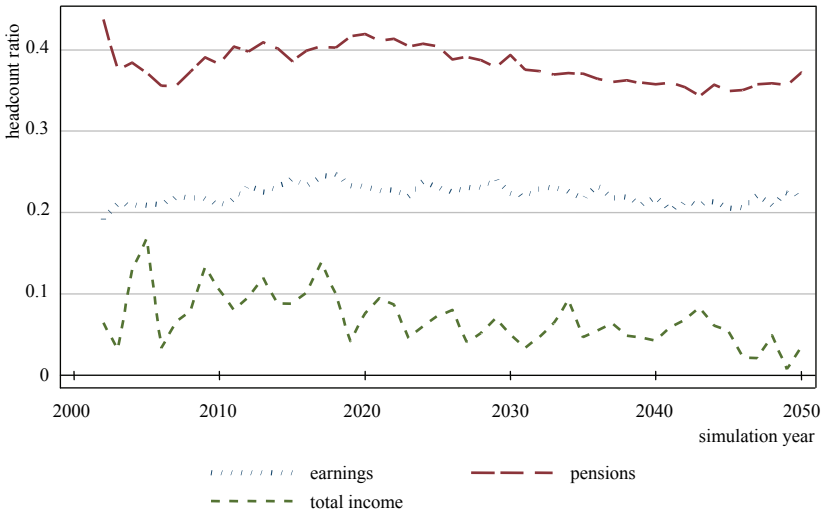
Figure 9 shows the incidence of poverty among individuals with households that have only earnings, only retirement benefits, or both.

Note that we analysis gross income components and do not take into account welfare, self-employed income, private pensions or income from other sources than dependent employment

[7] Figure 92 in the MIDAS Report (p. 222).

**Figure 9**

**Incidence of Poverty Pertaining to Individuals from Working and Retired Households – Germany**




Source: MIDAS Germany and own calculations.

and public pensions. Typically retirees pay no or only low taxes, thus looking at gross income means that the income difference between workers and pensioner is higher than for net income components. A higher income difference implies in turn a higher poverty risk for retirees in this perspective. Concerning the missing household income components, it has to be kept in mind that we restrict this poverty analysis to simulated income components. This leads to a relatively high poverty rate for pensioners for three reasons. The first is mentioned above: the difference between pensions and gross earnings is higher than that between pensions and net earnings. The second reason is that households without earnings and pensions are not part of the analysis. However, we observe virtually no household without pension rights in the simulation but we do observe that households have no market income from time to time. These pension rights might be very small. This leads to the third reason for high poverty rates of pensioners: very low pensions are often associated with welfare recipience which we do not simulate. Taken all together, the following figures are not comparable to official poverty statistics. However, they show in a very pure way the relation of gross earnings and pensions before taxes and redistribution.

Receiving income from both sources, earnings and pensions, leads to a lower risk of poverty as compared to having only one source of income. Adding to the difference in levels, pensions show a negative trend in poverty risks over time. This trend is dominated by higher pension benefits for women and a stable or slightly negative growth for men. All households experience the aforementioned trends regardless of their sources of income. That explains the decrease in poverty risks over time for pensions and total income.

### *5.3 Adequacy of pensions in Italy*

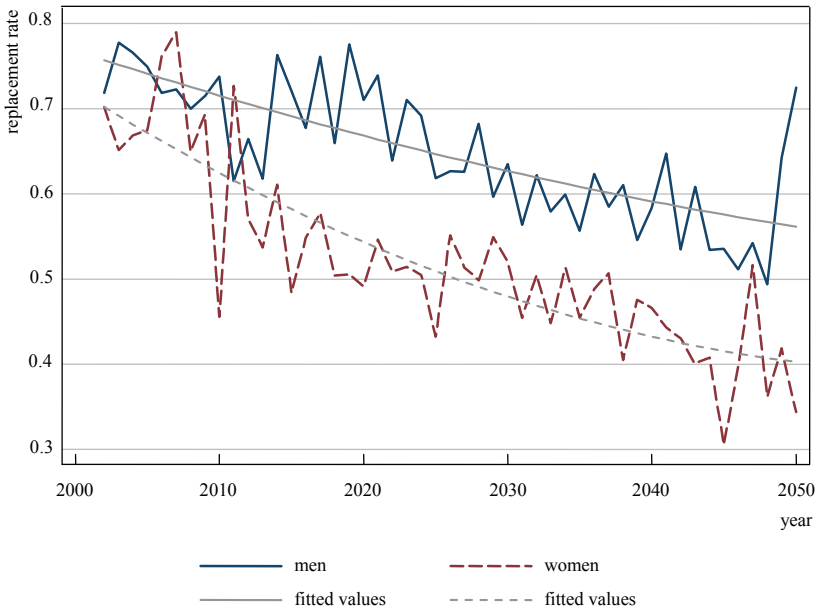
The development of the replacement rate in Figure 10 again is somewhat erratic, due to the sometimes low numbers of people making the actual transition into retirement. Hence, global trends emerging from these figures, rather than their punctual values, should be observed and assessed.

The increase of career length, assessed through seniority years, is lower than that of the average age of retirement (see Figure 117 in the *MIDAS Report*). This is because of two factors that counteract an increase in the age of withdrawal from work: an increase in the average age of labour

market entry (due to higher educational attainments) and the decrease of the seniority requirements for receiving an old age pension in the NDC system (amounting to 5 years, while it amounts to 15/20 years in earnings related and mixed schemes). Finally, over the whole simulation period, male average career length increases, while female one is quite constant, maybe due to the higher share of women getting an old age benefit after having worked for few years.

**Figure 10**

**Average Replacement Rate of Individuals Entering into Retirement – Italy**




Source: MIDAS Italy and own calculations.

The counteracting effect played by 1) benefits remaining rather constant over time (see the discussion of the replacement rate in the *MIDAS Report*) and 2) real wages that increase steadily with the productivity growth level, emerges in the development of the replacement rates (*i.e.*, the ratio between the first pension received and the last wage earned) in Figure 10. The more benefits are based on the NDC formula, the more replacement rates decrease both for males and females. The increases in career length and in age of retirement shown before are not enough for compensating this decrease in replacement rate brought about by the change from the earnings related to the NDC formula.

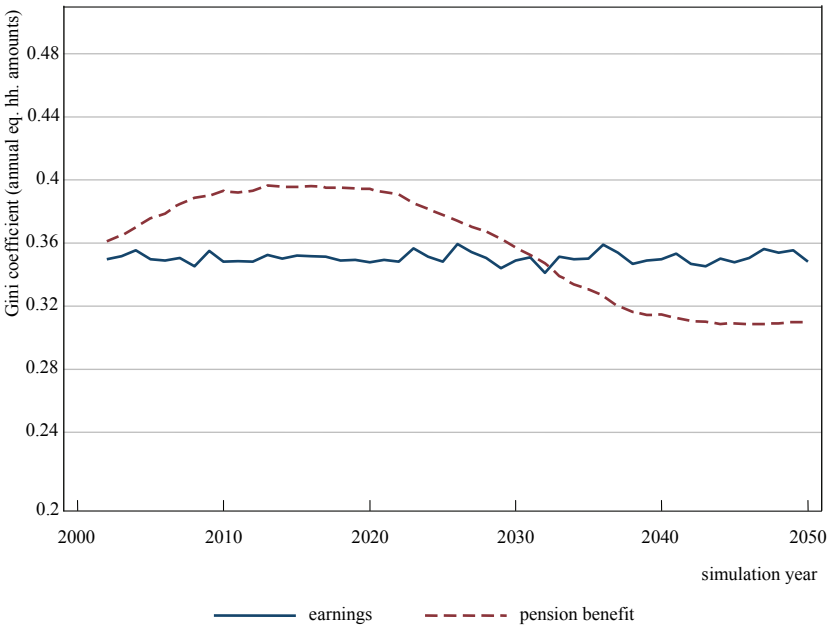
Figure 11 shows the development of the inequality of (equivalent) earnings and pension benefits in Italy.

In MIDAS-IT like in the other countries, earnings inequality remains fairly constant in the whole period. On the contrary, the trend of the Gini coefficient of pension benefits is much more diversified. It starts from a value slightly higher than the one pertaining to wages (about 0.36 vs. 0.35), but it steadily increases towards 0.40 in the mid-2010s. From 2020 onward, the Gini of pension benefits decreases, crosses the Gini of wages around 2035 and finally reaches a value around 0.31 in 2050. This trend of the Gini seems consistent with the evolution of the Italian pension system; at the beginning of the simulation the inequality of pension benefits increase because individuals with high pensions retire, then such increase is exacerbated by the coexistence of cohorts of retired belonging to different (and differently generous) schemes. After 2025, the death of the most of individuals fully belonging to the more generous earnings related scheme contributes to reduce the inequality of pension benefits.

Figure 12 shows the spread of poverty risks among the different groups of the population. During the whole simulation period, the incidence of poverty among households receiving only pension benefits increases importantly, while it steadily reduces among households receiving

**Figure 11**

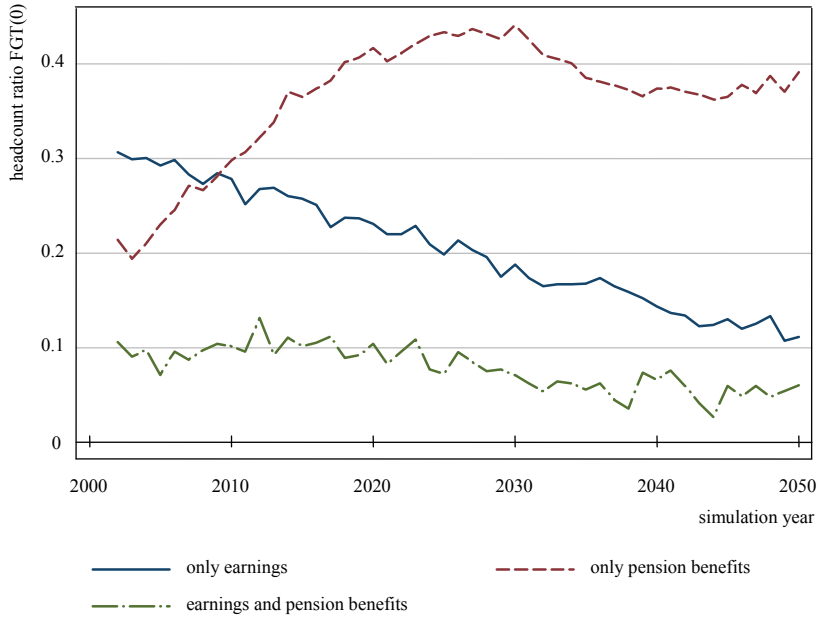
**Gini Coefficients of Gross Earnings and Retirement Benefits – Italy**




Source: MIDAS Italy and own calculations.

**Figure 12**

**Incidence of Poverty by Household's Sources of Income – Italy**




Source: MIDAS Italy and own calculations.

earnings. After 2010, poverty risks are much higher for pensioners than for workers. This trend can be explained by the different evolution of wages, which steadily increases in line with productivity, raising then also the poverty threshold (the 60 per cent of median income), while benefits, being not indexed according to the real wage growth, reduce their relative value compared to wages in all years of simulation.

## 6 Conclusions

The AWG projections of social security pensions in the European Member States are an important tool in the assessment of their sustainability. To date, the projections that Member States produce for the AWG include only a limited notion of adequacy, being the replacement rate. Other relevant aspects of pensions, specifically pertaining to the adequacy of pensions, are not considered. This paper aims to set a first step into integration by assessing the consequences of the AWG projections and assumptions on the adequacy of pensions in Belgium, Germany and Italy.

The simulation results pertaining to the

adequacy of pensions show that the Belgian replacement rate will gradually decrease until the beginning of the 2030s, after which it will recover. The level of the replacement rate is lower in Germany, but the development over time is comparable to Belgium. This is not so for Italy: here, the replacement rate starts off higher than in Belgium, but shows a continuous decrease as benefits from the earnings related system are gradually replaced by benefits from the NDC pension system. This larger impact in Italy than in Belgium and Germany seems to be consistent with the findings of Zaidi and Grech (2007, Table 1, page 305)

Also, the difference between men and women in terms of their replacement rates is smaller in Belgium and Germany than in Italy. Seeing that the difference between men and women seems to appear only in the second half of the 2010s, it seems to be caused by the NDC pension system as well.

In all three countries, and for Italy only in the first years of simulation, levels of income inequality decline from working to retirement ages, confirming the findings of Brown and Prus (2006).

Inequality of equivalent pension benefits in all three countries are roughly alike in their development, but not in their level. The inequality of pension benefits increases at first, reaches a maximum in the early 2010s (late 2020s for men in Germany) and then decreases again. The redistributive effect of pensions (measured by comparing the inequality of earnings with that of pension benefits) will increase from the late 2020s on in Italy and Belgium, and from the early 2020s on in Germany.

The forces causing this development in equality of pension benefits are quite different, at least between Belgium and Italy. Using the terminology of Zaidi and Grech (2007), the increasing redistributive impact of pensions in Belgium is caused by the parametric reform of reinforcing the link between pensions and earnings. In Italy, the effect is caused by the systemic changes of pension system. This also explains why the effect is stronger in Italy than in Belgium. Furthermore, inequality of pension benefits in Belgium is in all years well below that of earnings. In Italy, it is the opposite in the period up to the first half of the 2030s.

The paper also discusses the difference between workers and retirees in terms of their relative risk of poverty. Here the differences are more outspoken. In Belgium and Germany, the risk of poverty of those receiving only pension benefits is in all years higher than for those living in households receiving earnings (as well). In Italy, the poverty risk of those receiving a pension benefit starts of lower than those receiving earnings (as well), but increases very considerably until about 2030. This suggests that the systemic reform in Italy has a more profound impact on poverty than the parametric reform in Belgium and Germany.

Next, we consider the development of the incidence of poverty of those living in households that receive only pension benefits. The developments are roughly comparable between the three counties, as was the case with inequality, but the levels are not. Furthermore, the risk of poverty shows a rising trend in Italy, and the "common pattern" therefore surfaces in the speed of this increase, rather than in the change itself.

In the three countries, the risk of poverty pertaining to pension benefit recipients increases at first, and then decreases. In Belgium and Germany, this turning point is early in the 2020s, whereas it is late in the 2020s in Italy. Furthermore, relative to the preceding increase, the decrease of both risk of poverty is considerably stronger in Belgium and Germany than in Italy. As a result, the poverty rate of Italian pension benefit recipients show a positive trend, which is absent in Belgium and Germany. About a decade later after the first turning point (*i.e.*, early 2030s for Belgium, and early 2040s for Italy), poverty risks stabilize and then starts a modest increase again. This last change is again stronger in Belgium than in Italy and Germany. The explanations for these

developments in both countries are comparable as well, namely the link between the development of wages and pension benefits. In Belgium, however, the impact of the average age of the elderly seems to play an important role in conjunction with this linkage. This is not reported in the Italian case. On the whole, poverty among the recipients of social security pension benefits increases more in Italy than in Belgium and Germany, which for the first two countries confirms the tentative results of Zaidi *et al.*, 2006, Table 16, page 51.

An international comparison of the simulation results suggests that the impact of the parametric reform in Belgium and Germany and the systemic reform in Italy on (re)distribution and poverty should go into the same direction, but that the magnitudes would differ. Indeed, this impact is expected to be stronger in Italy than in Belgium and Germany.

Demographic ageing, in combination with projected growth rates of productivity and the assumed linkage between the development of earnings and pensions, has a profound impact on the future adequacy of pensions. Policies aiming to restore or improve sustainability therefore are bound to affect adequacy, and this makes it all the more important that both aspects of pension systems be assessed in unison.

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# PUBLIC TRANSFERS AND THE AGE-PROFILE OF POVERTY IN EUROPE

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*Ensuring adequate living standards to a growing number of elderly while restraining the growth of pension spending represents the main challenge for pension policy in most countries. There is a need for an in-depth analysis of the economic conditions of the elderly which can help targeting resources in the coming years to the more needy groups. Children are another potentially vulnerable group of the population: their poverty can affect human capital accumulation and have long lasting effects on life-time well-being. Using data from the latest wave of the EU Survey on Income and Living Conditions (SILC), we document that the poverty rates of these two age groups with respect to the other components of the population differ considerably across European countries. These differences are largely due to the different anti-poverty effectiveness of national social policies. In particular, in "Social-democratic" and "Corporatist" welfare states the age-profile of poverty is flat; on the contrary, in Anglo-saxon and especially in Southern European countries young and elderly groups show remarkably higher poverty rates.*

## 1 Introduction

The main aim of this paper is to assess the extent of income deprivation among children and elderly in EU countries, as well as the role of social spending policies in shaping cross-country differences in the age-profile of poverty.

Focusing on poverty is especially relevant from a normative point of view. Indeed, while there is a lot of disagreement about the "just" or "fair" amount of inequality within a society, there is wide agreement that poverty and social exclusion are the source of huge individual and collective costs (see, e.g., Feldstein, 2005). Widespread poverty can put into question the European endeavour itself, which might be seen as unable to promote social cohesion and to protect the living conditions of a significant fraction of the European population. These concerns are confirmed by the inclusion of "eradication of poverty and social exclusion" as one of the main objectives of the Open method of co-ordination (OMC) on Social inclusion and social protection launched in 2006.[1] Focusing on the young and the old is also justified by the fact that these two subgroups are particularly vulnerable: indeed, we show below that both the elderly and the young face a higher-than-average risk of poverty, and that for both groups public transfers represent a large fraction of their resources. Children deserve particular attention for two further reasons: they do not bear responsibilities for their conditions, and deprivation in the first part of life can have long lasting effects on their lifetime well-being (OECD, 2009).

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The opinions expressed herein do not necessarily reflect those of Banca d'Italia.

[1] In the EU jargon, the OMC is an approach to the coordination of member states' policies which is intermediate between EU common policies and the policies left to the single countries. Under the OMC, the member states agree on common objectives and on a set of common indicators. They prepare national reports on a regular basis, in which plans are outlined in order to meet the common objectives, and plans are then evaluated in joint reports by the EU Commission and the Council. The OMC on Social inclusion and social protection brings together two previously separated sets of policies in the field of social inclusion and pensions, and encompasses for the first time the field of health and long-term care. This process has three "overarching objectives": promote social cohesion and equal opportunity for all; interact closely with the Lisbon objectives; strengthen governance, transparency and the involvement of the stakeholders in the design, implementation and monitoring of policy. It also has three more specific aims (one for each of the three policy areas): eradication of poverty and social exclusion, adequate and sustainable pensions, accessible, high-quality and sustainable health care and long-term care. Based on the work of its Indicators Subgroup, the Social Protection Committee of the European Union adopted a set of common indicators for the social protection and social inclusion process. It consists of a set of fourteen indicators meant to reflect the overarching objectives and of three sets of further indicators specific to the policy areas of social inclusion, pensions, and health and long-term care. See European Commission (2009a).

An in-depth examination of the conditions of these vulnerable age-groups is also particularly relevant from a public finance point of view. At the moment, most European countries are striving with difficult budgetary choices. On one side, it is urgent to gain fiscal room to finance expansionary stimulus packages. On the other side, long-term challenges, especially those due to the aging process and to the related spending pressures, are looming large. So it seems important that increasingly scarce fiscal resources are targeted toward the most needy groups of the population.

While it is well known that European countries differ markedly in the incidence of poverty among the population (Marlier *et al.*, 2007; European Commission, 2009a; OECD, 2008), in this paper we show that European countries differ with respect to another less-discussed dimension, namely the relative condition of children and elderly citizens with respect to the rest of the population.[2] Moreover, we show that in some – but not all – European countries the tax-benefit system is particularly effective in smoothing-out the age-profile of poverty, thereby reducing the differences in deprivation between young and elderly citizens and the other groups of the population.

An assessment of welfare policies is complicated by the fact that they differ along many dimensions across European countries. Following Esping-Andersen (1990), we group European welfare states into a small number of clusters: "Liberal" (the United Kingdom and Ireland), "Corporatist" (Austria, Belgium, France, Germany and Luxembourg), "Social-democratic" (which comprises the Scandinavian countries – Denmark, Finland, Iceland, Norway and Sweden – and the Netherlands), and "Southern European" (Cyprus, Greece, Italy, Spain and Portugal).

As the labels suggest, the typology is built to reflect hypotheses concerning (1) the common historical and political origins of each different welfare regime and (2) the common consequences in terms of inequality and class differences. It is argued that in Liberal regimes the state has a residual welfare role with respect to the market; it provides means-tested social benefits targeted to the very poor. Corporatist countries allegedly give less emphasis to redistribution and use welfare primarily for reasons of mutual aid and risk pooling, with rights to benefits depending on the individual being inserted in the labour market. In Social-democratic countries the state has instead a substantial redistributive role, through generous social welfare and unemployment benefits. Finally, the Southern European group is singled out for the strong role of family support, while labour market policies are relatively less developed and selective.

In what follows, we do not take a stance in this debate. However, although researchers disagree about the causes and consequences of different welfare regimes, they broadly agree on the grouping of countries (Arts and Gelissen, 2002). So we use the four-group distinction (to which we add the Post-communist country group) as a handy way to present and summarize our findings.[3]

The four groups also dovetail nicely in the two-dimensional classification proposed by Bonoli (1997), based on (1) the amount of spending, distinguishing small welfare states (Liberal and Southern) from large welfare states (Corporatist and Social-democratic) and (2) the redistributive impact of policies, separating Beveridgean welfare states (Liberal and Social-democratic) from Bismarkian welfare states (Southern and Corporatist). The significance of

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[2] Two exceptions are Smeeding and Sullivan (1998) and Dang *et al.* (2006). The former paper considers four countries (Canada, Sweden, UK and USA) over the 1974-1994 period. The latter uses data for the late nineties about 9 OECD countries. Both papers differ from ours because they rely on national surveys, each with a different questionnaire design and definition of variables.

[3] There is some disagreement about the usefulness of separating southern and corporatist countries (in favour of the separation are, for example, Bonoli (1997) and Ferrera (1996). There is also some debate about the right place for the Netherlands. We put it in the Social-democratic cluster following, among others, Nolan and Whelan (2007). Lynch (2006) provides an in-depth analysis of the post-war II evolution of the Netherlands welfare state towards Scandinavian standards.

these two dimensions has also been emphasized in the economics literature (e.g., Conde-Ruiz and Profeta, 2007; Koethenbuerger *et al.*, 2008).

The importance of the age-orientation of public spending has been stressed by several studies. The literature on generational accounting (Raffelhuschen, 1999; European Commission, 1999) takes an inter-temporal approach. Combining cross-sectional micro-data with macroeconomic and demographic projections, and imposing an economically meaningful inter-temporal government budget constraint, this stream of literature aims at assessing whether public policies treat different cohorts differently. Instead, we limit ourselves to the first step, taking a snapshot of differences in policies as of today. This might be a limit if one considers that in many European countries current fiscal policies might not be sustainable (they do not comply with the inter-temporal government budget constraint), so that they will have to be changed in some point in the future (see European Commission, 2009b; Balassone *et al.*, 2009).[4]

There are two more fundamental differences between the generational accounting approach and ours. First, we consider the distribution of resources across and within age groups, whereas the latter dimension is ignored in generational accounting studies. Second, while in generational accounting studies the approach is completely individualistic (it assumes the absence of resource-sharing within families), we assume that resources are shared equally among the members of the same household. Of course in the two frameworks the impact of public transfers on the well-being of different cohorts/age groups can be quite different. For example in our framework old-age pensions benefit not only the recipient, but also the people who live with her or him, some of which may be young.

Our paper is particularly related to Lynch (2001 and 2006), who has made the first attempt at measuring and explaining the age-orientation of developed countries' welfare states. We improve on her contribution in two respects: first, we provide more accurate and comprehensive measures of the age-bias of European social policies; second, we explore the impact of such age-bias on poverty.

The rest of the paper is organized as follows: in Chapter 2 we briefly describe our micro-data (drawn from the EU-SILC survey), review the main concepts usually employed in the study of poverty, and highlight their main limitations. In Chapter 3 we provide a short overview of poverty and deprivation across Europe, considering in particular the role played by living arrangements and working conditions. In Chapter 4 we focus on our main issue of interest: the age-profile of poverty and its cross-country variations. In Chapter 5 we provide measures of effectiveness, efficiency and age-orientation of public policies and evaluate their impact on the age-profile of poverty. Chapter 6 offers some tentative conclusion.

## 2 Data, definitions and measurement issues

Our analysis is based on data from the latest available wave of the European Union Survey on Income and Living Conditions (EU-SILC). It has been conducted in 2006 with reference to 2005 and contains data for twenty-six countries, namely all EU member states in that year except Malta plus Iceland and Norway.[5]

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[4] Moreover, government policies are already changing. In recent years, many countries have introduced pension reforms which are characterized by less generous benefits and tighter eligibility conditions (Feldstein and Siebert, 2002). As a result, the economic conditions of elderly people are likely to deteriorate with respect to those of workers, unless longer working lives and a quick development of private pensions can offset the less generous social security rules.

[5] The survey has been launched for the first time in 2004, with reference to 2003. EU-SILC is organised under a common framework and is compulsory for all EU member states. A Regulation defines the minimum effective sample size to be achieved. For the cross-sectional component, it is planned to achieve a minimum effective sample size of around 121,000 households or 250,000

*(continues)*

The EU-SILC sample covers about 203,000 households and 537,000 individuals. One sixth of these individuals are younger than 16, two thirds are in the 16 to 64 bracket, and one sixth are older than 64 (Table 1).

Among households, 30.3 per cent are composed by only one person, 36.5 per cent is made up of two or more adults without children. Among the households with children (32.5 per cent), those with a single parent are slightly more than 4 per cent (Table 2).[6]

EU-SILC, which adopts a questionnaire common to all countries, provides information on individuals living in private households.[7] It includes variables measured both at the household and individual level. These variables include: income, education, information on current and past working status, health, access to health care, detailed labour and career information.

An important goal of the survey is to provide both gross and net income data. In particular, three main aggregates are made available by EU-SILC: total disposable household income, total disposable household income less transfers, and total gross income (disposable income plus taxes and social contributions). However, the latter will only be fully available with the data concerning 2007. The years 2004-06 can be seen as transitional period as five countries, namely France, Greece, Italy, Latvia and Portugal, are allowed to deliver only net income components and for all countries a limited number of components is not compulsory.

Gross income components covered by EU-SILC are: employee income, self-employment income, imputed rents, property income, interests paid on mortgage, current transfers paid (this item is in turn made up of: tax on income and regular taxes on wealth, social security contributions and regular inter-household transfers), and current transfers received.

For our aims, transfers received from the government are particularly important. Social benefits are decomposed in: unemployment benefits, old-age benefits, survivor' benefits, sickness benefits, disability benefits and education related allowances. At the household level, we also have family/children related allowances, housing allowances, and a third item concerning other transfers generically directed to the problem of social exclusion.[8]

individuals older than sixteen years in the EU (respectively 127,000 and 260,000 including Iceland and Norway). Useful information about the EU-SILC survey can be found in Eurostat (2007b).

[6] Here and in what follows, we will focus on the population counterparts of the sample variables. The latter are derived from the former applying a specific set of weights. Indeed, if the sampling design is such that individuals in the population have different probabilities of sample participation, due to sampling design or to systematically different non-response behaviour, this may bias inference from the sample to the population, unless selection probabilities are properly taken into account through weights (see, e.g., the discussion in Deaton, 1997). In accordance with the Commission Regulation on sampling and tracing rules (Regulation No. 982/2003 of 21 October 2003, par. 7.4), EU-SILC provides weights "calculated as required to take into account the units' probability of selection, non-response and, as appropriate, to adjust the sample to external data relating to the distribution of households and persons in the target population, such as by sex, age (five-year age groups), household size and composition and region (NUTS II level), or relating to income data from other national sources where the Member States concerned consider such external data to be sufficiently reliable".

[7] All individuals living in collective households and in institutions are therefore excluded. In some countries this implies an under-representation of elderly people, which often live in specialised institutions. Furthermore, the exclusion of collective households, hospitals and prisons may conduct to an under-estimation of the incidence and intensity of poverty.

[8] In order to be considered as social transfers, the monetary benefit has to come from collectively organised schemes or by government units and non profit institutions serving households and should meet one of two criteria: coverage in the scheme is compulsory or it is based on the principle of social solidarity. In the EU-SILC, social benefits are consistent with the European System of integrated Social Protection Statistics (ESSPROS) classification, even if not all elements of ESSPROS itself are included (in particular, EU-SILC definition covers only cash benefits with the exceptions of housing and only current transfers; it includes the function education while ESSPROS does not; the ESSPROS definition, differently from EU-SILC, covers certain reductions on taxes different from family allowances if they meet the general criteria for social protection schemes and other specific criteria). The ESSPROS classification is in turn consistent with the COFOG classification of government expenditures by function. In some countries social transfers include the value of social contributions and income taxes payable on the benefits by the beneficiary.

**Table 1**

## Individuals and Households in EU-SILC

| Countries | Individuals | | | | Households | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | 0-15 | 16-64 | 65+ | Total | One-person Households | Households with Two or More Adults without Children | One-adult Households with Children | Two-adult Households with Children |
| Austria | 14,883 | 2,778 | 9,680 | 2,425 | 6,028 | 1,754 | 2,192 | 273 | 1,809 |
| Belgium | 14,329 | 2,840 | 9,378 | 2,111 | 5,860 | 1,642 | 2,134 | 366 | 1,708 |
| Cyprus | 11,069 | 2,251 | 7,280 | 1,538 | 3,621 | 533 | 1,412 | 98 | 1,578 |
| Czech Republic | 17,830 | 2,907 | 11,807 | 3,116 | 7,483 | 2,923 | 2,916 | 361 | 2,083 |
| Germany | 31,777 | 5,515 | 20,400 | 5,862 | 13,799 | 3,832 | 5,415 | 1,016 | 3,521 |
| Denmark | 14,676 | 3,222 | 9,763 | 1,691 | 5,711 | 1,108 | 2,294 | 254 | 2,022 |
| Estonia | 15,840 | 2,503 | 10,830 | 2,507 | 5,631 | 1,139 | 1,960 | 326 | 2,180 |
| Spain | 34,694 | 5,667 | 22,896 | 6,131 | 12,205 | 1,981 | 5,246 | 314 | 4,521 |
| Finland | 28,039 | 5,768 | 19,125 | 3,146 | 10,868 | 2,377 | 4,408 | 392 | 3,691 |
| France | 24,940 | 5,279 | 15,966 | 3,695 | 10,036 | 2,752 | 3,452 | 536 | 3,242 |
| Greece | 15,190 | 2,415 | 9,475 | 3,300 | 5,700 | 1,228 | 2,558 | 102 | 1,793 |
| Hungary | 19,902 | 3,290 | 13,009 | 3,603 | 7,722 | 1,939 | 3,057 | 366 | 2,360 |
| Ireland | 14,634 | 3,139 | 8,600 | 2,895 | 5,836 | 1,816 | 2,065 | 312 | 1,643 |
| Iceland | 8,598 | 2,061 | 5,734 | 803 | 2,845 | 383 | 938 | 152 | 1,359 |
| Italy | 54,512 | 8,035 | 35,215 | 11,262 | 21,499 | 5,491 | 8,805 | 599 | 6,604 |
| Lithuania | 12,134 | 1,811 | 7,928 | 2,395 | 4,660 | 1,016 | 1,838 | 219 | 1,587 |
| Luxembourg | 10,242 | 2,391 | 6,857 | 994 | 3,836 | 866 | 1,306 | 199 | 1,465 |
| Latvia | 10,985 | 1,678 | 7,005 | 2,302 | 4,315 | 1,120 | 1,591 | 261 | 1,318 |
| Netherlands | 23,096 | 5,489 | 15,128 | 2,479 | 8,986 | 2,091 | 3,358 | 327 | 3,209 |
| Norway | 15,454 | 3,434 | 10,541 | 1,479 | 5,768 | 1,232 | 2,071 | 274 | 2,109 |
| Poland | 45,122 | 8,201 | 30,613 | 6,308 | 14,914 | 2,726 | 5,165 | 528 | 6,256 |
| Portugal | 12,071 | 1,788 | 7,820 | 2,463 | 4,367 | 770 | 1,933 | 112 | 1,545 |
| Sweden | 17,149 | 3,577 | 11,419 | 2,153 | 6,803 | 1,664 | 2,441 | 344 | 2,330 |
| Slovenia | 31,276 | 4,136 | 23,044 | 4,096 | 9,478 | 872 | 3,936 | 258 | 4,412 |
| Slovakia | 15,147 | 2,258 | 10,917 | 1,972 | 5,105 | 1,122 | 1,801 | 151 | 2,028 |
| UK | 23,365 | 4,789 | 14,592 | 3,984 | 9,902 | 2,768 | 3,983 | 634 | 2,309 |
| Total | 536,954 | 97,222 | 355,022 | 84,710 | 202,978 | 47,145 | 78,275 | 8,774 | 68,682 |

**Table 2**

## Individuals and Households in EU-SILC (Weighted)

| Countries | Individuals | | | | Households | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | 0-15 | 16-64 | 65+ | Total | One-person Households | Households with Two or More Adults without Children | One-adult Households with Children | Two-adult Households with Children |
| Austria | 8,182,229 | 1,355,651 | 5,465,163 | 1,361,415 | 3,508,442 | 1,218,616 | 1,224,163 | 137,467 | 928,196 |
| Belgium | 10,432,483 | 1,848,167 | 6,840,279 | 1,744,037 | 4,521,958 | 1,510,535 | 1,593,291 | 236,457 | 1,175,082 |
| Cyprus | 762,164 | 148,087 | 522,308 | 91,770 | 256,600 | 41,096 | 94,566 | 6,594 | 114,344 |
| Czech Republic | 10,160,544 | 1,588,904 | 7,135,368 | 1,436,272 | 4,027,670 | 953,570 | 1,644,553 | 165,076 | 1,264,470 |
| Germany | 81,954,033 | 12,363,215 | 54,046,986 | 15,543,832 | 38,895,762 | 14,810,117 | 13,587,872 | 2,016,935 | 8,432,803 |
| Denmark | 5,365,079 | 1,054,800 | 3,474,598 | 835,681 | 2,661,145 | 1,165,972 | 782,542 | 142,808 | 563,791 |
| Estonia | 1,348,337 | 211,901 | 908,533 | 227,903 | 565,138 | 186,847 | 174,066 | 35,603 | 166,752 |
| Spain | 44,539,936 | 6,602,000 | 30,560,782 | 7,377,154 | 15,604,257 | 2,569,350 | 6,969,705 | 285,726 | 5,575,340 |
| Finland | 5,179,228 | 949,916 | 3,393,406 | 835,906 | 2,434,999 | 938,394 | 843,927 | 99,011 | 553,667 |
| France | 59,513,895 | 11,194,694 | 38,327,629 | 9,991,572 | 25,988,931 | 8,073,528 | 9,043,656 | 1,268,085 | 7,490,537 |
| Greece | 10,828,138 | 1,643,477 | 7,136,878 | 2,047,782 | 4,009,513 | 792,216 | 1,808,290 | 73,025 | 1,321,767 |
| Hungary | 9,927,583 | 1,765,058 | 6,636,188 | 1,526,337 | 3,810,173 | 942,461 | 1,419,344 | 197,435 | 1,250,933 |
| Ireland | 4,253,340 | 941,700 | 2,835,179 | 476,461 | 1,494,000 | 326,500 | 501,965 | 119,025 | 546,510 |
| Iceland | 281,817 | 78,893 | 176,506 | 26,418 | 104,685 | 25,262 | 27,502 | 9,035 | 42,280 |
| Italy | 58,839,605 | 8,799,229 | 38,026,793 | 12,013,583 | 23,907,410 | 6,851,696 | 9,157,601 | 636,373 | 7,261,741 |
| Lithuania | 3,389,407 | 595,433 | 2,255,037 | 538,937 | 1,326,551 | 373,219 | 397,332 | 72,507 | 483,492 |
| Luxembourg | 451,387 | 88,010 | 301,151 | 62,226 | 182,860 | 52,846 | 62,042 | 6,000 | 61,971 |
| Latvia | 2,249,039 | 364,142 | 1,516,631 | 368,266 | 856,874 | 208,973 | 302,153 | 46,577 | 293,521 |
| Netherlands | 16,237,968 | 3,166,257 | 10,771,522 | 2,300,189 | 7,146,088 | 2,498,086 | 2,493,229 | 234,477 | 1,919,879 |
| Norway | 4,602,262 | 953,564 | 2,952,756 | 695,942 | 2,101,694 | 871,295 | 599,855 | 113,522 | 496,055 |
| Poland | 37,925,985 | 6,492,843 | 26,250,536 | 5,182,606 | 13,318,760 | 3,290,217 | 4,273,567 | 395,116 | 5,150,441 |
| Portugal | 10,607,674 | 1,694,283 | 7,046,651 | 1,866,740 | 3,829,465 | 640,547 | 1,595,464 | 109,058 | 1,480,475 |
| Sweden | 9,153,151 | 1,870,151 | 5,781,016 | 1,501,984 | 4,344,671 | 1,792,642 | 1,259,193 | 259,256 | 1,025,979 |
| Slovenia | 2,005,885 | 303,331 | 1,383,967 | 318,586 | 710,818 | 145,078 | 272,712 | 24,830 | 268,197 |
| Slovakia | 5,388,751 | 853,000 | 3,820,762 | 714,990 | 1,872,687 | 453,877 | 638,538 | 54,574 | 724,700 |
| United Kingdom | 59,772,192 | 11,503,490 | 39,021,474 | 9,247,229 | 25,528,775 | 7,752,949 | 9,675,802 | 1,609,747 | 5,779,741 |
| Total | 463,352,111 | 78,430,196 | 306,588,097 | 78,333,818 | 193,009,927 | 58,485,889 | 70,442,930 | 8,354,319 | 54,372,664 |

We estimate household poverty considering the equivalised total disposable income obtained using the modified OECD equivalence scale.[9] This allows to take into account that larger households can exploit economies of scale in housing and in the consumption of goods and services.

As it is typical in poverty studies for rich countries, we endorse a relative concept of poverty.[10] This is not incompatible with an "absolute" view of deprivation, as long as the minimum amount of resources which are necessary to avoid social exclusion rises with general prosperity (Sen, 1983 and 1987). In particular, for each country we calculate the poverty line as the 60 per cent of the country median equivalised income and define as poor persons those living in households with a total equivalised disposable income lower than this threshold.[11] Robustness of the poverty rates is tested considering two alternative poverty lines (respectively equal to 50 and 70 per cent of the national median income).

Even controlling for family composition, other comparability problems remain. First of all, for a given level of income and for a given household composition, well-being also depends on personal characteristics, such as health, education and the amount of available leisure time. Secondly, we ignore in-kind transfers, which in many countries are quite sizable (Commission of the European Communities, 2002; Garfinkel *et al.*, 2006). Thirdly, we do not take into account the flow of benefits stemming from the ownership of durable consumption goods and real assets (however, we do try to capture some of the effects of real-asset ownership by taking into account imputed rents).

Finally, while in most of the paper we consider a nation-specific poverty line (as it is customary in cross-country studies), we also provide some poverty statistics using both a single EU-wide poverty line and a mixed poverty line (built as a geometric mean of the national and the EU-wide thresholds). These estimates are to be considered with extreme caution, given the many conceptual and empirical difficulties implied by this kind of exercises (see, e.g., Atkinson, 1998; Brandolini, 2007; Mogstad *et al.*, 2007).

## 3 A bird's eye on poverty in Europe

### *3.1 The incidence of poverty*

Poverty rates among households differ widely across EU countries. They range from 8.6 per cent in the Czech Republic to 22.8 per cent in Latvia (Table 3). Four countries have poverty rates near or below 10 per cent (Czech Republic, the Netherlands, Slovakia and Iceland); eleven countries have rates between 11 and 15 per cent (Denmark, France, Sweden, Norway, Luxembourg, Belgium, Hungary, Slovenia, Finland, Austria and Germany); the remaining ones have poverty rates above 15 per cent. Eleven countries have poverty rates above the EU average (16.2 per cent).

The relative position of countries in terms of poverty rates does not change significantly if we use poverty lines equal to 50 and 70 per cent of the median equivalised disposable income (Table 4). The only exceptions are represented by Finland, Latvia, Austria and, to a lesser extent, Ireland and France, suggesting that in those countries there is a high number of people concentrated around the poverty line.

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[9] This scale assigns a unitary weight to the head of the household, a weight of 0.5 to each household component aged 14 and over at the end of the income reference period and a weight of 0.3 to members aged 13 or less. It is the scale endorsed by the EU in the construction of the indicators used in the OMC on Social inclusion and social protection.

[10] Relative poverty is also one of the indicators agreed upon by EU member states in the context of the OMC on Social protection and inclusion.

[11] This is consistent with the indicators used in the OMC on Social inclusion and social protection.

**Table 3**

**Poverty Rates**

| Countries | Poverty Line: 60% of Median Income | Robustness Exercises | | Unique Poverty Line(1) | Hybrid Poverty Line(2) |
|---|---|---|---|---|---|
| | | 50% of Median Income | 70% of Median Income | | |
| Austria | 14.7 | 7.0 | 22.1 | 5.0 | 8.0 |
| Belgium | 14.2 | 7.3 | 22.7 | 7.7 | 9.9 |
| Cyprus | 19.6 | 11.9 | 27.1 | 14.0 | 14.0 |
| Czech Republic | 8.6 | 4.2 | 16.3 | 90.8 | 50.3 |
| Germany | 14.9 | 8.7 | 22.5 | 9.3 | 10.9 |
| Denmark | 12.1 | 6.5 | 20.5 | 3.0 | 4.4 |
| Estonia | 16.5 | 9.9 | 27.8 | 92.1 | 57.6 |
| Spain | 20.4 | 13.2 | 28.0 | 30.1 | 24.4 |
| Finland | 14.6 | 6.7 | 24.4 | 3.7 | 6.2 |
| France | 13.1 | 7.3 | 21.0 | 8.4 | 10.0 |
| Greece | 19.8 | 13.1 | 27.5 | 40.2 | 28.4 |
| Hungary | 14.5 | 9.0 | 22.3 | 93.3 | 61.1 |
| Ireland | 18.7 | 8.7 | 28.4 | 4.6 | 8.9 |
| Iceland | 10.3 | 5.4 | 18.7 | 1.3 | 3.2 |
| Italy | 19.6 | 12.5 | 27.0 | 17.9 | 18.4 |
| Lithuania | 18.2 | 11.5 | 27.4 | 96.8 | 69.9 |
| Luxembourg | 13.9 | 8.0 | 21.7 | 1.0 | 3.7 |
| Latvia | 22.8 | 12.7 | 30.5 | 95.7 | 67.0 |
| Netherlands | 10.0 | 5.3 | 19.0 | 4.8 | 6.4 |
| Norway | 13.4 | 6.9 | 21.4 | 2.2 | 3.7 |
| Poland | 17.7 | 11.2 | 25.8 | 95.3 | 67.5 |
| Portugal | 19.0 | 12.0 | 27.5 | 60.2 | 35.5 |
| Sweden | 13.2 | 8.1 | 20.7 | 6.4 | 8.3 |
| Slovenia | 14.5 | 8.0 | 21.8 | 39.6 | 20.8 |
| Slovakia | 10.1 | 5.6 | 17.5 | 97.5 | 69.4 |
| United Kingdom | 18.8 | 11.8 | 27.2 | 8.1 | 12.2 |
| Min | 8.6 | 4.2 | 16.3 | 1.0 | 3.2 |
| Max | 22.8 | 13.2 | 30.5 | 97.5 | 69.9 |
| EU average | 16.2 | 9.8 | 24.1 | 24.5 | 20.6 |
| All countries average | 16.2 | 9.7 | 24.1 | 24.3 | 20.4 |

(1) It is a poverty line calculated as 60 per cent of the European equivalised median income. It is equal for all counties.

(2) Calculated as $pl_i^{\alpha} \cdot \overline{p}^{1-\alpha}$, where the first term is the poverty line of each country (equal to 60 per cent of the median equivalised income) and the second term the unique poverty line described in footnote (1). We used $\alpha = ½$.

**Table 4**

**Correlation between Poverty Rates Computed with Different Poverty Lines**

| Median Income | 60% | 50% | 70% | EU-wide | Hybrid |
|---|---|---|---|---|---|
| **60%** | 1.000 | 0,948 | 0.970 | 0.156 | 0.214 |
| **50%** | | 1.000 | 0.898 | 0.240 | 0.294 |
| **70%** | | | 1.000 | 0.170 | 0.224 |
| **EU-wide** | | | | 1.000 | 0.989 |
| **Hybrid** | | | | | 1.000 |

**Table 5**

**Main Indicators by Welfare Regimes**

| | Social-democratic | Corporatist | Liberal | Southern | Post-communist |
|---|---|---|---|---|---|
| **Poverty rates** | | | | | |
| Overall | 9.8 | 12.7 | 16.7 | 17.6 | 14.3 |
| 0-15 | 9.9 | 14.3 | 20.5 | 18.8 | 18.7 |
| 16-64 | 9.4 | 11.7 | 14.4 | 15.0 | 13.6 |
| 65+ | 11.1 | 14.5 | 22.2 | 29.1 | 12.1 |
| **Poverty rates pre-transfers** | | | | | |
| 0-15 | 27.7 | 22.5 | 28.4 | 23.6 | 30.1 |
| 16-64 | 27.7 | 28.0 | 24.5 | 27.3 | 30.1 |
| 65+ | 91.6 | 91.3 | 87.4 | 82.3 | 83.6 |
| Overall | 37.1 | 37.7 | 33.8 | 36.0 | 38.3 |
| **Age-bias index** | | | | | |
| Old/Working age | 4.19 | 4.07 | 4.17 | 3.53 | 3.78 |
| Child/Working age | 0.79 | 0.35 | 0.53 | 0.22 | 0.52 |
| **VEE** | | | | | |
| Families with children | 52.4 | 57.8 | 74.0 | 46.6 | 46.4 |
| Families with working-age adults | 67.3 | 71.9 | 54.1 | 52.7 | 58.7 |
| Families with elderly | 93.9 | 91.8 | 87.6 | 81.8 | 85.7 |

Overall, low levels of poverty rates characterise Social-democratic countries (12.3 per cent on average) and Corporatist countries (14.2 per cent), whereas above EU-average levels of poverty characterize Liberal (18.8 per cent), Southern (19.7 per cent) and Post-communist (15.4 per cent) countries (Table 5).

### *3.2 The intensity and inequality of poverty*

Together with the incidence of poverty (how many are the poor) summarized by the poverty rate, a further dimension of poverty is its "intensity" (how poor are the poor). To capture intensity we computed the widely-used poverty gap, defined as the difference between the average income among poor families and the poverty line, expressed as a percentage of the latter.[12]

Neither the poverty ratios nor the poverty gaps are sensitive to changes in the income distribution among the poor (to the so called "inequality" of poverty). To keep this element into account we also consider a version of the so-called Forster-Greer-Thorbecke index (FGT2).[13] As with the poverty gap, this index can be seen as a weighted sum of the households' poverty gaps. The difference is that the weights are not equal for all: instead, in the summation the gaps of very poor households have bigger weights.

According to our data, poverty gaps in Europe range from around 20 per cent in Finland and Ireland to a maximum of 44 per cent in Norway (Table 6). However, the majority of countries has poverty gaps between 25 and 35 per cent, and the average poverty gap is slightly above 30 per cent. No clear-cut distinction emerges across different groups of countries. The poverty rates and the poverty gaps are weakly correlated: there are some countries with relatively high headcount ratios but relatively low poverty gaps (i.e., Cyprus, Finland and Ireland) and vice versa (*i.e.*, Denmark, Germany, Hungary, the Netherlands, Norway and Sweden) (Table 7). If one disregards outliers (Norway, Belgium and Germany), these considerations are confirmed if one looks at the FGT2 index.

### *3.3 Poverty and family composition*

Behind national differences in poverty rates there can be differences in factors such as family structure and labour market characteristics.

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[12] Sometimes the poverty gap is averaged over the entire population (non-poor have obviously a gap of 0). Indeed the measure we show in the main text does not satisfy some desiderable monotonicity properties (for example, if one of the richest among the poor gets out of poverty, the index may well increase); besides it is not decomposable among subgroups (see the next footnote). However, the latter measure can be obtained as the product of the former times the headcount ratio:

$$\frac{\sum_i gap(i)}{Population} = \frac{\sum_i gap(i)}{\#\,Poor} \times \frac{\#\,Poor}{Population}$$

[13] Foster-Greer-Thoerbeke indices are calculated as:

$$\frac{\sum_i gap(i)^a}{Population}$$

where $a$ is greater than or equal to 0 (if $a = 0$ one has the headcount ratio, with $a = 1$ one has the poverty gap). The poverty indices which are used more frequently in applied work belong to two main families: the family of Sen indices, which have the nice property to be sensitive to inequality among the poor, and the Foster-Shorrocks indices, which have the property of being decomposable among population subgroups. The poverty ratio and the poverty gap (averaged over the whole population) belong to the second family but not to the first. Foster-Greer-Thoerbeke indices with $a > 1$ share both set of properties. In our calculation we set $a = 2$ (for poverty indices a classic reference is Sen, 1997).

**Table 6**

**Poverty Gaps**

| **Countries** | **Poverty Gap** | **Forster-Greer-Thorbecke Index** (FGT2) |
|---|---|---|
| Austria | 24.8 | 1.7 |
| Belgium | 28.9 | 11.8 |
| Cyprus | 24.2 | 1.7 |
| Czech Republic | 21.2 | 0.7 |
| Germany | 35.6 | 13.3 |
| Denmark | 35.4 | 5.9 |
| Estonia | 29.6 | 2.8 |
| Spain | 30.7 | 3.3 |
| Finland | 20.5 | 1.2 |
| France | 24.6 | 1.5 |
| Greece | 32.2 | 5.5 |
| Hungary | 32.6 | 4.5 |
| Ireland | 19.0 | 1.2 |
| Iceland | 26.7 | 2.6 |
| Italy | 32.7 | 4.0 |
| Lithuania | 32.5 | 3.3 |
| Luxembourg | 26.7 | 2.8 |
| Latvia | 31.7 | 5.2 |
| Netherlands | 33.4 | 4.4 |
| Norway | 44.0 | 80.5 |
| Poland | 29.8 | 2.6 |
| Portugal | 28.8 | 2.6 |
| Sweden | 35.2 | 3.1 |
| Slovenia | 25.3 | 1.6 |
| Slovakia | 25.4 | 1.1 |
| United Kingdom | 30.5 | 3.2 |
| Min | 19.0 | 0.7 |
| Max | 44.0 | 80.5 |
| EU average | 30.7 | 5.3 |
| All countries average | 30.8 | 6.1 |

**Table 7**

**Correlation among Poverty Indicators**

| | **Poverty Rate** | **Poverty Gap** | **FGT2** | **Poverty Rate × Poverty Gap** |
|---|---|---|---|---|
| Poverty rate | 1.000 | 0.070 | -0.100 | 0.810 |
| Poverty gap | | 1.000 | 0.630 | 0.620 |
| FGT2 | | | 1.000 | 0.260 |
| Poverty rate × Poverty gap | | | | 1.000 |

**Table 8**

**Poverty Rates by Household Types**

| Countries | One-person Households | Households with Two or More Adults Without Children | One-adult Households with Children | Two or More Adults with Children | Total |
|---|---|---|---|---|---|
| Austria | 21.8 | 9.7 | 26.8 | 10.2 | 14.7 |
| Belgium | 19.9 | 11.3 | 25.2 | 8.6 | 14.2 |
| Cyprus | 40.9 | 25.0 | 26.6 | 7.0 | 19.6 |
| Czech Republic | 13.4 | 3.3 | 33.7 | 8.7 | 8.6 |
| Germany | 21.5 | 10.4 | 23.3 | 8.6 | 14.9 |
| Denmark | 20.5 | 5.2 | 9.9 | 5.0 | 12.1 |
| Estonia | 26.7 | 8.3 | 33.9 | 10.1 | 16.5 |
| Spain | 34.1 | 16.0 | 35.3 | 19.4 | 20.4 |
| Finland | 28.3 | 5.6 | 13.2 | 5.3 | 14.6 |
| France | 17.7 | 9.7 | 23.2 | 10.2 | 13.1 |
| Greece | 23.9 | 17.3 | 26.3 | 20.6 | 19.8 |
| Hungary | 12.2 | 18.3 | 35.1 | 16.8 | 14.5 |
| Ireland | 15.2 | 22.6 | 38.9 | 11.1 | 18.7 |
| Iceland | 5.9 | 11.5 | 25.7 | 7.9 | 10.3 |
| Italy | 16.8 | 29.0 | 27.5 | 20.9 | 19.6 |
| Lithuania | 9.8 | 20.9 | 33.3 | 15.1 | 18.2 |
| Luxembourg | 9.1 | 17.7 | 44.5 | 14.9 | 13.9 |
| Latvia | 19.3 | 30.3 | 31.3 | 15.9 | 22.8 |
| Netherlands | 5.3 | 11.4 | 27.3 | 8.3 | 10.0 |
| Norway | 4.3 | 13.6 | 14.1 | 5.3 | 13.4 |
| Poland | 14.7 | 28.7 | 29.6 | 22.5 | 17.7 |
| Portugal | 40.6 | 36.1 | 32.7 | 14.6 | 19.0 |
| Sweden | 3.9 | 11.3 | 25.5 | 8.5 | 13.2 |
| Slovenia | 16.1 | 20.1 | 17.7 | 7.1 | 14.5 |
| Slovakia | 7.0 | 12.6 | 23.8 | 11.1 | 10.1 |
| United Kingdom | 16.2 | 29.2 | 36.2 | 14.4 | 18.8 |
| | | | | | |
| Min | 13.4 | 3.3 | 9.9 | 5.0 | 8.6 |
| Max | 44.6 | 25.0 | 44.5 | 22.5 | 22.8 |
| EU average | 22.5 | 11.2 | 27.8 | 14.3 | 16.2 |
| All countries average | 22.5 | 11.2 | 27.6 | 14.2 | 16.2 |

**Figure 1**

**Poverty Rates by Family Type**

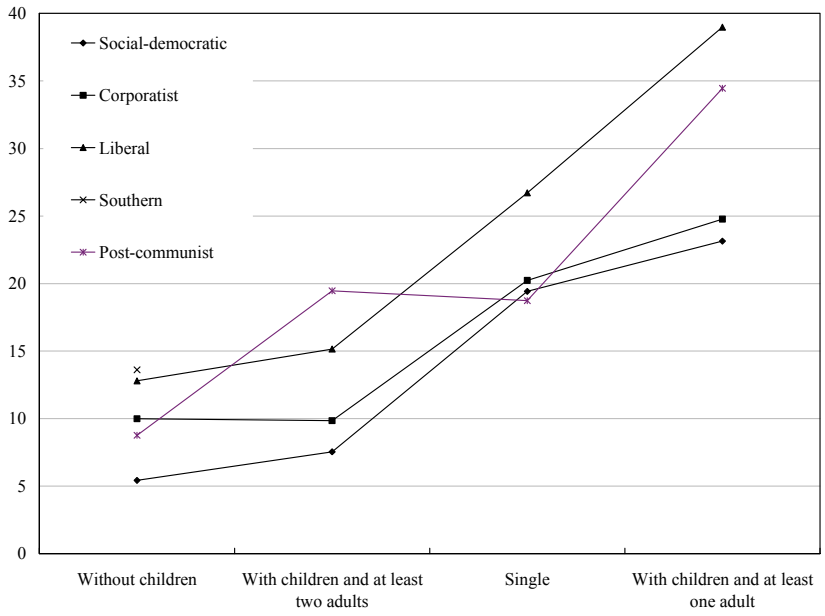
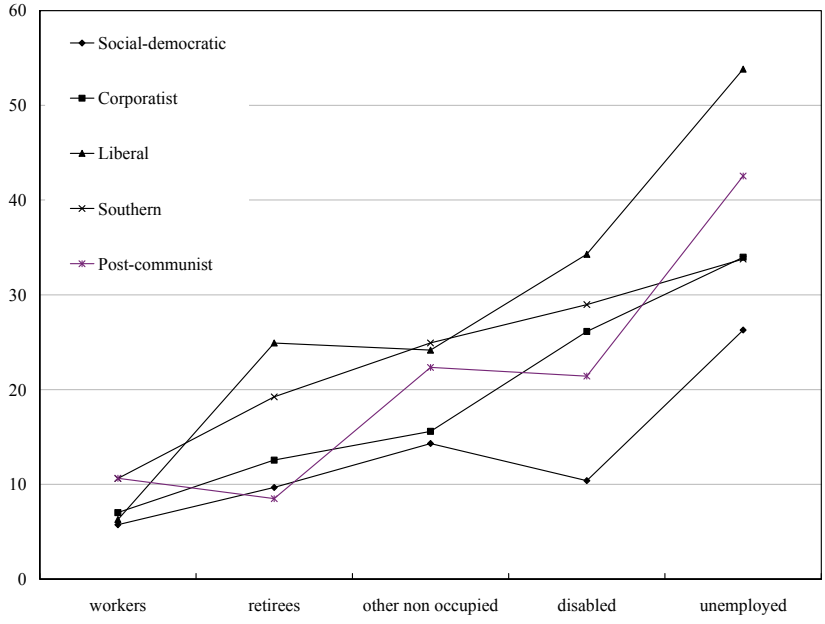



**Figure 2**

**Poverty Rates by Economic Status**




Indeed, poverty risks differ among household types (Table 8 and Figure 1). As one could expect, they are significantly higher than the average for one-person households (22.5 per cent) and especially for single-parent families (27.6 per cent).[14] Households with one adult are often those made up of younger or older people which are more likely to be in poverty conditions; in households with two adults there is generally income pooling which represent a cushion against temporary income shocks.

There are however huge differences across Europe. There are countries in which the poverty rate among one-adult households with dependent children is lower, or only slightly higher than the overall poverty rate (Denmark, Finland and Norway). At the other extreme, there are countries in which the poverty rate for single parent households is almost four times (Czech Republic) or three times (Luxemburg) higher than the overall average.

### *3.4 Poverty and occupation status*

Poverty risks depend also on the

[14] We defined as dependent children household members aged 17 or less and economically inactive members aged between 18 and 24.

occupational status. We grouped individuals in five categories: workers, retirees, disabled, unemployed and other non-occupied individuals. As expected, workers have the lowest poverty rate (8.3 per cent on average for the European countries), followed, in order, by retirees (14.8 per cent), other non-occupied individuals (20.6 per cent), disabled (24.6 per cent) and unemployed (36.7 per cent) (Table 9 and Figure 2).

Poverty rates vary substantially between and within countries. For example, the poverty risks for workers range from 0.1 per cent in Lithuania to 15 per cent in Poland; those for retirees range from 3.9 per cent in the Czech Republic to 46.3 per cent in Cyprus. In some countries retirees have a poverty rate which is close to the rate of workers (Czech Republic, Sweden and Slovakia); in some other countries they are actually better-off (Hungary, Luxembourg, Netherlands and Poland) (Table 9).

Similar differences arise for the unemployed. Unsurprisingly, they always display higher poverty rates. In the Czech Republic their poverty rate is more than ten times the poverty rate of workers. In the United Kingdom, Finland, and Ireland it is more than seven times. In Cyprus, Spain, Greece, Iceland, Italy, Poland, Portugal and Sweden it is between two and four times higher.

## 4 The age profile of poverty

Children and elderly people tend to be poorer than individuals in working age. In Europe the poverty rate is 17.9 per cent for the young (less than 16-years-old) and 17.4 per cent for the old (more than 64-years-old). It is 14.1 per cent for the population in working age (between 16 and 64 years old). Therefore, on average, poverty among the young and among the old is about one quarter higher than among the working age people.

Table 10 shows that European countries differ not only with respect to the incidence of poverty, but also with respect to its age-profile. In four countries the risk of poverty among young people is even lower than that for the working age population (Cyprus, Denmark, Finland and Norway). In other countries the ratio between the two is quite high.

Looking at different groups of countries, poverty among the young is higher than among the working age people by 42 per cent in Liberal countries, 25 per cent in Southern countries, 22 per cent in Corporatist welfare states, 5 per cent in Social-democratic countries. It is 37 per cent higher in Post-communist states (Figure 3).

As for elderly people, in nine countries, most of which Post-communist (the Czech Republic, Estonia, Hungary, Lithuania, Luxembourg, the Netherlands, Poland, Sweden and Slovakia) their poverty rates are below national average.

Poverty among the elderly is higher than among the working age people by 66 per cent in Liberal countries, 45 per cent in Southern countries, 19 per cent in Corporatist countries, and 2 per cent in Social-democratic countries. It is 5 per cent lower than that among working age people in Post-communist states.

To sum up, Liberal and Southern welfare states display both a higher overall poverty rate, and a more pronounced V-shaped age profile of poverty, with respect to Corporatist and Social-democratic welfare states. In Post-communist countries the age profile of poverty is monotonically decreasing.

**Table 9**

**Poverty Rates by Occupation Status**

| Countries | Workers | Unemployed | Retirees | Disabled | Other Unemployed |
|---|---|---|---|---|---|
| Austria | 7.0 | 32.1 | 12.8 | 15.2 | 17.2 |
| Belgium | 4.3 | 31.5 | 15.6 | 24.7 | 16.3 |
| Cyprus | 6.7 | 20.3 | 46.3 | 28.0 | 10.9 |
| Czech Republic | 3.3 | 35.9 | 3.9 | 10.7 | 13.5 |
| Germany | 7.6 | 38.4 | 12.7 | 29.7 | 14.3 |
| Denmark | 4.4 | 20.2 | 8.6 | 6.4 | 15.1 |
| Estonia | 6.5 | 43.9 | 15.8 | 43.2 | 17.0 |
| Spain | 10.2 | 30.3 | 23.4 | 28.3 | 24.8 |
| Finland | 4.3 | 31.1 | 15.2 | 14.8 | 11.2 |
| France | 6.5 | 28.3 | 11.9 | 23.7 | 16.8 |
| Greece | 14.1 | 29.3 | 22.8 | 39.3 | 22.7 |
| Hungary | 8.3 | 43.9 | 7.8 | 21.5 | 23.7 |
| Ireland | 5.2 | 37.5 | 20.1 | 37.2 | 21.5 |
| Iceland | 6.3 | 21.4 | 10.5 | 5.4 | 12.7 |
| Italy | 10.4 | 39.8 | 16.0 | 28.2 | 26.0 |
| Lithuania | 0.1 | 45.1 | 15.7 | 23.8 | 21.3 |
| Luxembourg | 10.9 | 45.2 | 7.5 | 26.4 | 18.0 |
| Latvia | 9.8 | 49.8 | 25.9 | 30.4 | 23.1 |
| Netherlands | 5.8 | 28.0 | 5.6 | 10.0 | 14.0 |
| Norway | 5.4 | 24.4 | 14.6 | 9.7 | 12.8 |
| Poland | 15.0 | 44.7 | 7.9 | 22.6 | 25.8 |
| Portugal | 10.6 | 25.1 | 21.0 | 26.9 | 22.0 |
| Sweden | 7.3 | 23.5 | 9.6 | 10.9 | 17.1 |
| Slovenia | 4.4 | 27.1 | 14.4 | 38.6 | 10.2 |
| Slovakia | 6.1 | 34.9 | 6.7 | 8.6 | 14.1 |
| United Kingdom | 6.4 | 55.9 | 25.1 | 34.1 | 24.4 |
| Min | 0.1 | 20.2 | 3.9 | 5.4 | 10.2 |
| Max | 15.0 | 55.9 | 46.3 | 43.2 | 26.0 |
| EU average | 8.3 | 36.8 | 14.8 | 24.9 | 20.7 |
| All countries average | 8.3 | 36.7 | 14.8 | 24.6 | 20.6 |

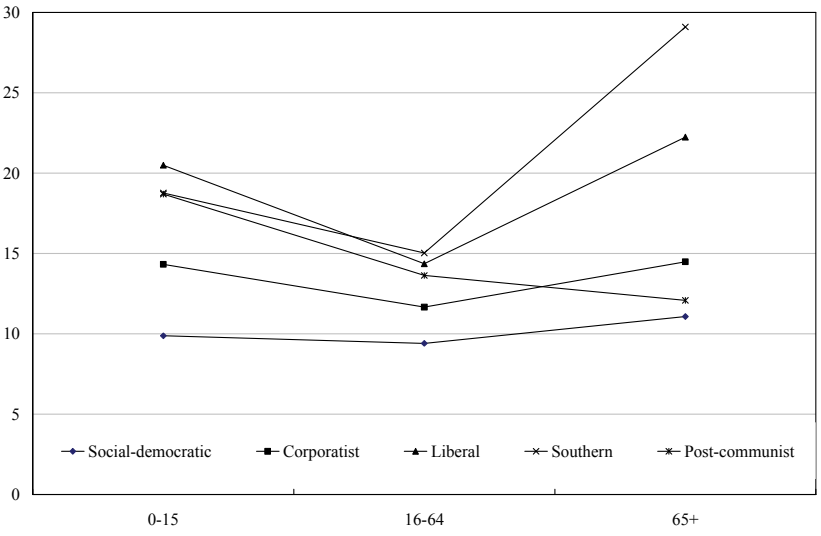
**Table 10**

**Poverty Rates by Age**

| Countries | 0-15 | 16-64 | 65+ | Total |
|---|---|---|---|---|
| Austria | 14.6 | 11.1 | 15.7 | 12.4 |
| Belgium | 12.6 | 10.6 | 19.6 | 12.4 |
| Cyprus | 8.8 | 9.5 | 48.1 | 14.0 |
| Czech Republic | 14.5 | 8.0 | 3.7 | 8.4 |
| Germany | 11.9 | 11.8 | 13.3 | 12.1 |
| Denmark | 7.2 | 9.2 | 9.9 | 8.9 |
| Estonia | 16.0 | 13.2 | 13.6 | 13.7 |
| Spain | 22.9 | 15.5 | 28.7 | 18.8 |
| Finland | 6.6 | 9.5 | 16.6 | 10.1 |
| France | 12.5 | 11.0 | 15.1 | 12.0 |
| Greece | 21.3 | 18.1 | 24.3 | 19.8 |
| Hungary | 24.1 | 14.5 | 8.8 | 15.3 |
| Ireland | 18.4 | 14.0 | 19.8 | 15.6 |
| Iceland | 11.7 | 8.3 | 9.6 | 9.4 |
| Italy | 23.1 | 17.3 | 20.6 | 18.9 |
| Lithuania | 21.0 | 16.6 | 14.9 | 17.1 |
| Luxembourg | 20.0 | 13.9 | 8.7 | 14.4 |
| Latvia | 21.8 | 17.4 | 22.6 | 19.0 |
| Netherlands | 13.4 | 9.1 | 5.8 | 9.5 |
| Norway | 7.5 | 9.4 | 14.6 | 9.8 |
| Poland | 27.7 | 21.1 | 8.7 | 20.5 |
| Portugal | 17.7 | 14.7 | 23.7 | 16.8 |
| Sweden | 12.9 | 11.0 | 9.8 | 11.2 |
| Slovenia | 10.1 | 8.4 | 17.3 | 10.1 |
| Slovakia | 14.4 | 9.8 | 6.9 | 10.1 |
| United Kingdom | 22.5 | 14.7 | 24.6 | 17.7 |
| | | | | |
| Min | 6.6 | 8.0 | 3.7 | 8.4 |
| Max | 27.7 | 21.1 | 48.1 | 20.5 |
| EU average | 18.0 | 14.1 | 17.4 | 16.4 |
| All countries average | 17.9 | 14.1 | 17.4 | 16.4 |

**Figure 3**

**Poverty Rates by Age Class**




These results are substantially confirmed by a multivariate analysis (Table 11).[15] Estimating logistic regressions in which the probability of being poor is related to the age-group of the individual and its regime, allowing for interaction terms between the two, it appears that: (1) elderly people are poorer that working age people in Southern and especially Liberal countries, while their position is not much worse than those of the middle-aged in Corporatist countries. It is virtually identical in Social-democratic countries, while it is actually better in post-communist countries; (2) the relative conditions of children appear to be worse than those of working age people in all regimes. Their relative position is however somewhat better in Social-democratic and Corporatist countries, while it is especially critical in liberal countries.

Therefore, it remains true that the age profile of poverty is flatter in Social-democratic and Corporatist countries, whereas its V shaped profile is particularly pronounced in Liberal and Southern countries. Post-communist countries are somewhat a class of their own, due to the particularly good relative position of the elderly.

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[15] The underlying assumptions are: (i) the difference between the national poverty threshold and the equivalized household income is measured with some noise, so that it is equal to the "real" difference plus an i.i.d. error term distributed according to a logistic distribution function; (ii) the "real" difference depends linearly on the regime type, and on the age group at which the individual belongs (in some specification the age group is decomposed into a finer partition, and the specification allows for interaction terms):

$$P_i \equiv \text{Prob}(\text{poverty threshold} - \text{equivalized household income of person i} > 0) = \frac{e^{c+\sum_r \alpha_r regime_{ir} + \sum_a \beta_a age_{ia} + \sum_a \sum_r \gamma_{ra} regime_{ir} age_{ia}}}{1+e^{c+\sum_r \alpha_r regime_{ir} + \sum_a \beta_a age_{ia} + \sum_a \sum_r \gamma_{ra} regime_{ir} age_{ia}}}$$

where $regime_{i,r}$ (viz. $age_{i,a}$) is equal to 1 if $i$ belongs to regime $r$ (viz.: $i$ belongs to the age group $a$), and 0 otherwise. So the odd-ratio of being in poverty for a person in regime $r$ and age group $a$ is: $O(r,a) \equiv \frac{P_i}{1-P_i} = e^{c+\alpha_r+\beta_a+\gamma_{ra}}$. An index of the relative disadvantage of group $a'$ with respect to group $a$ in regime $r$ is given by: $\frac{O(r,a')}{O(r,a)} = e^{\beta_{a'}+\gamma_{ra'}-\beta_a-\gamma_{ra}}$, and to compare the relative disadvantage of group $a'$ one can look at:

$$\frac{\frac{O(r,a')}{O(r,a)}}{\frac{O(r',a')}{O(r',a)}} = \frac{e^{\beta_{a'}+\gamma_{ra'}-\beta_a-\gamma_{ra}}}{e^{\beta_{a'}+\gamma_{r'a'}-\beta_a-\gamma_{r'a}}} = e^{\gamma_{ra'}-\gamma_{ra}-\gamma_{r'a'}+\gamma_{r'a}}$$

Notice that only the interaction terms matter.

**Table 11**

**Risk To Be Poor with Respect to Age and Welfare Regime**

| Poors | Coefficient | Standard Error | *t* | *P* > \| *t* \| | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| Age1 | 0.37548 | 0.02775 | 13.53 | 0.000 | 0.32109 | 0.42987 |
| Age3 | 0.46378 | 0.02312 | 20.06 | 0.000 | 0.41847 | 0.50910 |
| Corporatist | –0.42636 | 0.02322 | –18.36 | 0.000 | –0.47188 | –0.38085 |
| Liberal | –0.13760 | 0.02723 | –5.05 | 0.000 | –0.19097 | –0.08422 |
| Social-democratic | –0.61737 | 0.02786 | –22.16 | 0.000 | –0.67198 | –0.56277 |
| Post-communist | 0.0154 | 0.01728 | 0.89 | 0.372 | –0.01844 | 0.04930 |
| Age1 × Social-democratic | –0.22845 | 0.05369 | –4.25 | 0.000 | –0.33369 | –0.12321 |
| Age3 × Social-democratic | –0.44004 | 0.05643 | –7.80 | 0.000 | –0.55065 | –0.32943 |
| Age1 × Corporatist | –0.28172 | 0.04622 | –6.09 | 0.000 | –0.37232 | –0.19113 |
| Age3 × Corporatist | –0.19432 | 0.04438 | –4.38 | 0.000 | –0.28130 | –0.10733 |
| Age1 × Liberal | 0.134318 | 0.05029 | 2.67 | 0.008 | 0.03576 | 0.23288 |
| Age3 × Liberal | 0.166917 | 0.04980 | 3.35 | 0.001 | 0.06931 | 0.26452 |
| Age1 × Post-communist | 0.04586 | 0.03553 | 1.29 | 0.197 | –0.02377 | 0.11550 |
| Age3 × Post-communist | –1.15478 | 0.03865 | –29.88 | 0.000 | –1.23053 | –1.07903 |
| Constant | –1.62457 | 0.01304 | –124.57 | 0.000 | –1.65013 | –1.59901 |

Logistic regression. Number of observations = 534,997. Wald $\chi^2$ (14) = 3,797.31. Prob.> $\chi^2$ = 0.0000.

Log pseudo-likelihood =-224,126.6. Pseudo $R^2$ = 0.0162.

If one takes a further step and distinguishes, inside the working age population, different working conditions, other interesting results emerge. It turns out that younger pensioners (*i.e.*, less than 65-years-old) are better off than the elderly in the south, they are equally well off in the social-democratic regime, and they are worse off in the remaining regimes (Table 12). This might be due to the generous early retirement schemes which characterize several of those countries (e.g., France, Germany and Italy).

Age seems to matter for poverty gaps as well, but the direction is opposite. For all groups of countries analysed in the paper poverty gaps have an hump-shaped curve if plotted against age classes. Middle-age individuals, if poor, are poorer than the other individuals.

**Table 12**

**Risk To Be Poor with Respect to Age, Occupational Status and Welfare Regime**

| Poors | Coefficient | Standard Error | *t* | *P* > \| *t* \| | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| Age1 | 0.8881 | 0.0319 | 27.85 | 0.000 | 0.8256 | 0.9506 |
| Age2 × unemployed | 1.4662 | 1.4662 | 34.04 | 0.000 | 1.3817 | 1.5506 |
| Age2 × retiree | 0.0649 | 0.0649 | 1.06 | 0.288 | –0.0549 | 0.1846 |
| Age2 × disabled | 1.2333 | 1.2333 | 13.52 | 0.000 | 1.0544 | 1.4121 |
| Age2 × non-occupied | 1.0698 | 1.0698 | 35.85 | 0.000 | 1.0113 | 1.1283 |
| Age3 | 0.9764 | 0.9764 | 34.94 | 0.000 | 0.9216 | 1.0311 |
| | | | | | | |
| Corporatist (C) | –0.5031 | –0.5031 | –13.67 | 0.000 | –0.5752 | –0.4310 |
| Liberal (L) | –0.5749 | –0.5749 | –12.08 | 0.000 | –0.6683 | –0.4816 |
| Social-democratic (SD) | –0.6619 | –0.6619 | –15.75 | 0.000 | –0.7443 | –0.5795 |
| Post-communist (PC) | 0.0176 | 0.0176 | 0.65 | 0.519 | –0.0359 | 0.0712 |
| | | | | | | |
| Age1 × SD | –0.1839 | –0.1839 | –2.95 | 0.003 | –0.3059 | –0.0619 |
| Age2 × unemployed × SD | 0.3020 | 0.3020 | 2.96 | 0.003 | 0.10197 | 0.5021 |
| Age2 × retiree × SD | –0.3915 | –0.3915 | –2.24 | 0.025 | –0.7335 | –0.0494 |
| Age2 × disabled × SD | –0.5620 | –0.5620 | –3.97 | 0.000 | –0.8392 | –0.2849 |
| Age2 × non-occupied × | 0.3954 | 0.3954 | 6.33 | 0.000 | 0.2730 | 0.5178 |
| Age3 × SD | 0.3955 | –0.3955 | –6.12 | 0.000 | –0.5221 | –0.2688 |
| | | | | | | |
| Age1 × C | –0.2050 | –0.2050 | –3.77 | 0.000 | –0.3114 | –0.0985 |
| Age2 × unemployed × C | 0.5430 | 0.5430 | 7.56 | 0.000 | 0.4022 | 0.6838 |
| Age2 × retiree × C | 0.3231 | 0.3231 | 3.22 | 0.001 | 0.1262 | 0.5199 |
| Age2 × disabled × C | 0.4227 | 0.4227 | 3.36 | 0.001 | 0.1764 | 0.6691 |
| Age2 × non-occupied × C | 0.0443 | .04427 | 0.78 | 0.433 | –0.0664 | 0.1550 |
| Age3 × C | –0.1176 | –0.1176 | –2.23 | 0.026 | –0.2210 | –0.0141 |
| | | | | | | |
| Age1 × L | 0.5717 | 0.5717 | 8.98 | 0.000 | 0.4469 | 0.6964 |
| Age2 × unemployed × L | 1.4155 | 1.4155 | 11.74 | 0.000 | 1.1792 | 1.6518 |
| Age2 × retiree × L | 1.4336 | 1.4336 | 12.64 | 0.000 | 1.2112 | 1.6560 |
| Age2 × disabled × L | 0.8814 | 0.8814 | 6.81 | 0.000 | 0.6279 | 1.1350 |
| Age2 × non-occupied × L | 0.6043 | 0.6043 | 9.21 | 0.000 | 0.4756 | 0.7329 |
| Age3 × L | 0.6043 | 0.6043 | 9.55 | 0.000 | 0.4802 | 0.7283 |
| | | | | | | |
| Age1 × PC | 0.0437 | 0.0437 | 1.06 | 0.291 | –0.0374 | 0.1247 |
| Age2 × unemployed × PC | 0.3535 | 0.3535 | 6.49 | 0.000 | 0.24668 | 0.4606 |
| Age2 × retiree × PC | –0.3926 | –0.3926 | –4.95 | 0.000 | –0.5482 | –0.2370 |
| Age2 × disabled × PC | –0.3130 | –0.3130 | –3.08 | 0.002 | –0.5123 | –0.1136 |
| Age2 × non-occupied × | –0.1540 | –0.1540 | –3.69 | 0.000 | –0.2358 | –0.0722 |
| Age3 × PC | –1.1570 | –1.1570 | –26.26 | 0.000 | –1.2433 | –1.0701 |
| | | | | | | |
| Constant | –2.1371 | –2.1372 | –104.71 | 0.000 | –2.1772 | –2.0972 |

Logistic regression. Number of observations = 534,997. Wald $\chi^2$ (34) =12,501.54. Prob.> $\chi^2$ = 0.0000.

Log pseudo-likelihood = –213,392.62. Pseudo $R^2$ = 0.0633.

## 5 Public policies and the age-profile of poverty

In the previous chapter, we documented that poverty and its age-profile differ markedly across welfare regimes. Our next step is to show that social policies have a major role in shaping these differences.

### *5.1 Measuring the anti-poverty effectiveness of expenditures*

The amount of transfers received by each family can be computed using EU-SILC data (Table 13). Reassuringly, there is a very high correlation (above 80 per cent) between social expenditure as taken from our micro-data, and the amount of social expenditures recorded in the national accounts by Eurostat (Table 14).

The amount of transfers can be used to compute some straightforward measure of the anti-poverty effectiveness of public policies. In particular, one can compare actual poverty with poverty computed in absence of government transfers (Tables 15 and Figure 4). It appears that anti-poverty effectiveness, defined as the ratio between the two (so that a higher value of the index means lower effectiveness), varies significantly across countries (Table 16).[16] The index is 58 per cent in Cyprus, while it is below 25 per cent in Netherlands, Norway, Finland and Denmark.

Anti-poverty effectiveness of public spending is highest in Social-democratic and Corporatist countries: the above mentioned index takes values, respectively, equal to 27 and 34 per cent, while effectiveness is much lower in Liberal and Southern welfare states (in both cases, the index is around 50 per cent).

Anti-poverty effectiveness can be also calculated for population subgroups. As with overall effectiveness, we find big differences. For example, in the case of children, poverty after transfers is just 22 per cent of poverty pre-transfer in the case of Finland, while it is still 87 per cent in the case of Greece. Concerning the elderly, the maximum reduction in poverty is achieved in the Czech Republic: post-transfers poverty is just 4.2 per cent of pre-transfer poverty; the minimum reduction is in Cyprus, where the index is equal to 57 per cent.

Across regimes, differences in the age-profile of poverty before social transfers are quite small (Figure 4). For example, while the post-transfer poverty rate of children in the liberal regime is on average twice that in the Social-democratic regime, the pre-transfer poverty rates are respectively equal to 28.4 and 27.7 per cent (Table 5). For the elderly, pre-transfers poverty rate are very high (above 80 per cent) in all regimes.

Therefore, most of the cross-regimes differences in the actual age-profile of poverty are attributable to differences in effectiveness. Social-democratic states are the most effective in reducing both child and old age poverty (with an index of 37 and 12 per cent respectively), while the Southern countries are the less effective (the index is equal to 79 and 35 per cent respectively).

As a more formal way to capture the link between public transfers and (the age-profile of) poverty, we run a logistic regression in which the individual probability to exit the poverty status thanks to government transfers is related to the age class and the welfare regime of the individual's country, also allowing for regime-age interaction terms. There are two main results (Tables 18 and 19):

- with respect to the other groups of the population, children have the highest probability to exit poverty in Social-democratic countries and the lowest in the Southern ones, while their probability to be in poverty before transfers is the same of that of the working age population in both groups of countries;

[16] The percentage reduction in the poverty rate has been used, among others, by Moller *et al.* (2003).

**Table 13**

**Social Transfers in EU-SILC**

| Countries | **Social Transfers** *(percentage of national disposable income)* | **Average Social Transfers by Family Type** *(euros per equivalent household members)* | | | | |
|---|---|---|---|---|---|---|
| | | **Families with Children** | **Families with Working-age Adults** | **Families with Elderly** | **Young/ Working Age** | **Old/ Working Age** |
| Austria | 10.33 | 835 | 3,662 | 14,755 | 0.23 | 4.03 |
| Belgium | 10.68 | 2,867 | 4,092 | 12,027 | 0.70 | 2.94 |
| Cyprus | 4.72 | 377 | 2,185 | 8,011 | 0.17 | 3.67 |
| Czech Republic | 8.45 | 375 | 922 | 3,435 | 0.41 | 3.73 |
| Germany | 13.12 | 1,099 | 3,292 | 14,541 | 0.33 | 4.42 |
| Denmark | 15.64 | 4,670 | 6,271 | 22,833 | 0.74 | 3.64 |
| Estonia | 6.32 | 137 | 387 | 2,080 | 0.35 | 5.37 |
| Spain | 7.14 | 532 | 1,657 | 6,815 | 0.32 | 4.11 |
| Finland | 13.34 | 3,802 | 4,710 | 16,259 | 0.81 | 3.45 |
| France | 12.12 | 1,281 | 4,175 | 15,550 | 0.31 | 3.72 |
| Greece | 8.05 | 284 | 1,870 | 6,278 | 0.15 | 3.36 |
| Hungary | 11.05 | 850 | 1,013 | 3,182 | 0.84 | 3.14 |
| Ireland | 5.24 | 1,591 | 3,335 | 11,538 | 0.48 | 3.46 |
| Iceland | 5.71 | 3,765 | 2,918 | 19,362 | 1.29 | 6.64 |
| Italy | 10.28 | 638 | 3,176 | 10,842 | 0.20 | 3.41 |
| Lithuania | 7.47 | 320 | 386 | 1,618 | 0.83 | 4.19 |
| Luxembourg | 7.94 | 962 | 4,758 | 25,019 | 0.20 | 5.26 |
| Latvia | 5.65 | 155 | 302 | 1,332 | 0.51 | 4.41 |
| Netherlands | 13.70 | 2,174 | 5,179 | 19,685 | 0.42 | 3.80 |
| Norway | 12.40 | 6,142 | 6,744 | 24,355 | 0.91 | 3.61 |
| Poland | 9.61 | 289 | 926 | 2,890 | 0.31 | 3.12 |
| Portugal | 8.45 | 504 | 1,829 | 5,691 | 0.28 | 3.11 |
| Sweden | 10.88 | 1,954 | 3,412 | 13,696 | 0.57 | 4.01 |
| Slovenia | 8.12 | 571 | 2,047 | 5,986 | 0.28 | 2.92 |
| Slovakia | 8.80 | 537 | 811 | 2,687 | 0.66 | 3.31 |
| United Kingdom | 7.93 | 1,660 | 2,857 | 13,959 | 0.58 | 4.89 |
| Min | | 137 | 302 | 1,332 | 0.2 | 2.9 |
| Max | | 6,142 | 6,744 | 25,019 | 1.3 | 6.6 |
| All country average | | 1,476 | 2,804 | 10,939 | 0.5 | 3.9 |

**Table 14**

## Public Expenditure from National Accounts

| Countries | Total Government Expenditure *(percent of GDP)* | Health | Education | Social Protection | | | | | | Other Non-age-specific Expenditure |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Sickness and Disability Benefits | Old-age Benefits | Survivors Benefits | Family Allowances | Unemployment Benefits | Housing Allowances | |
| AT | 49.4 | 7.5 | 5.2 | 1.9 | 12.0 | 1.6 | 2.4 | 1.3 | 0.0 | 17.4 |
| BE | | | | | | | | | | |
| CY | 43.4 | 3.1 | 7.2 | 0.2 | 4.4 | 0.1 | 1.9 | 0.8 | 0.1 | 25.6 |
| CZ | 43.8 | 7.2 | 4.9 | 2.8 | 6.6 | 0.7 | 1.5 | 0.3 | 0.1 | 19.7 |
| DE | 45.3 | 6.3 | 4.0 | 2.6 | 9.7 | 2.1 | 2.2 | 2.7 | 0.1 | 15.8 |
| DK | 51.6 | 7.1 | 7.7 | 4.8 | 7.6 | 0.0 | 5.0 | 2.6 | 0.7 | 16.1 |
| EE | 34.2 | 4.3 | 6.2 | 1.8 | 5.5 | 0.1 | 1.6 | 0.3 | 0.0 | 14.4 |
| ES | 38.5 | 5.7 | 4.3 | 2.1 | 6.2 | 1.9 | 0.5 | 1.6 | 0.1 | 16.2 |
| FI | 48.7 | 6.8 | 6.0 | 4.3 | 8.9 | 0.7 | 2.6 | 2.3 | 0.3 | 16.8 |
| FR | | | | | | | | | | |
| GR | 42.2 | 5.0 | 2.9 | 1.8 | 12.2 | 1.3 | 0.6 | 0.4 | 0.1 | 17.9 |
| HU | 51.9 | 5.6 | 5.8 | 3.8 | 6.5 | 1.2 | 2.4 | 0.5 | 1.1 | 25.1 |
| IE | 34.1 | 7.8 | 4.3 | 1.8 | 2.7 | 0.9 | 2.1 | 0.9 | 0.6 | 12.9 |
| IS | | | | | | | | | | |
| IT | 49.9 | 7.0 | 4.5 | 1.7 | 12.2 | 2.6 | 1.0 | 0.5 | 0.0 | 20.3 |
| LT | 33.6 | 4.6 | 5.4 | 2.4 | 4.7 | 0.4 | 1.0 | 0.4 | 0.1 | 14.7 |
| LU | | | | | | | | | | |
| LV | | | | | | | | | | |
| MT | 43.6 | 6.4 | 5.6 | 1.9 | 7.4 | 1.9 | 1.1 | 0.6 | 0.2 | 18.5 |
| NL | | | | | | | | | | |
| NO | 40.5 | 6.9 | 5.4 | 5.8 | 4.9 | 0.3 | 3.1 | 0.4 | 0.1 | 13.6 |
| PL | 43.8 | 4.6 | 6.0 | 2.5 | 9.9 | 1.8 | 1.2 | 1.0 | 0.1 | 16.7 |
| PT | 46.3 | 7.1 | 7.1 | 1.6 | 9.5 | 1.6 | 1.1 | 1.2 | 0.0 | 17.0 |
| SE | 54.1 | 6.8 | 7.0 | 5.7 | 10.6 | 0.5 | 2.6 | 2.0 | 0.4 | 18.5 |
| SI | 44.5 | 6.0 | 6.3 | 2.7 | 10.2 | 0.3 | 1.9 | 0.7 | 0.0 | 16.4 |
| SK | | | | | | | | | | |
| UK | 44.2 | 7.2 | 6.1 | 2.7 | 7.3 | 0.1 | 2.7 | 0.3 | 1.1 | 16.7 |
| Simple average | 43.4 | 6.1 | 5.3 | 2.7 | 7.4 | 1.0 | 1.9 | 1.0 | 0.2 | 17.7 |

Source: Calculations based on Eurostat data. Data refer to 2006 except for Ireland (2005). The item "Other Non-age-specific Expenditure" includes general public services, defense, public order, economic affairs, environment protection, housing and community amenities, recreation culture and religion, other non attributable social protection.

**Table 15**

**Poverty Rates by Age in Absence of Social Transfers**

| Countries | 0-15 | 16-64 | 65+ | Total |
|---|---|---|---|---|
| Austria | 21.3 | 26.1 | 87.2 | 35.5 |
| Belgium | 26.6 | 29.3 | 90.3 | 40.0 |
| Cyprus | 11.9 | 17.0 | 84.0 | 24.1 |
| Czech Republic | 21.9 | 24.7 | 88.2 | 33.2 |
| Germany | 21.2 | 29.8 | 94.7 | 40.8 |
| Denmark | 27.8 | 31.2 | 95.4 | 40.5 |
| Estonia | 21.1 | 21.8 | 79.8 | 31.5 |
| Spain | 29.0 | 29.7 | 83.0 | 38.5 |
| Finland | 30.2 | 31.9 | 93.8 | 41.6 |
| France | 19.8 | 28.8 | 95.6 | 38.3 |
| Greece | 24.5 | 30.8 | 80.8 | 39.3 |
| Hungary | 47.4 | 39.3 | 86.8 | 48.0 |
| Ireland | 25.8 | 24.1 | 83.7 | 31.2 |
| Iceland | 25.0 | 18.0 | 79.7 | 25.7 |
| Italy | 27.5 | 30.5 | 82.2 | 40.6 |
| Lithuania | 32.0 | 29.1 | 83.2 | 38.2 |
| Luxembourg | 23.6 | 25.9 | 88.6 | 34.1 |
| Latvia | 29.1 | 28.1 | 74.4 | 35.8 |
| Netherlands | 27.9 | 29.4 | 96.2 | 38.6 |
| Norway | 30.7 | 30.1 | 93.8 | 39.9 |
| Poland | 38.8 | 42.0 | 87.1 | 47.6 |
| Portugal | 24.9 | 28.6 | 81.5 | 37.3 |
| Sweden | 24.6 | 25.7 | 90.6 | 36.1 |
| Slovenia | 18.5 | 26.7 | 80.7 | 34.0 |
| Slovakia | 32.3 | 29.4 | 88.4 | 37.7 |
| United Kingdom | 30.9 | 24.9 | 91.1 | 36.3 |
| Min | 11.9 | 17.0 | 74.4 | 24.1 |
| Max | 47.4 | 42.0 | 96.2 | 48.0 |
| EU average | | | | |
| All countries average | 26.7 | 28.2 | 87.0 | 37.1 |

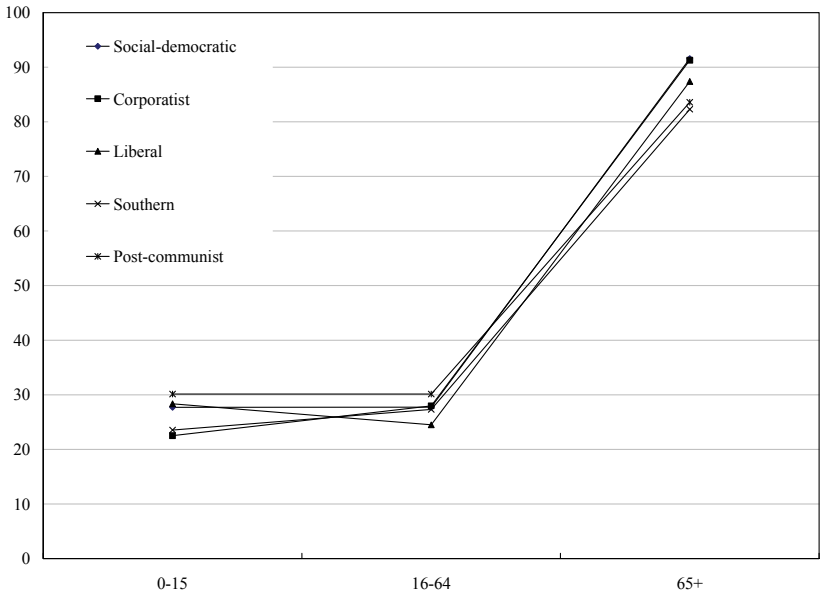
**Table 16**

**Anti-poverty Effects of Transfers**
*(post-transfer poverty as a fraction of pre-transfer poverty)*

| Countries | Total | 0-15 | 16-64 | 65+ |
|---|---|---|---|---|
| Austria | 0.35 | 0.69 | 0.42 | 0.18 |
| Belgium | 0.31 | 0.47 | 0.36 | 0.22 |
| Cyprus | 0.58 | 0.74 | 0.56 | 0.57 |
| Czech Republic | 0.25 | 0.66 | 0.32 | 0.04 |
| Germany | 0.30 | 0.56 | 0.40 | 0.14 |
| Denmark | 0.22 | 0.26 | 0.30 | 0.10 |
| Estonia | 0.43 | 0.76 | 0.60 | 0.17 |
| Spain | 0.49 | 0.79 | 0.52 | 0.35 |
| Finland | 0.24 | 0.22 | 0.30 | 0.18 |
| France | 0.31 | 0.63 | 0.38 | 0.16 |
| Greece | 0.50 | 0.87 | 0.59 | 0.30 |
| Hungary | 0.32 | 0.51 | 0.37 | 0.10 |
| Ireland | 0.50 | 0.71 | 0.58 | 0.24 |
| Iceland | 0.36 | 0.47 | 0.46 | 0.12 |
| Italy | 0.46 | 0.84 | 0.57 | 0.25 |
| Lithuania | 0.45 | 0.66 | 0.57 | 0.18 |
| Luxembourg | 0.42 | 0.85 | 0.54 | 0.10 |
| Latvia | 0.53 | 0.75 | 0.62 | 0.30 |
| Netherlands | 0.25 | 0.48 | 0.31 | 0.06 |
| Norway | 0.24 | 0.24 | 0.31 | 0.16 |
| Poland | 0.43 | 0.71 | 0.50 | 0.10 |
| Portugal | 0.45 | 0.71 | 0.51 | 0.29 |
| Sweden | 0.31 | 0.53 | 0.43 | 0.11 |
| Slovenia | 0.30 | 0.55 | 0.32 | 0.21 |
| Slovakia | 0.27 | 0.44 | 0.33 | 0.08 |
| United Kingdom | 0.49 | 0.73 | 0.59 | 0.27 |
| Min | 0.22 | 0.22 | 0.30 | 0.04 |
| Max | 0.58 | 0.87 | 0.62 | 0.57 |
| All countries average | 0.38 | 0.61 | 0.45 | 0.19 |

**Figure 4**

**Poverty Rates by Age-class Pre-transfers**




- the elderly have the highest probability to exit poverty thanks to transfers (relative to that of the working age population) in Southern countries and the lowest in the Social-democratic ones, notwithstanding a higher pre-transfer poverty rate with respect to working age people in the first group of countries with respect to the second group.

The next natural step is to understand better why the age-profile of effectiveness differs so much across countries and regimes.To this aim, we investigate its two fundamental determinants: the age distribution and the degree of targeting of social transfers.

### *5.2 The age-bias of European welfare states: a new measure*

As already mentioned, our measure of poverty, as it is common to all the literature on this subject, assumes that all the resources of the individuals are shared with the other members of the household, so that all the members of the household have the same poverty status, determined by the level of the disposable (equivalized) household income. Therefore, old-age pensions might in principle benefit a child, if he lives with the pension recipient. So our first step to compare the age orientation of national social policies is to compute the average amount of transfers which in each country accrues, respectively, to families with children, to families with just working age components (*i.e.*, without children nor elderly) and to families with elderly components, in equivalized terms (in turns out that the number of families in which children and old people live together is negligible).[17] The distribution of transfers across family types is displayed in Table 13.

We propose a new index of pro-old bias of policies, defined as the ratio between the transfers accruing to families with elderly components and those accruing to families with working age people (both divided by the number of equivalent persons in the household). According to such measure, Social-democratic countries, Corporatist and Liberal countries are the more pro-elderly (with an index of about 4.0/4.2) and the Southern ones are the less pro-elderly (with an average index equal to 3.5).

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[17] We considered transfers gross of taxes. Only for the few countries for which this information was not available we used net amounts. This does not affect much our results, because generally transfers are not subject to taxes (as we could ascertain looking to those countries which report both figures).

**Table 17**

**Vertical Expenditure Efficiency**

| Countries | Families with Children | Families with Working-age Components | Families with Elderly | Total |
|---|---|---|---|---|
| Austria | 55.4 | 69.9 | 90.1 | 81.8 |
| Belgium | 46.9 | 69.6 | 90.8 | 76.7 |
| Cyprus | 40.1 | 41.2 | 79.3 | 64.1 |
| Czech Republic | 55.4 | 63.4 | 89.4 | 77.3 |
| Germany | 60.9 | 73.1 | 93.5 | 86.2 |
| Denmark | 57.1 | 76.4 | 96.9 | 83.7 |
| Estonia | 28.3 | 46.6 | 81.9 | 69.7 |
| Spain | 49.8 | 58.7 | 83.4 | 75.1 |
| Finland | 49.7 | 71.3 | 93.9 | 79.2 |
| France | 57.3 | 75.7 | 95.9 | 86.8 |
| Greece | 51.8 | 57.9 | 80.8 | 74.0 |
| Hungary | 59.3 | 65.3 | 87.1 | 75.4 |
| Ireland | 64.5 | 50.6 | 85.3 | 70.7 |
| Iceland | 43.1 | 45.4 | 90.0 | 65.9 |
| Italy | 37.6 | 52.4 | 81.5 | 72.1 |
| Lithuania | 44.9 | 54.1 | 85.5 | 70.2 |
| Luxembourg | 68.4 | 71.0 | 88.5 | 82.3 |
| Latria | 40.5 | 51.3 | 76.9 | 64.8 |
| Netherlands | 60.1 | 82.7 | 95.6 | 87.3 |
| Norway | 53.3 | 68.6 | 95.6 | 78.4 |
| Poland | 58.8 | 70.9 | 89.4 | 79.5 |
| Portugal | 53.9 | 53.4 | 84.1 | 72.4 |
| Sweden | 51.3 | 59.3 | 91.6 | 76.9 |
| Slovenia | 41.4 | 61.3 | 84.9 | 72.6 |
| Slovakia | 42.2 | 56.3 | 90.2 | 69.9 |
| United Kingdom | 83.4 | 57.6 | 89.8 | 80.8 |
| Min | 28.3 | 41.2 | 76.9 | 64.1 |
| Max | 83.4 | 82.7 | 96.9 | 87.3 |
| All countries average | 52.1 | 61.7 | 88.2 | 75.9 |

**Table 18**

## Probability To Get Out of Poverty with Respect to Age and Welfare Regime

| Poor | Coefficient | Standard Errors | *T* | *P* > \| *t* \| | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| Age1 | –3.2624 | 0.0466 | –70.04 | 0.000 | –3.3537 | –3.1711 |
| Age2 | –2.2007 | 0.0215 | –102.29 | 0.000 | –2.2429 | –2.1586 |
| Corporatist | 0.9773 | 0.0318 | 30.77 | 0.000 | 0.9150 | 1.0395 |
| Liberal | 0.3389 | 0.0374 | 9.07 | 0.000 | 0.2656 | 0.4121 |
| Social-democratic | 1.3377 | 0.0378 | 35.37 | 0.000 | 1.2636 | 1.4118 |
| Post-communist | 0.8992 | 0.0261 | 34.42 | 0.000 | 0.8480 | 0.9504 |
| Age1 × Social-democratic | –0.0200 | 0.0626 | –0.32 | 0.749 | –0.1427 | 0.1026 |
| Age2 × Social-democratic | –0.8909 | 0.0427 | –20.88 | 0.000 | –0.9745 | –0.8073 |
| Age1 × Corporatist | –0.4140 | 0.0666 | –6.22 | 0.000 | –0.5446 | –0.2835 |
| Age2× Corporatist | –0.7505 | 0.0378 | –19.88 | 0.000 | –0.8245 | –0.6765 |
| Age1 × Liberal | 0.1849 | 0.0777 | 2.38 | 0.017 | 0.0324 | 0.3373 |
| Age2 × Liberal | –0.6545 | 0.0479 | –13.67 | 0.000 | –0.7484 | –0.5607 |
| Age1 × Post-communist | 0.0859 | 0.0557 | 1.54 | 0.123 | –0.0233 | 0.1951 |
| Age2 × Post-communist | –0.4333 | 0.0311 | –13.92 | 0.000 | –0.4943 | –0.3723 |
| Constant | 0.3397 | 0.0167 | 20.31 | 0.000 | 0.3070 | 0.3725 |

Logistic regression. Number of observations = 534,997. Wald $\chi^2$ (14) = 50,987.54. Prob.> $\chi^2$ = 0.0000.

Log pseudo-likelihood = –230,934.65. Pseudo $R^2$ = 0.2156.

**Table 19**

## Probability of Being Poor before Transfers with Respect to Age and Welfare Regime

| Poors | Coefficient | Standard Errors | *t* | *P* > \| *t* \| | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| Age1 | –2.5093 | 0.0315 | –79.570 | 0.000 | –2.5711 | –2.4475 |
| Age2 | –2.3857 | 0.0244 | –97.790 | 0.000 | –2.4335 | –2.3379 |
| Corporatist | 1.0962 | 0.0459 | 23.890 | 0.000 | 1.0062 | 1.1861 |
| Liberal | 0.7469 | 0.0586 | 12.750 | 0.000 | 0.6321 | 0.8618 |
| Social-democratic | 1.2294 | 0.0488 | 25.200 | 0.000 | 1.1338 | 1.3251 |
| Post-communist | 0.3358 | 0.0331 | 10.150 | 0.000 | 0.2710 | 0.4007 |
| Age1 × Social-democratic | –1.2145 | 0.0582 | –20.880 | 0.000 | –1.3285 | –1.1006 |
| Age2 × Social-democratic | –1.2657 | 0.0516 | –24.530 | 0.000 | –1.3668 | –1.1646 |
| Age1 × Corporatist | –1.4456 | 0.0574 | –25.200 | 0.000 | –1.5581 | –1.3332 |
| Age2× Corporatist | –1.2032 | 0.0488 | –24.660 | 0.000 | –1.2988 | –1.1076 |
| Age1 × Liberal | –0.5930 | 0.0700 | –8.470 | 0.000 | –0.7303 | –0.4558 |
| Age2 × Liberal | –1.0029 | 0.0625 | –16.040 | 0.000 | –1.1255 | –0.8803 |
| Age1 × Post-communist | 0.0618 | 0.0433 | 1.430 | 0.154 | –0.0231 | 0.1468 |
| Age2 × Post-communist | –0.0370 | 0.0357 | –1.030 | 0.301 | –0.1070 | 0.0331 |
| Constant | 1.5344 | 0.0221 | 69.520 | 0.000 | 1.4912 | 1.5777 |

Logistic regression. Number of observations = 534,997. Wald $\chi^2$ (14) = 38,301.22. Prob.> $\chi^2$ = 0.0000.

Log pseudo-likelihood = –296,462.89. Pseudo $R^2$ = 0.1720.

Our index can be seen as a refined version of the one proposed by Lynch (2001 and 2006) based on national accounts data. First, as mentioned above, it takes the household as the unit of analysis, consistent with the literature on poverty and inequality. Second, it is more precise in estimating who gets what in the first place. For example Lynch assumes that all pension and survivors benefits are paid to elderly people, while a part of the benefits are actually paid to younger individuals. Symmetrically, unemployment benefits, which Lynch completely attributes to the working age group, can also be paid to elderly unemployed. Of course, even our refined index must be taken with caution. First, some important items which potentially show an age-related profile are not included in the index (this is the case of expenditure for health and education). Second, the revenue side of the budget is not taken into consideration.[18] One of the main reasons for the difference between the two indicators is the fact that a sizable share of pension benefits goes to people less than 65 years old.[19]

Shifting the focus from the elderly to the young, we compute an index of the pro-children bias of policies. It is defined as the ratio between the transfers accruing to families with children and those accruing to families with working age people (Table 13). Differences across countries are larger than those concerning the orientation towards the elderly. While in some countries the expenditure for families with children is less than 20 per cent of what is given to families with working age individuals, this ratio is above one in Iceland, close to one in Norway, and above 80 per cent in Finland, Hungary, and Lithuania. Concerning the different regimes, the ratio is highest in Social-democratic countries (0.8). and lowest in the Southern countries (0.2).

To sum up, Social-democratic and Southern countries appear to be polar cases: public spending in the former is the most pro-children and the most pro-elderly, while the opposite is true for Southern countries. The other regimes lie somewhere in between these two extremes.

### *5.3 The degree of targeting*

Differences in effectiveness might be due not only to the distribution of transfers but also to the design of the transfer system itself. For example, even in a country in which most of the transfers go to families with elderly people, there is the possibility that these resources are enjoyed mainly by families which are not poor to start with.

A widely used indicator of the anti-poverty *efficiency* of public expenditure (first introduced by Beckerman, 1979) is the so-called Vertical Expenditure Efficiency index (VEE).[20] It is defined as the percentage of transfers going to households which would have been poor without the transfers. This component of spending has a clear impact in the direction of reducing poverty, whereas money going to those who are not poor to start with does not change overall poverty indices.

In Table 17, we display the Vertical Expenditure Efficiency (VEE) for each country. Data show that in several countries VEEs are lower than 70 per cent (Cyprus, Latvia, Iceland, Lithuania, Estonia and Slovakia), whereas in others it exceeds 80 per cent (the United Kingdom, Austria, Luxembourg, Denmark, France, Netherlands and Germany). However, there is not much difference in expenditure efficiency across country groups, as in all of them there are very efficient and very inefficient countries. For example, while on average Social-democratic countries have the highest

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[18] The correlation between the elderly-to-non-elderly spending ratio computed by Lynch and the ratio between transfers going to families with elderly and transfers going to the rest of the families computed by us from EU-SILC data is positive (56 per cent). Lynch has data for only 15 EU countries. She considers average spending between 1985 and 2000.

[19] An analysis of the economic conditions of older retirees relative to younger retirees for the case of a Southern country (Italy) can be found in Franco *et al.* (2008).

[20] See also Mitchell (1991).

**Table 20**

**Determinants of the Age-poverty Profile**

| | **Anti-poverty Effectiveness Index for the Middle-aged – Anti-poverty Effectiveness Index for the Young** | | **Anti-poverty Effectiveness Index for the Middle-aged – Anti-poverty Effectiveness Index for the Old** | |
|---|---|---|---|---|
| Constant | –0.285 | *** | 0.204 | |
| | (–4.03) | | (0.63) | |
| Difference in VEE | –0.001 | | –0.002 | |
| | (–0.45) | | (–0.57) | |
| Pro-old Bias | | | 0.060 | ** |
| | | | (2.66) | |
| Pro-young bias | 0.317 | *** | | |
| | (6.47) | | | |
| $R^2$ | 0.65 | | 0.25 | |
| Observations | 26 | | 26 | |

average VEE, Iceland has the lowest score of all countries (64 per cent). While the Southern group has the lowest VEE, Portugal displays a very high score (82 per cent). Moreover, VEE is positively, not negatively related to the overall amount of transfers: it seems that smaller welfare states are not more, but less efficient than the bigger ones.

We also compute VEE indicators for the different kinds of families. There are no big differences across regimes in the targeting of the transfers going to families with old age components (in all cases efficiency is above 80 per cent). The same is true for transfers accruing to families with children, with the exception of Liberal countries in which efficiency is relatively higher (74 per cent).

Before concluding this section, in order to get a feeling of how far our measures of age-orientation go in explaining anti-poverty effectiveness, we run two simple cross-country OLS regressions (Table 20). In the first, we relate the difference in the effectiveness indices of the middle-aged and of the young to our pro-young bias index, controlling for differences in the degree of vertical efficiency. As expected, the coefficient of the pro-young bias index is positive and significant. In the second regression, the difference in the effectiveness indices of the middle-aged and of the old is regressed on our pro-old bias index, again controlling for differences in the degree of vertical efficiency between the two age groups. Again, the coefficient of the pro-old bias index is positive and significant.

## 6 Conclusions and policy implications

We have documented that sizeable differences exist across Europe with respect to the relative conditions of young and elderly citizens: in some countries (mainly belonging to the Southern European and Anglo-Saxon groups) their poverty rate is indeed much higher than that of the remaining part of the population.

We showed that these cross-country differences are largely due to differences in the effectiveness of national social policies in lifting children and elderly people out of poverty, whereas pre-transfer age-poverty profiles are rather similar across countries.

Finally, we have proposed new country-level measures of the age-orientation of social spending, and argued that they can be useful to explain why in some countries (mainly belonging to the Social-democratic and Corporatist groups) the transfer system is relatively more effective in lifting children and elderly people out of poverty.

Understanding the determinants of the age-orientation of welfare states is an obvious area for further research. Concerning this issue, economists emphasize the role of the lobbying power of the elderly, given their-single-mindedness (they do not care about the adverse labour market implications of large spending programs) and their reduced opportunity cost of lobbying (Mulligan and Sala-i-Martín, 1999).[21] Political scientists add that the elderly and the retirees are over-represented and over-influential inside powerful collective actors (e.g. trade unions), and that certain characteristics of the political system may further enhance their influence (for example, the "familist" ideology of some Christian democratic parties).

Of course, our results do not mechanically translate into a value judgement, or a ranking of European welfare states. As a matter of fact, we just investigate one particular dimension of social spending effectiveness – namely, the degree of protection against the risk of poverty – which is not the only, and not even the main goal of welfare systems. Moreover, as Esping-Andersen emphasizes, national systems differ in their ultimate targets, shaped as they are by country-specific historical forces and political struggles. So it would be wrong to look for a one-size-fits-all template, and for a common reform path.

On the other hand, our findings are potentially relevant from a policy point of view, in particular for Southern countries, where the age-poverty profile is pronouncedly V shaped. The evidence provided in our paper suggests that they have ample room for a reorientation of expenditures towards the more vulnerable age groups. Another implication of our results is that generous and expensive pension systems, such as those which are in place in some Southern countries, do not automatically translate into low poverty levels for the elderly. Indeed, due to the rules of the system, a sizable fraction of pension expenditures might goto the richest part of the elderly population, and/or to working-age individuals.

As we remarked at the beginning, EU welfare states do face common challenges, due to common socio-economic changes (Esping-Andersen, 1999) and to adverse budgetary developments, mainly due to the looming population ageing. We believe that there is much to be learnt from one's neighbors. This also represents a test for European institutions and in particular for the OMC as a platform for mutual learning. If it succeeds, it might be also fruitfully applied to other policy areas, taking into account both EU-wide challenges and national peculiarities.

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[21] See also the survey papers by Mulligan and and Sala-i-Martín (2004a and 2004b) and Galasso and Profeta (2002). While most of the papers consider the political sustainability of pensions and, more generally, transfers from the workers to the retirees, there is a more recent literature which brings transfers to the youngest part of the population into the picture (e.g., Boldrin and Montes, 2005; Slavov, 2006).

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# SOME REFLECTIONS ON PENSION REFORMS IN INDIA

*Mallavarapu Ramaiah*[*]

*Pension policy in India has been characterized by the dominance of the orgainsed sector based on financing through employer and employee participation. As a result the coverage has been limited to the organised sector and the employees in the unorganized sector needs to be brought into purview of the formal channels of old age financial support. Further, the existing mandatory and voluntary private pension system needs uniform regulatory framework for transparency and improved service. There is an imperative need to manage the pension funds through fund managers as is the practice in some of the developed countries to derive the positive spin-offs in terms of investment options and making available the resources for improving growth. In view of the experience with the current pension system in India, efforts have been made by the Government in the recent years towards the direction of reforms in pension policy with the introduction of a new pension system in 2004. The present paper focuses on the recent initiatives and reforms in the pension system in India in the light of international experience as also the compulsions due to demographic factors and attendant implications for finances of the Government both Central and State Governments. The policy initiatives include setting up of the Interim Pension Fund Regulatory and Development Authority (October 2003), introduction of a New Pension System and introduction of the Pension Fund Regulatory and Development Authority (PFRDA) Bill in Parliament in March 2005. Against this backdrop the paper also highlights some of the policy challenges and imperatives to be addressed in the medium term.*

The pension reforms initiatives have emerged as one of the important tenets of public policy in the recent past, although these are yet to take off on account of the pending of the passage of the PFRDA Bill. The introduction of pension is an integral component of the refining the social security system in India. The paper is organised as follows. Section 1 briefly deals with the international experience with regard to pension reforms. Section 2 presents necessity of pension reforms in Indian context and also focuses on the demographic factors having bearing on pension reforms. It also presents the salient features of the New Pension System and its architecture. A brief description of the role of private sector in pension also discussed in this section. Section 3 deals with the recent policy initiatives including some of the issues flagged by the PFRDA based on the recommendations of the Expert Group on investment guidelines for pension in the informal sector released recently. Section 4 concludes with emerging challenges and policy issues.

## 1 Brief review of international experience on pension reform

Many countries are grappling with the problem of how to reshape their onerous, tax-financed pension schemes. Latin America, however, has been a laboratory for pension reform. Starting with Chile in 1981, several countries such as Peru, Argentina and Mexico embarked on pension reforms. The details have varied across the region but, overall, pension provision has shifted decisively to a privatised model. What can the rest of the world learn from Latin America? A study by Gill *et al.*, *Keeping the Promise of Social Security in Latin America*, from the World Bank, presented a

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comprehensive analysis of the Latin American experiment. The World Bank set out a model of pension reform based on three "pillars": first, a tax-financed public safety-net; second, compulsory saving by workers, generally into individual pension accounts; and third, voluntary saving for retirement. The study found that main success of Latin American pension reform aimed at improving the governments' finances. The reform also galvanised the development of capital markets and helped to modernise the financial system, both by improving the quality of regulation and by generating services such as risk-rating.

According to the World Bank report, *Old-Age Income Support in the 21st Century*, most pension systems in the world "do not deliver on their social objectives, they contribute to significant distortions in the operation of market economies, and they are not financially sustainable when faced with an ageing population". Pension reform must take account of workers in the informal economy, who often make up more than half the labour force in developing countries. And it must also cater for people who will be poor throughout their lives.

Chile has been considered to be model country for implementation of pension reforms. Its pension system is based on obligatory individual accounts and private administration. In Chile, the debate has focused on the people who remain outside the system – a problem that the Chilean government says it would fix broadening Social Security coverage. Overall, the consensus is that the system of pension fund administrators has more strengths than weaknesses. That explains why, from Central and South America to Eastern Europe, the Chilean system has served as the inspiration for 17 countries that have decided to get rid of their underfinanced systems of distribution. The main attraction of the Chilean pension system was that it was created at the beginning of the 1980s as the successor to the old state-run system, which went bankrupt. A second factor was that the Chilean reform included the concept of individual capital accounts. "This feature appeals to many people who believe that governments are often unable to maintain sufficient assets to finance a retirement system." Individual accounts can be better protected against political risks. Its system incorporates a "security network" in the form of minimum pensions and old-age benefits guaranteed by the government (Olivia Mitchel).

According to a study by the AFP Association (which comprises Chile's seven private-sector pension administrators), the first foundation of the Chilean model is the country's government. In its subsidiary role, the government finances a portion of the minimum pensions and all of the public-assistance pensions provided for the aged poor. The second foundation consists of the private-sector pension administrators who administer the obligatory Social Security savings. They help to relieve the burden on the government. The third pillar is Chile's workforce, which voluntarily saves, either to increase its pensions or in order to take early retirement. The mechanism for doing this is called "voluntary provisional savings".

Individual accounts permit the establishment of a direct link between those contributions that people make to the system and the benefits they derive from it. This creates incentives for people to assume responsibility for their own pensions and can lead to a range of positive results for savings, the development of capital markets, and higher worker productivity. These factors, in turn, stimulate economic growth. Its impact on economic growth is a key "virtue" of the Chilean model.

According to the OECD report, *Pensions at a Glance: Asia/Pacific, a Joint OECD/World Bank Report*, many Asian countries would need to reform their pension systems in order to deliver sustainable and adequate retirement incomes for today's workers. In order to prepare for the rapid population ageing forecast over the next two decades, it is vital to act now to avoid future problems and repeating many of the mistakes made in Europe and North America. The report analyses the retirement income systems of 18 Asian countries, including Australia, China, India, Indonesia, Pakistan, the Philippines and Vietnam. It says that reform is needed because:

- coverage of formal pension systems is relatively low;

- withdrawal of savings before retirement is very common;
- pension savings are often taken as lump sums and often do not provide people with adequate income over their lifetime;
- pensions payments are not automatically adjusted to reflect changes in the cost of living.

In order to improve the pension systems in Asia Pacific region including India, the pension report by OECD relating to this region makes three key recommendations: Asian countries with defined-benefit schemes based on workers' final salaries should shift to calculating pension entitlements using lifetime average earnings, as most OECD countries do. This would make them more financially sustainable and fairer; final salary plans tend to favour the higher paid whose earnings tend to rise more rapidly with age compared to lower paid manual workers; and many countries allow people to withdraw their pension benefits before retirement or pay lump-sum benefits, rather than a regular retirement income. Allowing people to take out their savings only on retirement *via* regular payments, known as annuities, would reduce the risk of people's savings running out in retirement.

In OECD countries, an average of 70 per cent of the working-age population is eligible for a pension. However in South Asia, just 7.5 per cent of the working-age population are eligible and in East Asia 18 per cent. Furthermore, few countries in Asia/Pacific have social pensions to provide safety-net retirement incomes for people who are not members of formal schemes. Only in India are social pensions significant, with around 10 to 15 per cent of older people covered.

## 2 Demography and importance of pension reforms in India

Nearly one eighth of the world's elderly population lives in India. The vast majority of the population is not covered by any formal pension scheme. Instead they are dependent on their own earning and transfer from their children. Pension policy in India has traditionally been based on financing through employer and employee participation. As a result, the coverage has been restricted to organised sector and vast majority of the workforce in the unorganised sector has been denied access to formal channels of old age financial support. Only about 12 per cent of the working population in India is covered by some from of retirement benefit scheme. Besides the problem of limited coverage, the existing mandatory and voluntary private pension system is characterized by limitations like fragmented regulatory framework, lack of individual choice and portability and lack of uniform standards. High incidence of administrative cost and low real rate of returns characterize the existing system, which has become unsustainable. Non-sustainability of the existing pension system would be accentuated by the sharp increase in the financial burden on the Government and other employers on account of pension liabilities. The working age population is likely to increase in the next two decades at a brisk pace, thereby pension reform is vital to provide support at the old age without having any adverse effect on finances of the Government (Table 1).

The total pension liability on account of the Central Government employees has increased from 6 per cent of its revenue receipts in 1990-91 to 11 per cent in 2000-01, sharp rise possibly reflecting the impact of Fifth Pay Commission, before falling to 5.8 per cent in 2008-09 (budget estimates). In respect of State Governments, the same ratio has increased from 5.4 per cent in 1990-91 to 11.3 per cent in 2001-02 before sliding to 8.7 per cent in 2008-09 (budget estimates) (Table 2). There is an imperative to need reduce the burden on the Governments in view of the likely rise in these payments in future.

India is one of the youngest country in the World today with an average age being only 26 years. The dependency ratio in India is also one of the lowest in the World. However, old-dependency ratio during 2000-25 is estimated to increase almost 1.5 times (8.1 in 2000 to 12.2 in 2025); the next 25 years is likely to witness a sharper increase of around 2 times (from

**Table 1**

**India's Labor Force and Demographic Indicators**

| | Indicator | | Time Period |
|---|---|---|---|
| 1 | Life expectancy at birth *(years)* | | 2000-05 |
| | Male | 63.2 | |
| | Female | 64.6 | |
| 2 | Life expectancy at age 60 *(years)* | | 2001 |
| | Male | 15.7 | |
| | Female | 17.1 | |
| 3 | Total fertility rate (No. of children) | 2.85 | 2001 |
| 4 | Population *(millions)* | 1028 | 2001 |
| | Females *(millions)* | 496 | |
| | Males *(millions)* | 532 | |
| | Sex Ratio *(females per thousand males)* | 933 | |
| 5 | Population above age 65 *(millions)* | 46.6 | 2000 |
| | | 129.3 | 2030 |
| | *Old Age Dependency Ratio (percent)* | 11.9 | 2001 |
| 6 | Total workforce *(millions)* | 424.6 | 2001 |
| | Urban workforce *(millions)* | 97.7 | |
| | Rural Workforce *(millions)* | 326.9 | |
| 7 | Working age population *(millions)* | | |
| | | 619.7 | 2000 |
| | | 921.5 | 2025 |
| | | 1048.2 | 2050 |

Source: Asher and Vasudevan (2006).

12.2 in 2025 to 22.6 in 2050). The policy imperative under these circumstances is to a establish a strong and sustainable social security network in the country. At the same time India is growing old at a very fast rate and the population of people above 60 years of age, constitute 80 million in 2008 would double in the next 18 to 20 years. In order to reap the advantages implementation of pension reforms is vital. The coverage of old age constitute about 12 per cent of the total workforce in the formal social security system. The remaining 88 per cent do not have access to any formal scheme. New Pension Scheme is aimed at 88 per cent of the workforce.

The pension scheme in operation in India can be broadly divided into the Civil Services Pension schemes (12 million), Employees Provident Fund (40 million), Empoyees' Pension Scheme (28 million), Special Provident Funds (2.1 million) and New Pension Scheme (0.3 million). The Civil Servants' Pension (CSP) is a traditional defined benefit scheme which runs on the basis of pay-as-you-go system, for employees of Central Government who were

**Table 2**

**Pension Payments**
*(billion rupees)*

| Year | States | *as percent of revenue receipts* | Centre | *as percent of revenue receipts* |
|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** |
| 1990-91 | 35.93 | 5.4 | 32.72 | 6.0 |
| 1991-92 | 37.16 | 4.6 | 37.48 | 5.7 |
| 1992-93 | 43.79 | 4.8 | 45.85 | 6.2 |
| 1993-94 | 51.07 | 4.9 | 52.06 | 6.9 |
| 1994-95 | 61.46 | 5.1 | 57.34 | 6.3 |
| 1995-96 | 78.13 | 5.8 | 69.28 | 6.3 |
| 1996-97 | 98.27 | 6.5 | 82.52 | 6.5 |
| 1997-98 | 115.99 | 7.0 | 113.76 | 8.5 |
| 1998-99 | 161.66 | 9.4 | 153.46 | 10.3 |
| 1999-00 | 226.79 | 11.2 | 194.46 | 10.7 |
| 2000-01 | 254.53 | 10.9 | 211.17 | 11.0 |
| 2001-02 | 282.19 | 11.3 | 218.26 | 10.8 |
| 2002-03 | 310.05 | 11.3 | 221.02 | 9.6 |
| 2003-04 | 330.24 | 10.7 | 236.29 | 9.0 |
| 2004-05 | 373.78 | 10.3 | 249.7 | 8.2 |
| 2005-06 | 406.48 | 9.4 | 271.96 | 7.8 |
| 2006-07 | 468.61 | 8.8 | 295.2 | 6.8 |
| 2007-08 RE | 560.02 | 8.9 | 324.44 | 6.2 |
| 2008-09 BE | 627.29 | 8.7 | 346.75 | 5.8 |

BE: Budget Estimates. RE: Revised Estimates.
Source: Union Budget documents, various issues, State Finances, *A Study of Budgets* and Swarup (2007).

recruited up to December 31, 2003 and employees of State Governments recruited up to the effective date mentioned in notifications issued by those Governments. CSP is an unfunded scheme and there has been no attempt at building up pension assets through contribution or any other provision.

### *2.1 New Pension System*

There was a marked shift in pension policy during the period 2000 to 2007 in India which culminated in introduction of new pension system. A High level Expert Group and Old Age Social

and Income Security (OASIS) project commissioned by the Government were two milestones on the road to pension reforms for the Government employees and the unorganised sector respectively. These efforts culminated in setting up of the Pension Fund Regulatory and Development Authority (PFRDA) in October 2003, introduction of New Pension System in January 2004 and introduction of PFRDA Bill in March 2005. In order to reduce the liability, the Central Government has introduced the defined contributory system for the new employees. Similar schemes have been undertaken by nineteen State Governments. The remaining State Governments are expected to opt the Defined Contribution (DC) based New Pension System (NPS). The NPS contributions of the employees of the Central Government and 19 State Governments would be transferred to these fund managers by the respective Governments in the beginning of 2009-10. The NPS has been implemented for Central Government employees (excluding defence personnel) recruited on or after April 1, 2004. The NPS is designed for scalability, outreach, fair play and low cost, and provides choices to individual. For such a system sound regulatory framework is an imperative. The NPS envisages individual retirement based accounts, with the worker empowered to exercise investment choice.

The salient features of the NPS are that it provides seamless portability across jobs and across locations, unlike all current pension plans, including that of the EPFO. It would provide hassle-free arrangement for the individual participants and a pure DC product with no defined benefit element, returns being totally market-related. NPS also provides various investment options and choices to individuals to switch over from one investment option to another or from one fund manager to another subject to certain regulatory restrictions. At present there shall be only two investment choices – investment of entire contribution in Government securities alone or adopting the investment guidelines applicable to non-government provident funds. The current government guidelines provide that up to 15 per cent can be invested in equities and the balance 85 per cent in fixed income instruments. After the passage of the PFRDA Bill by Parliament, the Regulator would provide more investment choices. NPS will have comparatively lower costs. Low costs will enhance pension wealth and bring in more customers. The main challenges are: providing safety and high returns; extending coverage to as many people as possible and to improve financial literacy levels. There is an imperative to make efforts to educate potential participants about benefits and advantages of saving for retirement. According to an estimate made by a FICCI-KPMG study the assets under management will be US$ 95 billion in less than 20 years. One important element which would greatly incentivise pension savings is the tax treatment given to it. At present, NPS is subject to the EET tax regime. On the other hand, Employees Provident Fund (EPF), General Provident Fund (GPF) and Public Provident Fund (PPF) have more favourable tax treatment. EEE benefit is available to them. This goes against the basic philosophy of encouraging contractual savings, which provide long-term funds for investment.

One issue which needs attention for making the new pension scheme equitable is the tax treatment. Pension savings in general and the NPS in particular is a very long term saving instrument having a time horizon of 30-35 years. Therefore, the treatment of this instrument from a tax perspective, if not the most preferential, should at least be at par with other medium or short term financial instruments. This is especially important at the nascent stage of the new pension system development. In this context, example of Public Provident Fund (PPF) and other such instruments are worth mentioning. PPF having a life cycle of 15 years is under an EEE (exempt-exempt-exempt) tax regime and is not taxed at any point whereas NPS being a 30-35 years instrument is taxed at exit. Therefore, subscribers to NPS are at a disadvantage compared to the PPF especially when seen in the context that NPS is a mandatory scheme whereas PPF is a voluntary scheme. The Government employees appointed before January 1, 2004 participate in the GPF scheme which is again an EEE tax regime whereas NPS is subject to EET regime and the withdrawable tier-II account of NPS (a substitute to GPF) is envisaged to get no preferential tax treatment. Further, a common ceiling for contributions of both the employees and Government

under the Income Tax Act, 1961 may be a disadvantage for the subscribers of NPS. Accordingly, a need is felt to treat all long term savings instruments equitably and provide the same tax treatment to NPS as being given to PPF and other similar schemes. The tax treatment merits a review so as to take care of the distortions across financial instruments and giving right fiscal incentives for the development of the pension sector. The main challenges in the development of this sector include: covering the unorganized sector; empowering the subscribers to take appropriate investment decisions based on their risk and return profile, provide safety and optimum returns, and to improve financial literacy levels.

### *2.2 NPS architecture*

The Pension Fund Regulatory and Development Authority (PFRDA) and National Securities Depository Limited (NSDL) entered into a formal agreement on November 26, 2007 relating to the setting up of a Central Recordkeeping Agency (CRA) for the New Pension System (NPS). The CRA is a first of its kind venture in India and is critical to the successful operationalisation of the NPS. The main functions and responsibilities of the CRA are: (i) Recordkeeping, Administration and customer service functions for all subscribers of the NPS; (ii) Issue of unique Permanent Retirement Account Number (PRAN) to each subscriber, maintaining a database of all PRANs issued and recording transactions relating to each subscriber's PRAN; (iii) Acting as an operational interface between PFRDA and other NPS intermediaries such as Pension Funds, Annuity Service Providers, Trustee Bank etc. An important feature of the PRAN to be issued by CRA is that it shall be portable across jobs and geographical locations.

The NPS architecture consisting of a Central Recordkeeping Agency (CRA) and competing pension fund managers along with the NPS trust, custodian, Trustee bank, Retirement Advisers and other players. Based on the systems prevalent in both developing and developed countries, PFRDA devised a system that meets Indian conditions and needs. PFRDA had attempted to design an architecture which is simple, cost effective and robust.

PFRDA has completed the process of putting in place the full NPS architecture. The selection of the Central Record Keeping Agency (CRA), Pension Fund Managers (PFMs) and Trustee Bank was made. State Bank of India (SBI), UTI Asset Management Company (UTI-AMC) and Life Insurance Corporation (LIC) have been appointed as Pension Fund sponsors under the NPS.

As these intermediaries were selected through a bidding process, the fees/charges are very competitive *vis-à-vis* the prevalent fee/charges in the mutual fund and insurance industry. A Custodian of NPS assets and an NPS Trust have also been appointed. Once the volumes increase, these costs can only move southwards. Low costs will enhance pension wealth and bring in more customers. Once the volumes increase, these costs can only move southwards. Low costs will enhance pension wealth and bring in more customers.

### *2.3 Private sector*

Three private sector groups – Reliance (ADAG), ICICI and Kotak Mahindra – were among the six bidders shortlisted by the Pension Fund Regulatory & Development Authority (PFRDA) for managing pension funds for citizens other than government employees. The other three are UTI, SBI and IDFC. As per the Government plan, the New Pension System for all citizens will be rolled out from April 1 2009. The six parties were shortlisted by PFRDA from more than a dozen participants in the competitive bidding. Under the NPS, fund managers, besides incurring the operating expenses, will have to pay PFRDA Rs 10 lakh a year as marketing expenses. There was aggressive bidding from private parties who feel that the corpus would be large as the scheme is

**Table 3**

**Investment Pattern of Pension Funds**

| Instrument | Revised Investment Pattern | Investment Pattern Dated January 2005 |
|---|---|---|
| Government securities and mutual funds dedicated to government securities, regulated by the Securities Exchange Board of India (SEBI) | up to 55% | minimum 40% |
| Debit securities (issued by corporate bodies, including banks and public financial institutions); term deposit receipts (issued by scheduled commercial banks) and rupee bonds | up to 40% | minimum 25% |
| Money market instruments, including units of money market mutual funds | up to 5% | previously not allowed |
| Equities | up to 15% | up to 5% |
| Equity-linked schemes of mutual funds regulated by the SEBI | up to 15% | up to 10% |

open to all. Analysts, however, think it may not be the case, going by the investor response to some of the existing pension schemes. Private sector entities were barred from bidding for the New Pension System for government employees launched last year. However, they were allowed to bid when it came to managing funds for citizens other than government employees. The NPS for the government employees is currently managed by three public sector institutions – LIC, SBI and UTI. Under the new NPS – which is a voluntary scheme – an individual can join any one of the funds and would have a permanent Retirement Account Number (PRAN). The records of subscribers are run by a central record keeping agency.

## 3 Recent policy initiatives

As a sign of increasing confidence in the expansion of private pension systems in India, the Ministry of Finance had increased the flexibility in the pattern of investment. This would be effective from 1 April 2009 for non-governmental provident funds, superannuation and gratuity funds. In line with the practice in many developing countries, there have always been significant restrictions on how these funds could be invested, with a considerable bias toward local investments and toward government securities. The latest revision to the investment pattern provides an avenue of investment options and will give more flexibility for investment management within the revised ceilings available for different categories of investment (Table 3).

Within the above instruments, it should be noted that investment in equities is limited to shares of companies for which derivatives are available on the Bombay Stock Exchange or the National Stock Exchange. However, this does cover more than 250 stocks, which would now be available. Concerning debt securities, these should have a duration of at least three years, and at least 75 per cent of investments need to be investment grade. Bonds denominated in Indian currency and issued by multilateral agencies such as the International Finance Corporation, a member of the World Bank Group or the Asian Development Bank must also have a maturity of at

least three years. The required duration for term deposit receipts has been changed from a maximum of three years to a minimum of one year. Overall, this is a significant extension of flexibility in creating a range of bond portfolios.

Apart from a specific limit on exposure to mutual funds, which is not to be more than 5 per cent of the portfolio at any time, there are some further significant relaxations around trading and the monitoring of the investment pattern. While the investment pattern must be in place at the end of each year, movement is allowed during the year provided that each category does not exceed the investment pattern limit by more than 10 per cent. Also, the entire portfolio can be treated as tradable and exposed to active management. Rather than the old limit of 10 per cent of the portfolio being tradable, the only limit now is that the overall turnover ratio (that is, the value of securities traded during the year divided by the average value of the portfolio during the year) should not be more than 2 per cent.

### *3.1 Investment guidelines for pension funds in informal sector*

PFRDA had constituted an Expert Group (Chairman: Shri Deepak Parekh) to recommend investment norms for the New Pension System for all citizens other than Government employees covered by NPS. The Report submitted by the Group to PFRDA on February 17, 2009. The recommendations of the Group have been considered by PFRDA. Comments/views of the public on the recommendations of the Expert Group and modifications proposed to be made in the investment norms by PFRDA are invited. The major recommendations of the Group and the modifications proposed to be carried are shown in Table 4. A set of questions raised for evaluation relate to administrative choices were made at PFRDA as features of NPS. These are: how frequently ought a contributor be allowed to change his investment allocation? What are the valuation guidelines to be adopted to calculate the NAV of the funds under management? How are the PFMs to be evaluated on their fund management performance? What would be the frequency of NAV disclosure to PFRDA and to the contributors? What is the action to be taken on evaluating their performance? How are the "auto choice" funds to be allocated for fund management? Also see Annex 1 for investment guidelines for pension funds in the informal sector submitted by the Expert Group to the PFRDA.

### *3.2 Valuation guidelines to calculate the NPS funds NAV*

Pension funds are invested for long-horizon, it is important that there is no ambiguity about the NAV or the assets that the funds are invested in. In addition, the NPS is a new pension system . In order to build the credibility of the system, it is even more important to have clarity on what the NAV is with as much accuracy as possible. Thus, it would be commendable to have the NAV at each PFM reported to the PFRDA on a daily basis. However, a problem with the NPS funds is that the three proposed asset classes "E" , "G" , "C" have very different characteristics in terms of their frequent valuation. "E", the index funds have an extremely high level of valuation accuracy – these are the most liquid stocks traded on electronic exchanges showing as accurate a price as possible from minute to the next. "G" contain some ambiguity in valuation (on the older Government of India bonds, which are hardly traded and thus , is very difficult to find a recent market price for). Both E and G are not problems when it comes to standardised valuation guidelines, as described above. The problem lies in valuing funds invested in "C": here, there is very little trading of these securities; most of them are bought in over the counter trades; and often are held to maturity.

**Table 4**

## Suggestions on Investment Pattern for NPS for All Citizens

| Schemes | Expert Group | PFRDA |
|---|---|---|
| **"E"** | 100% | 100% |
| **"G"** | 100% | 100% |
| **"C"** | 100% | 100% |
| **Auto Choice** (till 35 years of age) | | |
| **"E"** | 65% | 60% |
| **"G"** | 10% | 10% |
| **"C"** | 25% | 30% |
| **at age** | **60 Years** | **55 Years** |
| **"E"** | 10% | 0% |
| **"G"** | 80% | 80% |
| **"C"** | 10% | 20% |
| Asset Class/Scheme | Expert Group | PFRDA |
| **"E"** | Nifty 50 | Index Funds that replicate the portfolio of a particular index such as BSE Sensitive index, NSE 50 index, etc. These schemes invest in the securities in the same weightage comprising of an Index. |
| **"G"** | **Government of India bonds**<br>Liquid Funds of Asset Management Companies with following filters:<br>- AMCs are SEBI regulated, with Average total assets under management (AUM) for the most recent six-month period of, at least, Rs 5,000 crores.<br>- All assets that are permitted for investment into liquid funds by SEBI. Fixed Deposits of banks with following filters:<br>- Net worth of at least Rs 500 crores and a track record of profitability in the last three years,<br>- Capital adequacy ratio which is not less than 9% in the last three years,<br>- Net NPA of under 5% as a percentage of net advances in the last year,<br>- Be a participant in the RTGS system,<br>- The price-to-book ratio of the bank<br>Must exceed 1.25 | **Government of India bonds**<br>**State Government Bonds** |
| **"C"** | **Govt. bonds/Credit rated State Govt. bonds**<br>**Credit rated Public Financial Institutions/PSU bonds**<br>**Credit rated Municipal bonds/infrastructure bonds**<br>**Bonds of all firms (including PSU/PSE) that have shares listed on a stock exchange with nation-wide terminals,** and:<br>1 Have a market capitalisation of over Rs 5,000 crore (as on 31st March),<br>2 Which have been traded for at least three years,<br>3 Whose shares have an average trading frequency of at least 95% for a period of the last one year on the exchange,<br>4 Whose top management as well as the board of directors of the company have no legal/regulatory charges against them | **Liquid Funds of AMCs regulated by SEBI with filters suggested by the Expert Group**.<br>**Fixed Deposits of scheduled commercial banks with following filters:**<br>- Net worth of at least Rs 500 crores and a track record of profitability in the last three years,<br>- Capital adequacy ratio of not less than 9% in the last three years,<br>- Net NPA of under 5% as a percentage of net advances in the last year.<br>**Debt securities with maturity of not less than three years tenure issued by Bodies Corporate, including scheduled commercial banks and public financial institutions [as defined in Section 4 (A) of the Companies Act]**<br>Provided that at least 75% of the investment in this category is made in instruments having an investment grade rating from at least one credit rating agency.<br>**Other categories/requirements as recommended by the Expert Group** |

## 4 Emerging challenges and issues

There are certain policy issues which need to be addressed for the success of New Pension System. The voluntary nature of NPS along with poor financial literacy and attitude of households towards financial savings pose challenge to achieving optimum coverage of NPS. Designing an effective, efficient and accessible system, which caters to the heterogeneous workforce should be priority in the success of NPS in India (See Annex 2). According to ADB survey, there is transition from family support to self-support in retirement. Therefore corrective measures are essential at an appropriate time. A major challenge in the new pension system is to provide the individual subscriber with an adequate retirement income. Public sector pension schemes involve policy risk in as much as the Government of the day may not be able to accommodate required pension outlays leading to delays in pension payment. The DC system does involve capital-market risk during the accumulations phase when contributions and returns on investment build up in the fund.

NPS architecture for Government employees has already started functioning in terms of investment of NPS corpus and the CRA started functioning from June 1, 2008. The real challenge will be in seeing that the entire system functions smoothly. In this regard, issues relating to safety and high returns, extending coverage to as many people as possible would be important. It is only when the system is made available to all citizens that its full potential will be realized in terms of economies of scale and the subscribers will gain substantially in terms of even lower fees and charges and high returns. Pension savings would provide the much needed funds for infrastructure development. NPS would provide an opportunity to every citizen to save for retirement in a regulated environment and thus help in promoting inclusive growth. In order to address the issue of investment of pension contributions under NPS through a mechanism of consensus, a conference of Chief Ministers on pension reform was held in January 2007, which was chaired by the Prime Minister. Except three state governments, all were in favour of the guidelines applicable to non-government PF prescribed by the Ministry of Finance for investing accumulations under NPS.

India has the world's youngest and fastest growing working-age population. In contrast to the rise in the median age of population in the industrialised countries from early 30s to early 40s over the last two decades, the median age in India has increased from 20 in 1980 to 24 in 2005. According to the projections made by the United Nations, the median age in India would cross 30, only by 2025 and would remain around 35 till 2040. In 2020, the average Indian will be only 29 years old, compared with the average age of 37 years in China and the US, 45 in West Europe and 48 in Japan. The demographic process would create a large labour force. However, the window of opportunity provided by a relatively large and young workforce in India needs a conducive social policy environment for getting realised. Therefore, to reap the rewards of demographic dividend, public-policy has a critical role to play. The evolving demographic characteristics, in view of the coverage of pension to the mainly to organised sector efforts need to be made in bringing the unorganised sector into purview of pension system in the coming years.

## ANNEX 1
## INVESTMENT REGULATIONS FOR THE NEW PENSION SYSTEM FOR THE INFORMAL SECTOR

**What assets classes should be offered in NPS investment choices?**

Recommendation: The simpler structure of the "E", "G", "C" investment choices is easier to understand, provides clear choices to the contributors and lowers the cost to the contributor, the regulator as well as the CRA. Thus, the Group recommend that investment choices offered in NPS be the "E", "C" , "G" asset classes.

*Asset Class "E"*

Given the need for prudence and simplicity in the initial stages of NPS, the Group argue that equity participation be done through a standardised portfolio across all PFMs, implemented through an index fund only (Nifty index fund). This should be approach adopted in the first stage of the NPS implementation. This can be expanded to include a wider set of alternative index funds after the first five years of the NPS to allow more choices to the fund managers to deliver better returns. As regulatory experience with NPS increases and regulatory capacity expands, NPS equity funds may even include active management of equity portfolios. This should include more sophisticated products such as derivative portfolios, hedge funds, and international investments as the capacity of both the contributor and regulator expand to accommodate these.

*Asset Class "G"*

All investments into asset class G assets should be either in Central Government bonds or the securities/instruments listed as follows:

1) liquid funds of mutual fund companies funds, where the AMCs satisfy the criteria of: having AMCs that are regulated by SEBI, with, average total assets under management (AUM) for the recent six-month period of , at least, Rs 5,000 crore;
2) all assets that are permitted for investment into liquid assets by SEBI. If this channel is used, the fees and expenses of the liquid fund do not become an issue;
3) fixed deposits of certain specified banks, where the banks must satisfy the following criteria: net worth of at least Rs 500 crore and a track record of profitability in the last three years; CAR of not less than 9 per cent in the last three years; net NPA of under 5 per cent as percetange of advances in the last year; be a participant in the RTGS system; the price to book ratio of the Bank must exceed 1.25;
4) NPS funds invested by any PFM in a liquid fund or FD of a bank should be under 10 per cent of the total "G" funds held by the PFM.
5) the total NPS funds invested in any single asset management company ought to be under 5 per cent of the total AUM of the AMC;

Limits on funds invested in any single FD or liquid fund should not exceed 5 per cent of the total funds invested in asset class "G".

*Asset class "C"*

1) all State Government bonds that are explicitly guaranteed by the state government;

2) all State Government bonds that are rated by a rating agency. There is no restriction on an acceptable minimum credit quality – the choice of investment is left up to the PFM to decide;
3) all bonds/securities of: 1. public financial institutions as specified under Section 4 (A) of the Companies Act, and 2. public sector companies as defined in Section 2 (36-A) of the Income Tax Act, 1961; the principal whereof and whereon is fully and unconditionally guaranteed by the Central Government that have credit rating;
4) all municipal bodies/infrastructure funds bonds that are rated by a credit rating agency. There is no restriction on an acceptable minimum credit quality in the case of municipal bonds as well – investment choice is left up to the PFM to decide;
5) bonds be permitted for NPS investment of all firms (including PSU/PSE) that have shares listed on a stock exchange with nationwide terminals, and: 1) have market capitalization of over Rs 5,000 crore (as on 31st March); 2) which have been traded for at least three years; 3) whose shares have an average trading frequency of at least 95 per cent for a period of the last one year on the exchange; 4) whose top management as well as the board of directors of the company have no legal/regulatory charges against them.

The stock market-based filters for selection of corporate bonds for NPS "C" asset investment also implies that the stock market indicators can be used for valuation of the "C" assets. This will be an improvement in the current valuation framework that is based on credit rating downgrade since the stock market price can be a more real-time measure of credit quality compared to the credit rating.

- Besides, exposure to any single bond of an entity should not exceed more than 5 per cent of the total funds invested by the PFM in asset class "C".
- The total exposure to bonds by any single entity should not exceed more than 10 per cent of the total funds invested by the PFM in asset class "C".
- The total credit exposure of all the NPS funds invested in the debt of any permitted entity should be limited to a concentration of less than 5 per cent of the total debt of the company.

**Limits on an individual contribution in a specific asset class**

Recommendation: Contributors making an active choice of NPS investment 9Class A contributors) can choose how much they wish to invest in "E", "G" and "C" asset classes. The se contributors have no limits on what fraction of their investment can go into any of the asset choices. Class A contributors have to choose their PFM. As well. NPS contributors who do not actively choose their NPS investment (Class S contributors) are invested into the "auto choice" scheme. Class S contributors do not have to choose their PFM.

**The auto choice investment scheme**

Recommendation: The auto choice investment is made in the form of a life cycle fund. Here, the fraction of funds invested across "E", "G" "C" are determined by eth age of the contributor. In this scheme the maximum amount permitted for investment in the "E" asset class is proposed to be set at 65 per cent of the contributions. The maximum amount permitted for investment in the "C" asset class is proposed to be set at 25 per cent of the contributions. There will be the choice of "E" and "C" investment for any auto choice contributor whose age is under 35 years.

As the contributors grow older, the amount invested in "E" and "C" start being draw down automatically to reduce the amount of risk exposure in the contribution portfolio. This will also

automatically reduce the expected return to the contributors portfolio. The risk of the portfolio becomes the lowest when the person nears retirement at age 60. The lowest risk of the portfolio is proposed to be set for an 80 per cent investment in “G” , 10 per cent in “E” and 10 per cent in “C” assets.

**What are the valuation guidelines to calculate the NPS funds NAV?**

Recommendation: Since the “E” class has components that are actively traded on the exchange, valuing AUM invested in “E” is not a problem. However, PFMs must have a third party valuation of the AUM in “G” and “C” investments. Given the difficulty with valuation , the Group recommend that the “G” and “C” AUM should be valued and reported to the PFRDA quarterly.

**How frequently should the contributor be allowed to change investment choice, or PFM choice?**

Recommendation: Contributors have to hold their choice of investment and PFM constant for the period of a year during the initial stages of NPS.

**What is the framework to use for evaluating the performance of NPS PFMs?**

Recommendation: If more than 605 of the NPS AUM is in “E” assets, PFRDA might consider the tracking error of the AUM invested in index funds for the different PFMs as a relative measure of their performance. Since costs of fund management is strongly related to the AUM,, it is recommended that NPS starts with a small group of PFMs.

**How should the selection of the “auto choice” funds in PFM be done?**

Recommendation: The auto choice funds should be split equally among all PFMs who offer to manage these funds at the cost quoted by the lowest bid in the PFM auction.

## ANNEX 2
## APPOINTMENT OF POINTS OF PRESENCE AND SPONSORS OF PENSION FUNDS/PENSIONS FUNDS UNDER THE NEW PENSION SYSTEM FOR ALL CITIZENS OTHER THAN GOVERNMENT EMPLOYEES COVERED UNDER THE NPS

I. The following entities have been approved by PFRDA for appointment as Sponsor(s) of Pension Fund/Pension Fund under the New Pension System for all citizens other than Government employees covered under NPS:

1) ICICI Prudential Life Insurance Company Limited
2) IDFC Asset Management Asset Management Company Limited
3) Kotak Mahindra Asset Management Company Limited
4) Reliance Capital Asset Management Company Limited
5) SBI Pension Funds Limited
6) UTI Retirement Solutions Limited

II. The following entities have been approved by PFRDA for appointment as Points of Presence (POPs) under the New Pension System for all citizens other than Government employees covered under NPS:

1) Allahabad Bank
2) Axis Bank Limited
3) Bajaj Allianz General Insurance Co Limited
4) Central Bank of India
5) Citibank N.A.
6) Computer Age Management Services Private Limited
7) ICICI Bank Limited
8) IDBI Bank Limited
9) IL&FS Securities Services Limited
10) Kotak Mahindra Bank Limited
11) LIC of India
12) Oriental Bank of Commerce
13) Reliance Capital Limited
14) State Bank of Bikaner & Jaipur
15) State Bank of Hyderabad
16) State Bank of India
17) State Bank of Indore
18) State Bank of Mysore
19) State Bank of Patiala
20) State Bank of Travancore
21) The South Indian Bank Limited
22) Union Bank of India
23) UTI Asset Management Company Limited

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# MACROECONOMIC IMPLICATIONS OF PENSION REFORM OR HOW TO PAY FOR THE CRISIS

*Ray Barrell,[*] Ian Hurst[*] and Simon Kirby[*]*

*The national debt stocks of the Euro Area countries and the UK are rising sharply as a result of the economic crisis, and equilibrium output is falling, with the capital stock contracting. Both problems could be alleviated by the rapid introduction (but slow implementation) of a policy to extend working lives. The paper analyses a delayed extension of working lives in the Euro Area and the UK. A distinction is drawn between the impacts of these changes on output (GDP) and income (GNP) in open economies with capital mobility. Increasing working lives will in equilibrium raise consumption and tax revenues and reduce pension spending. These gains by the government can be used to improve services, cut taxes or pay off debts.*

## 1 Introduction

This paper looks at the effects of changes in retirement ages on tax rates and the national debt stock which is rising sharply as a result of the economic crisis. At the same time equilibrium output is falling because risk premia are being permanently re-evaluated and as a result of an increase in these premia the equilibrium capital stock is contracting. Both problems could be alleviated by the rapid introduction of a policy to extend working lives. Increasing working lives will, in equilibrium, raise consumption and the equilibrium capital stock. If consumers and firms were aware that they would work longer and hence have higher incomes then consumption and investment would be increased now, helping to offset the impact of the current recession. In addition tax revenues would be higher and pension spending reduced. These gains by the government can be used to improve services, cut taxes or pay off debts. We advocate the policy of paying down government debt. It is of course difficult to implement this strategy. Society could choose to have everybody work longer and this would enable governments to cut taxes. However, as individuals we have less of an incentive to choose to extend our working lives, but this act would actually require us to pay more in tax in order to contribute to the pensions of others. Even if retirement decisions are personal the state can encourage later retirement by changing the state pension age, where there is significant bunching of retirements. A coordinated increase in working lives of one effective year (18 months on the age of retirement) could increase tax revenues and lower retirement spending by enough to reduce the government deficit by 1 per cent of GDP permanently.

Analysing individual optimising decisions in relation to working lives in a macro economic context is difficult, especially as the most commonly used overlapping generations models do not easily aggregate. We discuss the implications of a change in expected life in a growing economy where people save for retirement. The supply side of the model is the most important feature structuring the outcomes of the simulations, and the next section looks at the importance of the assumption that the economy is open with mobile capital. There is a discussion of the model of the public sector, where tax receipts and government spending are described. The major focus of the paper is on the impact of extending working lives on output, incomes and saving in the UK and the

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Euro Area using NiGEM with fully forward-looking consumers. Extending productive working lives means that a lower stock of saving is needed, and in a growing economy the saving rate will therefore be reduced marginally. The implications for incomes depend in part on the rate of return on assets, and especially on foreign assets. Increasing the work force will require that capital accumulates and domestic investment as a per cent of GDP will rise for a period. In a closed economy the increase in desired capital and the fall in saving would mean the rate of return on assets would rise, whilst in a small open economy it means that the stock of net foreign assets will decumulate.

## 2 The modelling framework

We utilise the NiGEM model in a version that has similar long run properties to the dynamic stochastic general equilibrium models in use by institutions such as the Bank of England.[1] In this paper we focus on results from the UK and from the Euro Area country models for Germany, France, Italy, Spain, Netherlands, Belgium, Austria, Portugal, Finland and Ireland, all of which have a similar structure.[2] Output (Y) is determined in the long run by supply factors, and the economy is open and has perfect capital mobility. The production function is CES, where output depends on capital (K) and on labour services (L) which is a combination of the number of person in work and the average hours of those persons. Technical progress (tech) is assumed to be labour augmenting and independent of the policy innovations considered here:

$$Q = \alpha(\delta(K)^{-\rho} + (1-\delta)(Le^{\lambda_L tech})^{-\rho})^{-1/\rho}$$

We assume forward-looking behaviour in production and because of "time to build" issues investment depends on expected trend output four years ahead and the forward-looking user cost of capital. However, the capital stock does not adjust instantly, as there are costs involved in doing so that are represented by estimated speeds of adjustment. The equilibrium level of unemployment is the outcome of the bargaining process in the labour market, as discussed in Barrell and Dury (2003), and the speed of adjustment depends on (rational) expectations of future inflation. Financial markets follow arbitrage conditions and they are forward-looking. The exchange rate, the long rate and the equity price will all "jump" in response to news about future events. Fiscal policy involves gradually adjusting direct taxes to maintain the deficit on target, but we assume that this has no direct effect on the labour supply decision. We investigate different fiscal responses to extending working lives and spell out the impact on the budget deficit. Monetary policy involves targeting inflation with an integral control from the price level, as discussed in Barrell, Hall and Hurst (2006) and inflation settles at its target in all our simulations.

Perhaps the most important feature of the model for our discussion is that consumers react to the present discounted value of their future income streams which we may call total wealth (*TW*), although borrowing constraints may limit their consumption to their personal disposable income in the short run. Total wealth is defined as:

$$TW_t = Y_t - T_t + TW_{t+1}/((1+rr_t)(1+my_t))$$

where *TW* is real total wealth, *Y* is real income, *T* are real taxes, and the suffix *t*+1 indicates an expected variable which is discounted by the real interest rate $rr_t$ and by the myopia premium used

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1 The Bank of England Quarterly model is discussed in Bank of England (2005). NiGEM is discussed in Barrell (2007) and Barrell *et al.* (2007) and in other papers at www.niesr.ac.uk. NiGEM does not impose maximising equilibrium conditions in the same way as DSGE models, but has the same steady state equilibrium properties.

2 Greece has a similar model, but we do not find the assumption of forward-looking consumers useful in that country. The models of Slovakia and Slovenia are smaller, and the results less interesting.

by consumers, $my_t$. The equation represents an infinite forward-recursion, and permanent income is the sustainable flow from this stock. Total wealth and permanent (PI) income can be linked by the stock flow relationship where $\gamma$ is the rate of return on *TW*:

$$PI_t = \gamma * TW_t$$

Although consumers know their total wealth and hence their permanent income, they may not consume it all as they are either risk averse or face a probability of death ($\rho$) in each time period and also a probability ($\tau$) that they will not make the transition from working to not working. If life span is uncertain, then consumers will have precautionary saving as discussed in Blanchard and Fisher (1989). If the length of working life is also uncertain then they may pay a small premium to insure themselves against early retirement. This premium falls with an increase in working lives. During their working years consumers save and then use their interest income and run down assets in retirement. The saving rate will depend, amongst other things, on the proportion of life that they expect to work, the level of consumption they prefer in retirement and on their desire to leave bequests. In a stationary economy consumption will equal permanent income. The gross stock of financial wealth will depend on the saving rate and on the number of years they expect to be retired.[3] Given that there is an optimal wealth to income ratio, *WR*, in an economy growing at a rate *g* the saving rate will be *g*WR* higher to sustain the equilibrium ratio; consumption will be lower than permanent income.

Total wealth will also change when asset prices change or when accumulation changes. Non-human wealth may rise when, for instance house prices increase, and this may raise consumption in the short term, even though real output may not have risen. We assume that consumption is determined by forward-looking behaviour in the long term, but that short term adjustment depends upon a number of factors. As Barrell and Davis (2007) show, changes in financial (*dlnNW*) and especially housing wealth (*dlnHW*) will affect consumption. Their estimates suggest that short-run impact on consumption from changes in housing wealth is five times the impact from changes in financial wealth. They also show that the adjustment to the long run equilibrium shows some inertia as well. Al-Eyd and Barrell (2005) discuss borrowing constraints, and investigate the role of changes in the number of borrowing constrained households. It is common to associate the severity of borrowing constraints with the coefficient on changes in current income (*dlnRPDI*) in the equilibrium correction equation for consumption, where *d* is the change operator and *ln* is natural log. We may write our equation for *dlnC* as:

$$dlnC_t = \lambda(lnC_{t-1} - b_0 - lnPI_{t-1}) + b_1 dlnRPDI_t + b_2 dlnNW_t + b_3 dlnHW_t$$

where the long run relationship between *lnC* and *lnPI* depends upon the equilibrium saving rate, and this relationship forms the long run attractor in an equilibrium correction relationship. We should note that permanent income, *PI*, is a forward-looking variable based on the infinite forward recursion of total wealth. The log approximation is explained in Barrell and Davis (2007).

Policy reactions are important in the determination of speeds of adjustment. Nominal short term interest rates are set in relation to a standard forward-looking feedback rule as described in Barrell, Hall and Hurst (2006). These feedback rules are known to be in place in the future and hence we can describe the path of future interest rates. Forward-looking long rates should be related to expected future short term rates:

$$(1 + LR_t) = \Pi^{T}_{j=1} \qquad (1 + SR_{t+j})^{1/T}$$

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[3] In a stationary world with no risk, no interest rates, a constant level of consumption and no bequests, the saving rate will the proportion of life in retirement ($\tau$) and the number of years in retirement. For instance if one third of adult life is in retirement and there are 60 years of adult life then the equilibrium wealth to income ratio will be 6.666. It will be lower if interest rates are positive or desired consumption in retirement is lower than in work.

The exchange rate and the equity market are also assumed to be forward-looking, with exchange rates following the open arbitrage path and equity prices moving in line with the discounted future value of expected net of tax profits.

In order to evaluate the effects of extending working lives on the public finances we need a reasonably disaggregated description of both spending and tax receipts. We model corporate (*CTAX*) and personal (*TAX*) direct taxes and indirect taxes (*MTAX*) on spending, along with government spending on investment and on current consumption, and separately identify transfers and government interest payments. Each source of taxes has an equation applying a tax rate (*TAXR*) to a tax base (profits, personal incomes or consumption). As a default we have government spending on investment (*GI*) and consumption (*GC*) rising in line with trend output in the long run, with delayed adjustment to changes in the trend. They are re-valued in line with the consumers' expenditure deflator (*CED*). Government interest payments (*GIP*) are driven by a perpetual inventory of accumulated debts. Transfers (*TRAN*) to individual are composed of three elements, with those for the inactive of working age and the retired depending upon observed replacement rates. Spending minus receipts give us the budget deficit (*BUD*), and this flows onto the debt stock.

$$BUD = CED*(GC+GI) + TRAN + GIP - TAX - CTAX - MTAX$$

We have to consider how the government deficit (*BUD*) is financed. We allow either money (*M*) or bond finance (*DEBT*):

$$BUD = \Delta M + \Delta DEBT$$

Rearranging, that gives:

$$DEBT = DEBT_{t-1} - BUD - \Delta M$$

In all policy analyses we use a tax rule to ensure that Governments remain solvent in the long run. This ensures that the deficit and debt stock return to sustainable levels after any shock, as is discussed in Blanchard and Fisher (1989). A debt stock target can also be implemented. The tax rate equation is of the form:

$$TAXR = f(\text{target deficit ratio} - \text{actual deficit ratio})$$

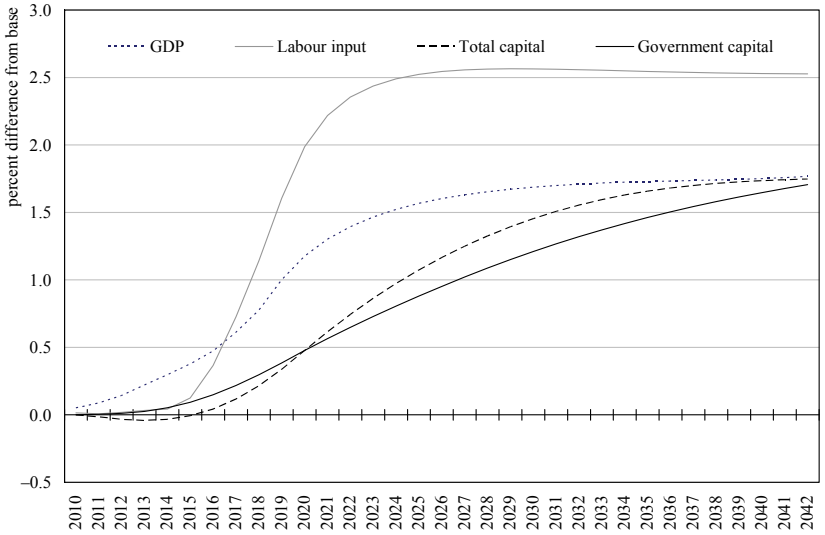
If the Government budget deficit is greater than the target, (e.g. –3 per cent of GDP and target is –1 per cent of GDP) then the income tax rate is increased. However, it is possible to turn off the tax rule and allow deficits to decline in response to increased tax revenues. However, debt stocks cannot expand or contract without bound, and hence in some analyses below we have to put a ceiling on the improvement in the deficit.

## 3 Extending working lives

We analyse the impact of a one year increase in effective working life in all the Euro Area countries together. Obviously, it might be wise to raise expected working lives by more, the effects of which can be extrapolated from our results. We assume that the working age population begins to increase five years after the start of the scenario and that it takes 5 years to increase the length of working lives by one year. Workers know that they will work longer and hence they need to save less now, and consumption will rise ahead of the increase in incomes. As the availability of increased labour is fully anticipated and comes through slowly in this simulation, the market adjusts and in our simulation there is little impact on the unemployment rate, which is determined by the wage bargain. Employers have enough time to raise investment in advance of the anticipated increase in labour supply so that the capital stock can grow approximately in line with employment. The business sector capital stock is assumed to be determined by the underlying production

**Figure 1**

**Impacts of a One-year Increase in Working Lives in the Euro Area**




function and hence rises in line with employment given any changes in real wages relative to the user cost of capital. If all capital did the same, then output should rise in exactly in line with labour input in the long run, as we would expect from the production function.

In Figure 1, GDP rises less than labour input in the long run, and continues adjusting. However, in the short run output rises ahead of labour input as demand increased. We also plot capital inputs, if these were to adjust more rapidly output would rise more quickly. These marginal changes could be smoothed if we assumed the government capital stock moved at the same pace as private sector capital, but we consider it useful to demonstrate the effects of budget rules. We assume that government investment rises with expected capacity output, and hence the government capital stock increases more slowly than business sector capital but eventually adjusts. All private sector investment plans are assumed to depend on capacity output anticipated for 4 years ahead as well as the forward-looking user cost of capital. As a result of these assumptions the capital stock rises less than the workforce, as we can see from Figure 1. Private sector capital rises less than employment as the increase in demand for capital, and hence the reduction in net saving, puts marginal upward pressure on long term real interest rates.

The need to finance capital inflows that go with an increased labour force require current account deficits and hence a build up of foreign liabilities. This will put a wedge between GNP and GDP and net property income from abroad will decline, as we can see from Figure 2. We could see a reduction of around 0.1 percentage points in the household saving rate of the Euro Area in the long run for every extra years working life we add. In the short term an expected (or anticipated) increase in working lives will immediately reduce the saving rate by around 0.3 percentage points. Total wealth rises as people anticipate higher future incomes and the effects are brought forward by rational optimising consumers. In the short run consumption rises ahead of incomes, as we can see in Figure 3.

## 4 Giving the Government options

The effects on the economy of extending working lives depend upon the assumptions made about government reaction. We consider three possible government reactions. Our main case leaves government investment and consumption rising in line with, but not ahead of trend output. Government transfers to the elderly (pensions and other social security payments) would be reduced because the number of retired people would fall relative to baseline. The scale of the

reduction would depend upon the numbers involved and the replacement ratio. Hence it is possible to cut taxes or reduce borrowing. In this scenario we allow taxes to fall in order to meet the government budget deficit target. The second case assumes taxes are kept fixed at base levels and government spending an investment rise with GDP. The failure to cut taxes allows the deficit to be reduced. Our third case keeps government investment and consumption at their baseline trajectory with tax rates fixed, at least initially, allowing more debt to be paid off with the increased revenue from higher incomes along with the reduction in spending. Once the improvement in the deficit reaches one per cent of GDP taxes are allowed to fall and the deficit improvement stays at that level. Figure 4 plots possible paths for direct taxes.

If tax rates are fixed but spending rises then the government deficit will be reduced by around 0.4 per cent of Euro Area GDP, as we can see from Figure 5. The government debt stock falls, and after 30 years the debt stock will have fallen by 6 per cent of (the value in 2043 of) GDP. With spending and

**Figure 2**

**Current Account Effect of a One-year Increase in Working Lives in the Euro Area**

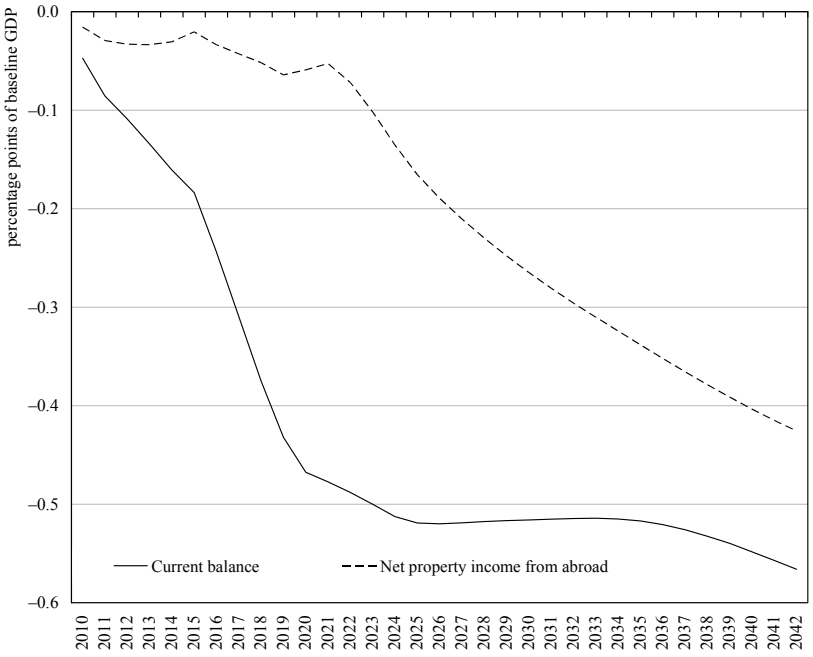



**Figure 3**

**Impacts of a One-year Increase in Working Lives on Consumption**

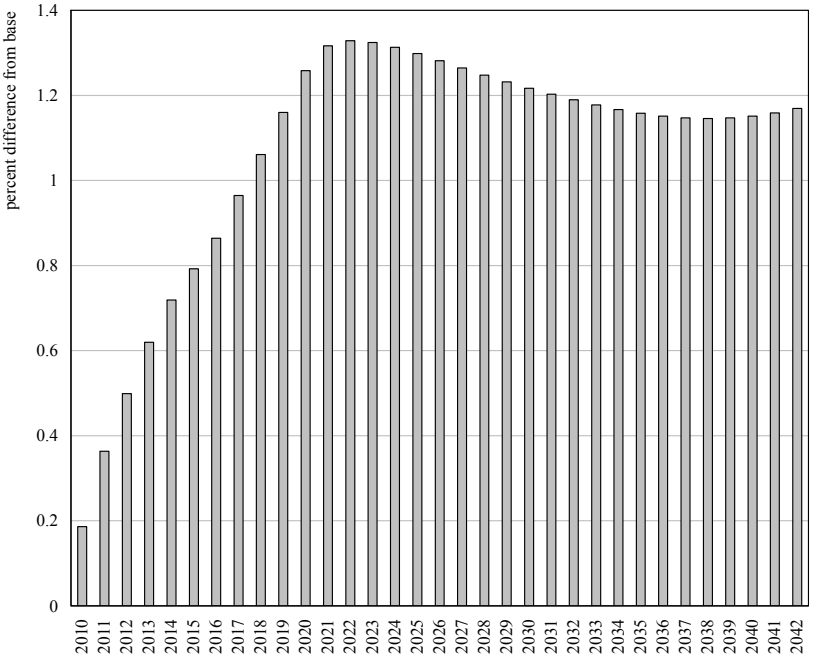


**Figure 4**

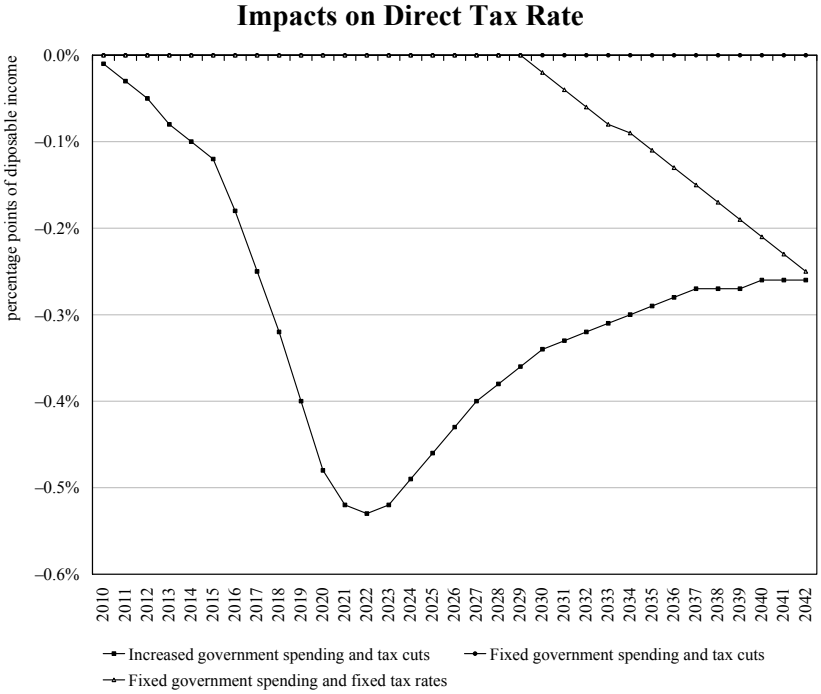
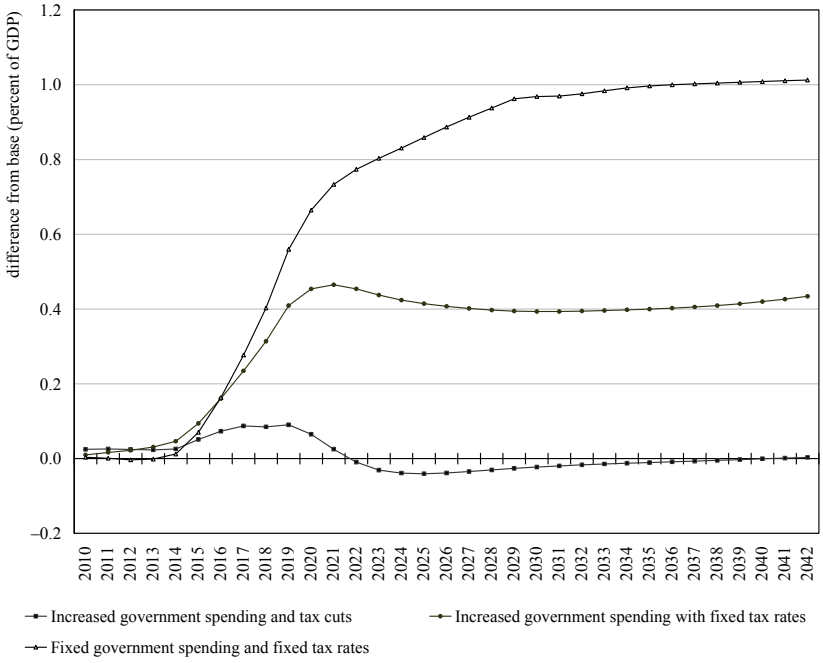



**Figure 5**




investment fixed, the budget deficit improves by 1 per cent of GDP after 20 years and stays higher in part because we impose the target at this level in all countries once the begin to reach it. Hence taxes are cut in order to ensure the budget deficit is kept different from base by a constant one per cent of GDP. As a result the government debt stock falls more rapidly and after 30 years it is 14 per cent of GDP lower. The choices available to the government are clear. Extending working lives can be absorbed into lower taxes, or it can finance higher spending, or it can be utilised to pay off the government debt accumulated in the recession.

## 5 Modelling Europe

NiGEM has a model of each of the 12 main European countries, and each has a complete supply side and rational expectations. The forward projection of population depends on Eurostat data both for the total population and the breakdown into the population of working age, the retired and those below working age. In each country government transfers to individuals depend on three factors:

*Transfers = a*ytrend + inactive*replacement rate + pensioners*pension replacement rate*

where *ytrend* is capacity output in nominal terms since transfers are also nominal.

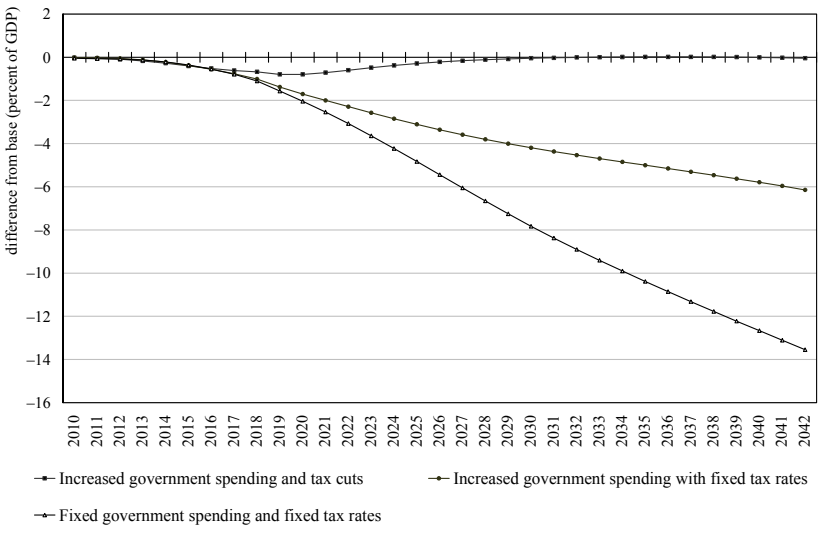
The replacement ratios are uprated with trend output in nominal terms. As a result of the uprating rule and the increase in the dependent population transfers rise as a share of GDP, and taxes rise to finance this in order that governments are solvent. If the retirement age is raised then transfers for pensions are reduced but initially unemployment rises, and the net effect on government spending depends on the two replacement ratios. We assume that over the first five years of the scenario working lives are raised progressively to be 2½ per cent longer than on the baseline. This is equivalent to an additional year of working life. The increase in the workforce is relatively quickly absorbed, and output rises in all cases.

The impact on interest rates in the rest of the world depends in large part on the projected change in the current account, and in the first case we can expect it to deteriorate. Figure 7 plots the output effects, whilst Figure 8 plots the impact on long term real interest rates in the steady state. We report numbers for the Euro Area, but similar changes take place in the US and the UK because the model allows for complete capital mobility and world real interest rates change approximately together. In Barrell, Hurst and Kirby (2009) we discuss similar policy initiatives in the UK, which is a small open economy, and hence global real interest rates are little affected. However, the Euro Area, like the US is not a small open economy, but a large one, and when it changes its saving and investment balance would real interest rates will change. If the increase in working lives were to be associated with higher government spending and lower taxes, and hence a similar government budget deficit, then world real interest rates would rise. Saving in the Euro Area would fall and the demand for capital would rise, and the market would have to find a new equilibrium. The larger the share of increased income that is used to pay down debt, the smaller is the increase (or larger the fall) in steady state real interest rates.

In each country we have details on the effects on output and direct tax rates, and these are plotted in Figures 9 and 10 for the base case where spending rises and the budget deficit is fixed, and hence taxes are cut. The increases in labour input are similar across countries in the long run but in the short run depend on how quickly labour markets adjust to increased labour input. The more forward-looking the wage bargain, the faster the increase in the supply of labour is absorbed. The effects on output vary more across countries, especially in the short run, where the dynamics of the trade equations will also have an impact. In the long run the effects depend mainly on the parameters of the production function (and the impact on the user cost which feeds into the production function).

**Figure 6**

**Debts after Extending Working Lives**




The effects on tax rates will depend in the

**Figure 7**

**European GDP**

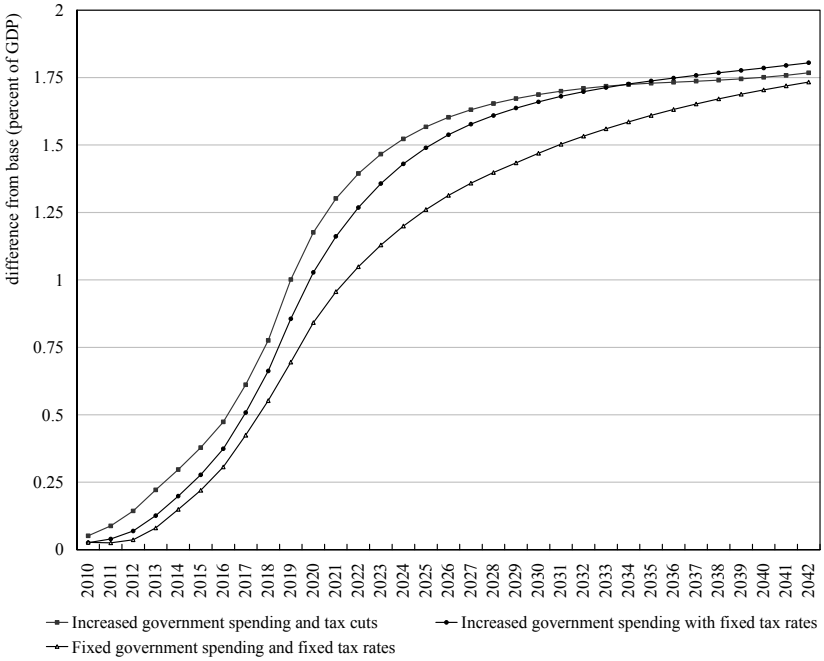
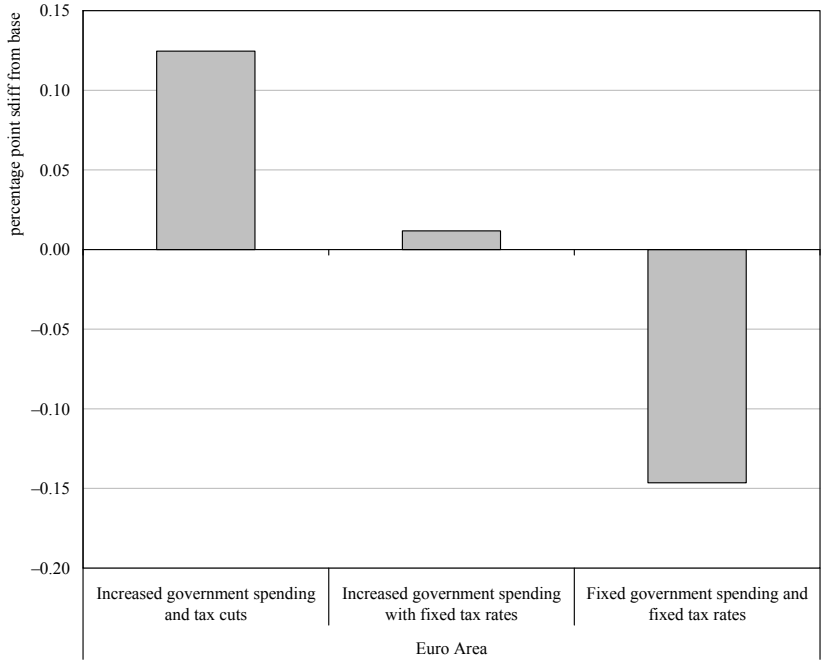



**Figure 8**

**Changes in Real Interest Rates in the Euro Area**




long run on the generosity of the state in the amount of transfers to households in relation to average incomes. The effects are least in the less generous countries such as Italy, but also in Germany. There is a correlation of –0.38 between our estimates of replacement ratios and the impact on tax rates, with higher ratios giving larger negative tax cuts. The short run effects depend on the relative generosity of state aid to the unemployed as an increase in the labour force might take a short while to absorb into increased employment. The speed of absorption of the retained workers depends on the degree of labour market flexibility. A shift to a more flexible labour market should increase the speed of adjustment.

## 6 Conclusion

It is widely acknowledged that the many countries have a shortfall of savings and an accumulation of government debt. The natural consequence is a shortfall in the resources available to cover retirement incomes. Extending working lives can be used to address this issue. Fewer assets are needed in order to provide an income stream over retirement

**Table 1**

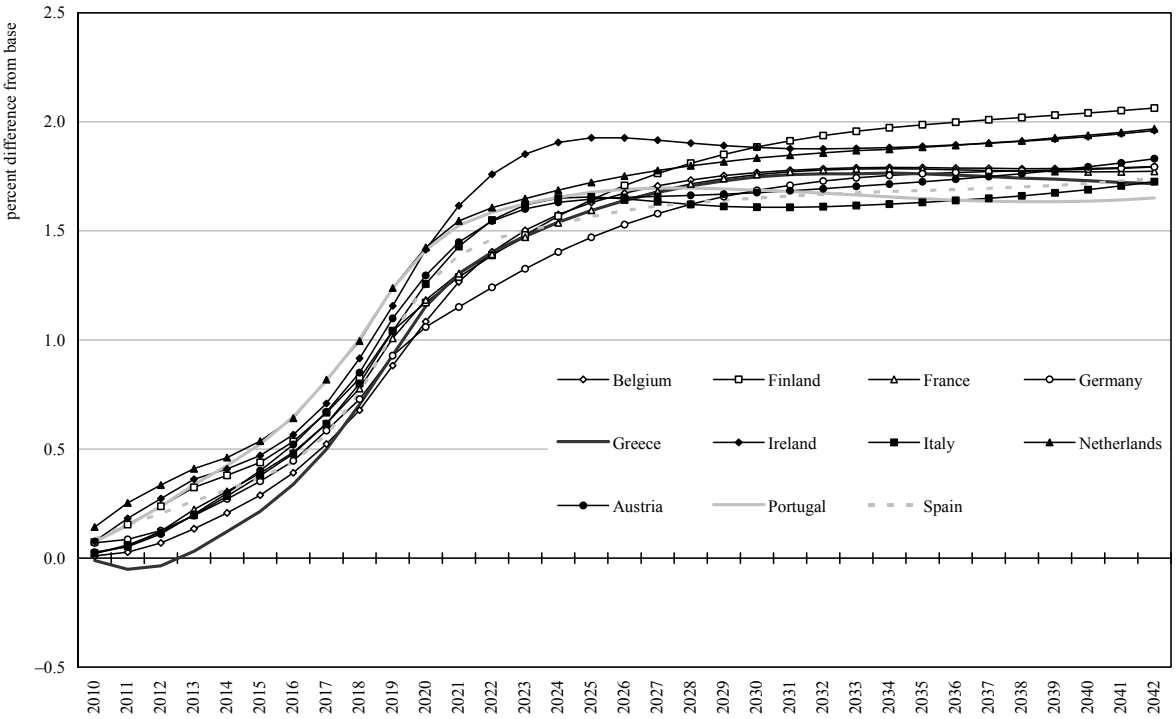
**Replacement Rates and Tax Changes with Extended Working Lives**

| | Belgium | Finland | France | Germany | Greece | Ireland | Italy | Neths | Austria | Portugal | Spain |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement rate | 0.119 | 0.138 | 0.167 | 0.152 | 0.1225 | 0.1032 | 0.1621 | 0.076 | 0.245 | 0.1861 | 0.1391 |
| Change in direct tax rate | | | | | | | | | | | |
| Fixed spending | –0.0075 | –0.016 | –0.0127 | –0.0084 | –0.0092 | –0.0104 | –0.0118 | –0.0087 | –0.0105 | –0.0175 | –0.0115 |
| Increased spending | –0.002 | –0.0095 | –0.0061 | –0.003 | –0.0038 | –0.0063 | –0.0066 | –0.0019 | –0.0063 | –0.0098 | –0.005 |

Source: Eurostat social spending data, NiGEM simulations.

**Figure 9**

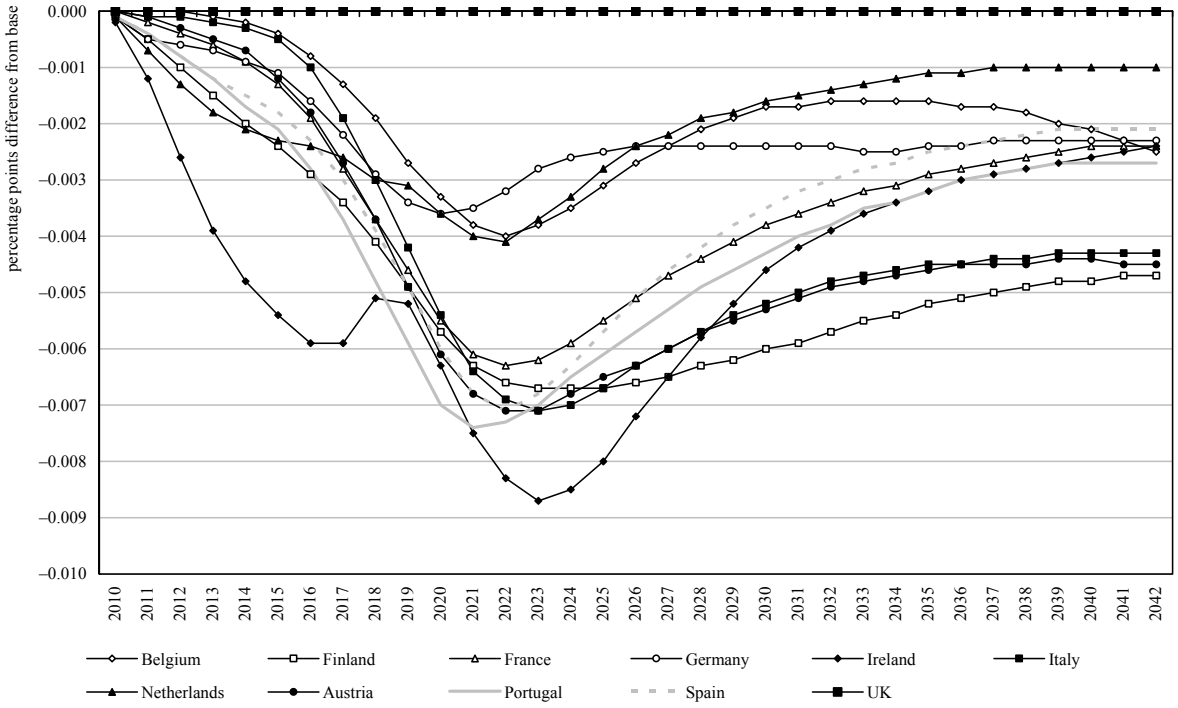
**GDP across Countries with Extended Working Lives**




reducing the necessary level of saving. Extending working lives gives governments a number of options for taxes and spending. It reduces transfer payments to pensioners without need to reduce their generosity, a policy option which may be politically easier than the alternatives of reducing the generosity of state contributions or raising taxes on the employed. It also increases tax revenues through increased incomes and consumption. These increased net revenues can be used to actually reduce the tax burden, increase spending or both together. It is also possible they could be used to pay down the national debt. Increased working lives raises output and hence the demand for capital to accompany more workers. Forward-looking consumers will adjust both their consumption patterns and their saving at the same time, with those who anticipate working longer increasing their consumption well before they approach retirement. The increase in consumption comes from

**Figure 10**

**Tax Rates across Countries with Extended Working Lives**




both increased output and a reduced the need to save for retirement. In a small open economy increasing working lives reduces net saving and hence reduces the current account surplus and foreign assets de-cumulate. In a large open economy such as Europe, an increase in the demand for capital and a reduction in saving will impact on the price of saving – the steady state real interest rate. Extending working lives in Europe by one year could raise the steady state real interest rate by 0.1 percentage points.

Increasing spending and cutting taxes are not the only options available to governments. If tax rates and spending plans were kept constant but working lives were to increase by one year then European general government budget deficits would, on average, improve by 1 per cent of GDP after 15 years. If this were maintained, in around 30 years national debt would be reduced by the equivalent of 16-20 per cent of GDP. Given the enormous increase in government debt induced by the banking crisis and the subsequent severe global recession policy options to reverse this accumulation of government debt need to be implemented. Extending working lives is a practical and feasible solution to this issue. We argue that the extension of working lives by 2 years in Europe would be enough to pay off government debt equivalent to around 40 per cent of GDP, which is what we expect the current crisis to have cost. If government debt were to be run down real interest rates would not rise by as much as we suggest. This is the case even if consumers are forward-looking, since they use a higher discount factor in their decision making than that observed in bond markets. This condition alone is enough to ensure "Ricardian equivalence" does not hold.

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# POVERTY AND INCOME OF OLDER PEOPLE IN OECD COUNTRIES

*Asghar Zaidi*[*]

## 1 Introduction

Two considerations impinge on the issue of what constitutes adequacy of pension income. How does the income of the current generation of older people fare in comparison to that of the current generation of working age population? And, how do older people fare in retirement in comparison to their living standards during working lives? Regarding the former consideration, two indicators that can be reliably measured are used in this paper: *relative poverty* and *relative income* of older people. For the latter consideration, the indicators of prospective replacement rates of workers who enter into labour force during 2004 are derived using micro-simulation analysis, and they are presented and analysed in detail elsewhere (see, e.g., Martin and Whitehouse, 2008; Queisser and Whitehouse, 2007).

The other critical issue is what constitutes poverty? For the purpose of international comparisons across developed countries, poverty is almost always a relative concept. A widely accepted measurement approach is to use household income as the measure of well-being, to "equivalise" household income for differences in household size and define the poverty threshold as one-half of national median household income. This approach is adopted in OECD's recent report on poverty and inequality *Growing Unequal?* (OECD, 2008). Under this approach, people are considered poor if they live in households whose equivalised disposable income is less than 50 per cent of the national median disposable income.

For the purpose of a good interpretation of results presented in this paper, two important implications of the measurement approach need to be kept in mind:

- poverty thresholds in use are country-specific as they use the national median income as its basis. Thus, the purchasing power of these poverty lines differs across countries, with the implication that some poor persons will be better off in one country than some non-poor persons in another country;
- poverty rates among older people for some countries will be high because the income of their working age populations have observed an unprecedented growth in the recent past. This situation arises in particular for Ireland and Spain in the recent past.

The Annex provides further discussion on the measurement methods used, their strengths and limitations, and differences in the poverty thresholds across countries. These issues are discussed at a greater length in Zaidi (2008).

The paper makes use of data available in the OECD Income Distribution Database – itself the basis of OECD (2008). The discussion below is presented in five parts. *First*, results on patterns of poverty among older people are analysed. *Second*, income of older people, levels relative to the rest of the population and its composition, are analysed. *Third*, the distributional role of public pension benefits and taxes is investigated. *Fourth*, the analysis included explores the impact of

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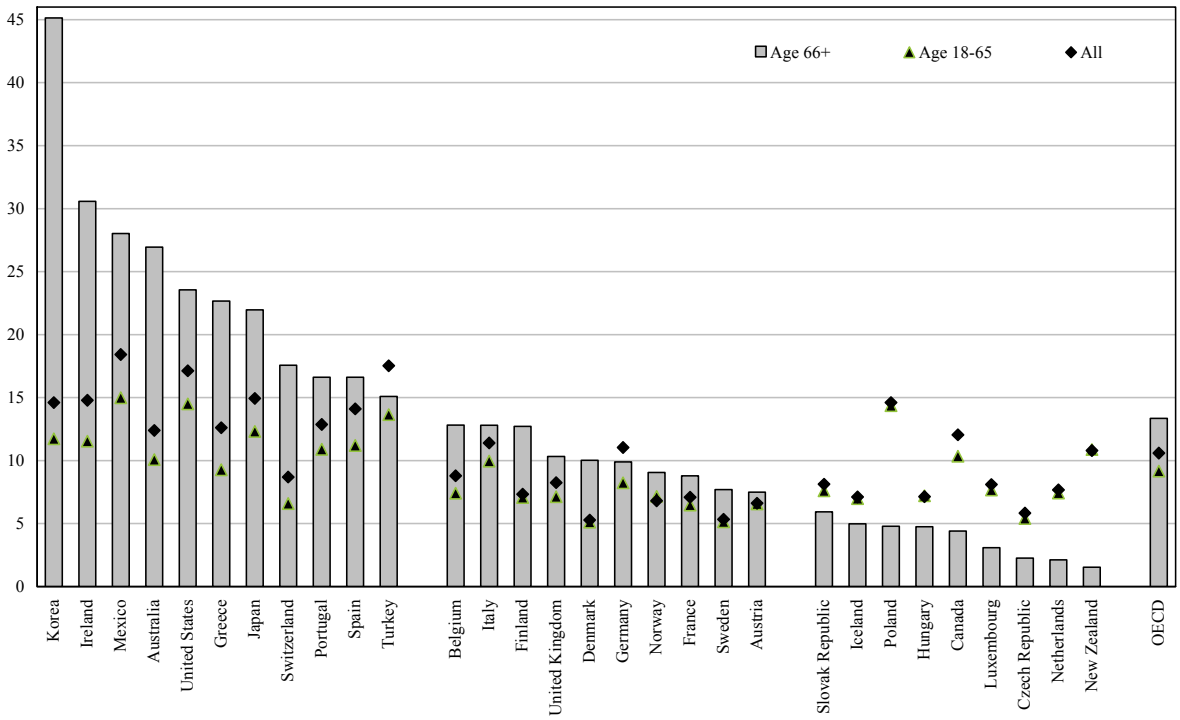
The views expressed in the paper are those of the author, and neither the OECD nor the other organisations with which the author is affiliated carry any responsibility with regard to data used and interpretations made. The author takes full responsibility for any remaining errors and omissions.

**Figure 1**

**Poverty Rates among People of Retirement Age, Working Age and the Total Population, Mid-2000s**




Note: Poverty rates are defined as the proportion of individuals with disposable income less than 50 per cent of the national median. Countries are ranked, from left to right, in increasing order of income poverty rates of people of retirement age. The income concept used is that of household disposable income adjusted for household size.
Source: Computations from OECD Income Distribution Questionnaire.

recent pension reforms on the future value of pension entitlements. *Finally*, some recommendations are made in view of conclusions drawn from this paper.

## 2 Patterns of poverty among older people in OECD countries

### *2.1 Key findings on older people poverty*

Using the definitions mentioned above, results for the years around 2005 show that about 13 per cent of all older people in OECD countries are counted as "poor". In the context of this study, an older person is someone who is aged 66 or more, for the fact that these people have reached the most usual statutory retirement age of 65 as observed across many OECD countries.

Figure 1 highlights the variations observed across countries. Results are brought together so as to allow the poverty rates for three population groups – older people, working age people and the overall population – to be presented and contrasted. The country-by-country variations observed are broadly captured by the following three groupings of countries:

- *low poverty rates (<6 per cent):* Nine countries fall in this category: the Slovak Republic, Iceland, Poland, Hungary, Canada, Luxembourg, the Czech Republic, the Netherlands and New Zealand;

- *lower-than-average poverty rates (between 7-13 per cent):* Ten other countries show older person poverty rates lower than the OECD average of 13.3 per cent: Belgium, Italy, Finland, the United Kingdom, Denmark, Germany, Norway, France, Sweden and Austria;
- *higher-than-average poverty rates (>15 per cent):* This cluster of countries has 11 countries, with Korea standing out among the OECD countries with the highest poverty rate for older people (45 per cent). Other countries with a higher-than-average poverty rate for older people are Ireland (30.6 per cent), Mexico (28 per cent), Australia (26.9 per cent), the United States (23.6 per cent), Greece (22.7 per cent), Japan (22 per cent), Switzerland (17.6 per cent), Portugal (16.6 per cent), Spain (16.6 per cent) and Turkey (15.1 per cent).

In countries with higher-than-average poverty rates among older people, the corresponding rates for the working age population (age 18-65) are considerably lower. For example, working age poverty rates in Korea, Ireland, Australia, Greece and Switzerland are less than half of poverty rates observed for older people. In contrast, in countries where older people poverty rates are low, the poverty rates for working age people are generally higher. This result is observed in particular for Poland and New Zealand. Among many of the countries with high poverty rates for older persons, a gap of notable magnitude is observed in the poverty rates between these two age groups. The differential is highest in Korea, in excess of 30 percentage points, followed by five other countries (Ireland, Australia, Greece, Mexico and Switzerland) where it is in excess of 10 percentage points.

Other perspectives on the profile of older people poverty are dealt with by the data available in the OECD Income Distribution Survey, and the following analytical questions are relevant:

- how do poverty rates differ across older men and women?
- how do the younger cohorts of older persons (aged 66-74) fare in comparison to the oldest cohorts (75 or more)?
- what is the impact on the poverty rate for older households with someone in the household working?
- how do different living arrangements of older households, specifically living as a single person or a couple, affect poverty rates?
- what are the underlying trends in the poverty rate for older persons?

These issues are addressed in more detail in the rest of this section.

### *2.2 The gender dimension*

The different experiences of poverty for older men and women are captured by Figures 2a and 2b. The following patterns emerge from these results:

- older women in general have a much higher poverty rate compared to older men. On average, older women have a poverty rate of about 15 per cent as compared to older men poverty rate of about 10 per cent (see Figure 2a). The exception to this result is observed only in four countries with low overall poverty rates for older persons (New Zealand, the Netherlands, Luxembourg, and Iceland);
- the above result is all the more striking when they are compared with the corresponding poverty rates for the equivalent working age cohorts. Female poverty rates are in most cases broadly equivalent with those of the males (see Figure 2b). Obviously, the two groups of men and women belong to different generations, but it also reflects the fact that the relative risk of poverty for older women increases in their old age.

Partly mirroring the above results is the fact that the oldest age cohorts, aged 75+, have a higher poverty rate than those aged 65-74. This is principally because women dominate the oldest

**Figure 2a**

**Poverty Rates across Men and Women of Retirement Age, Mid-2000s**

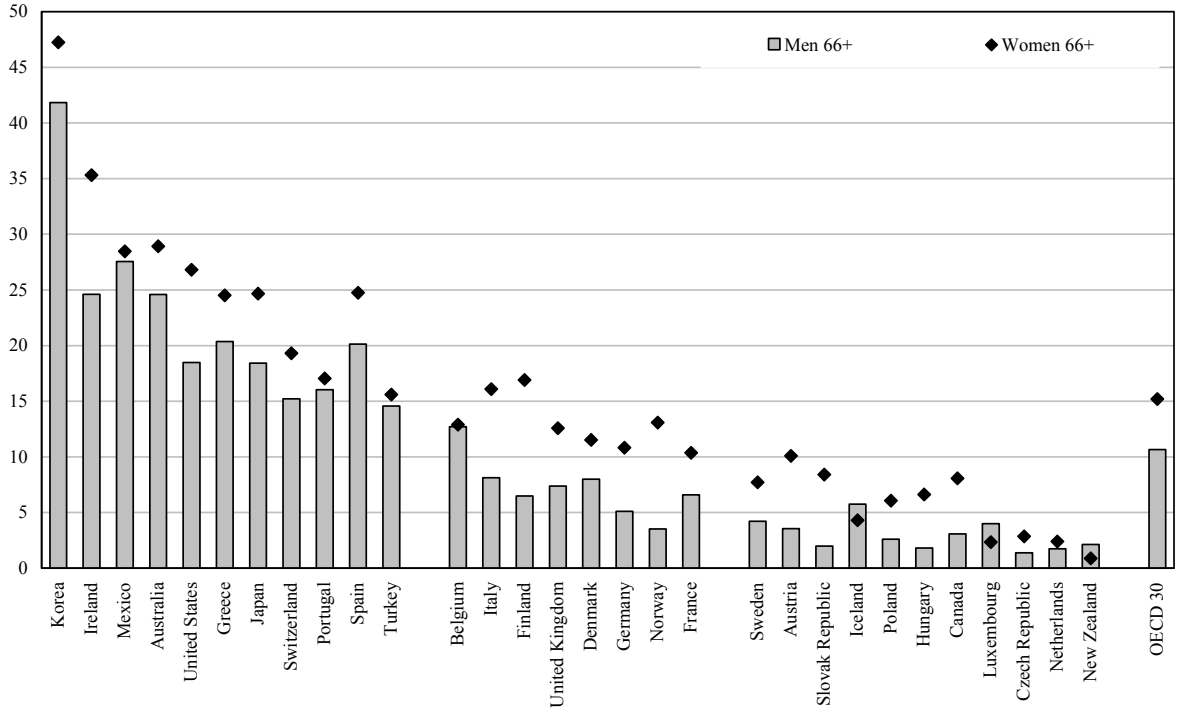
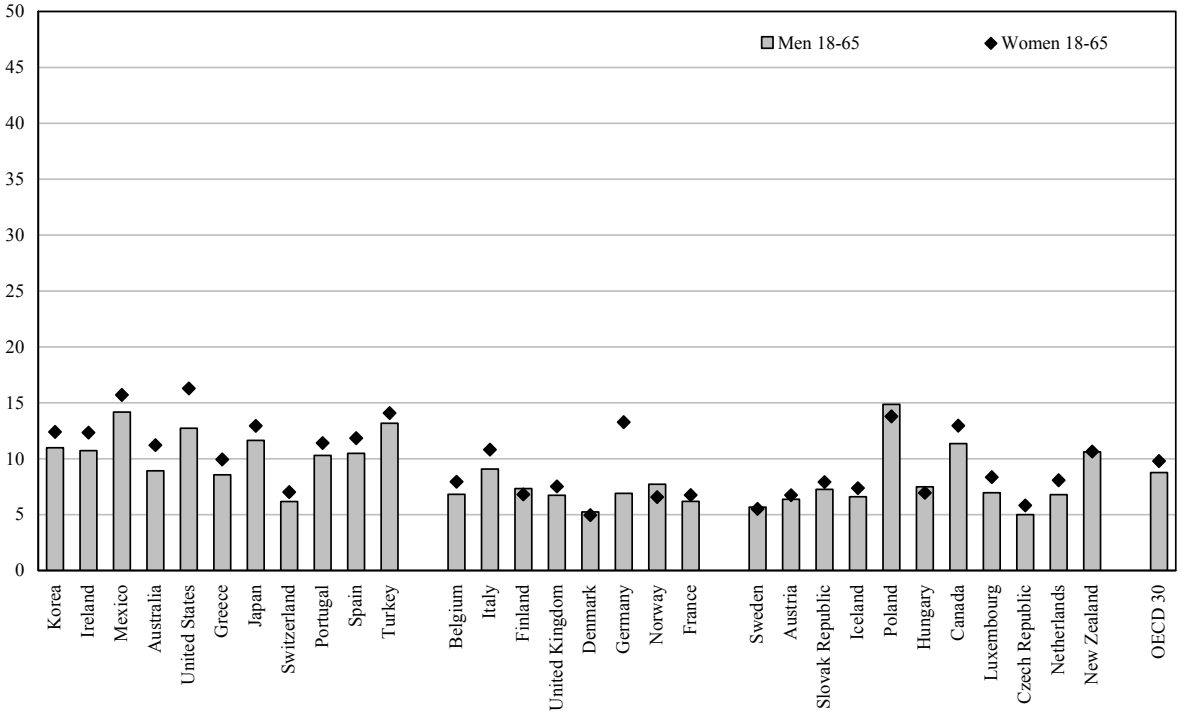



**Figure 2b**

**Poverty Rates across Men and Women of Working Age, Mid-2000s**



age cohort, as – on average – women live longer than men. Another compositional effect, contrasting in nature, arises because richer people tend to live longer than poorer people.[1]

Further analysis between older men and women within each of the two age cohorts draws attention to the result that older women in the age group of 75+ stand out as the poorest subgroup (see Figure 3a and 3b). On average, almost 18 per cent of all women aged 75+ have a risk of falling in poverty. In the majority of countries with higher-than-average poverty rates for older persons, the risk for poverty for the oldest women cohort is strikingly high (in excess of 25 per cent).

### *2.3 The impact of earnings and living arrangements on older people poverty*

Many OECD countries now offer pension income bonuses to those who delay their retirement and continue to work beyond the statutory retirement age. Although the opportunities of older people to adjust their labour supply behaviour may be restricted for the reasons of seniority wages and employers' age discrimination (see OECD 2006), it is nonetheless useful to analyse how the poverty risk of older people is affected when they are able to work beyond the retirement age.

The living arrangements dimension of households is also an important dimension in determining income. Couple households benefit from pooling and sharing their pension income resources and also enjoy economies of scale. However, their lives are affected by events common to old age, such as widowhood, and this has a detrimental impact on income, which varies across countries depending upon the systems of social insurance and social assistance provision. Thus, it is of importance to analyse how households with different living arrangements fare in terms of risks of poverty in old age.

In many OECD countries, the effective retirement age has been rising (approximating one year for women and almost half year for men during the decade ending in 2007). Nevertheless, at 27 per cent, the share of elderly people who work (or live with persons who work) has remained remarkably stable over the past ten years. Where members of such older households continue to work, the poverty rates are much lower. On average, across the OECD, poverty rate is 7 per cent when someone in older households works as opposed to 17 per cent for others (see Table 1). The decrease in poverty due to the working status a household member is most noticeable in Australia, France, Germany, Greece, Ireland, Italy, Norway, Portugal and the United Kingdom. The effect on the poverty rate is lower in Austria, Finland, the Netherlands, New Zealand and Poland. Turkey offers the only exception where non-working older households have lower poverty rates than working ones.

Different living arrangements also affect the poverty rates of older people. Two broad categories are covered here: (a) older persons living alone as single persons, and (b) older persons living as a couple. Older persons living alone – very often widowed women – face a much higher risk of falling into poverty than older persons living as a couple (see Table 1). However, during the decade spanning the mid-1990s and mid-2000s, in many OECD countries the poverty rates for single elderly persons have declined more than the equivalent rates for older couples. This decline in the poverty rates for single elderly persons is most notable in the Czech Republic (–19.1 percentage points), followed by Norway (–13.8) and Austria (–11.6). A contrasting result is obtained for seven countries, in particular for Spain and Finland where poverty rates for the single elderly persons increased considerably during the same period, by 32.7 and 12.5 percentage points respectively.

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[1] See Whitehouse and Zaidi (2008) for a survey of the literature and new evidence on socio-economic differences in mortality of older people in Germany, the United Kingdom and the United States.

**Figure 3a**

**Poverty Rates among Men and Women for the Age Group 66-74, Mid-2000s**

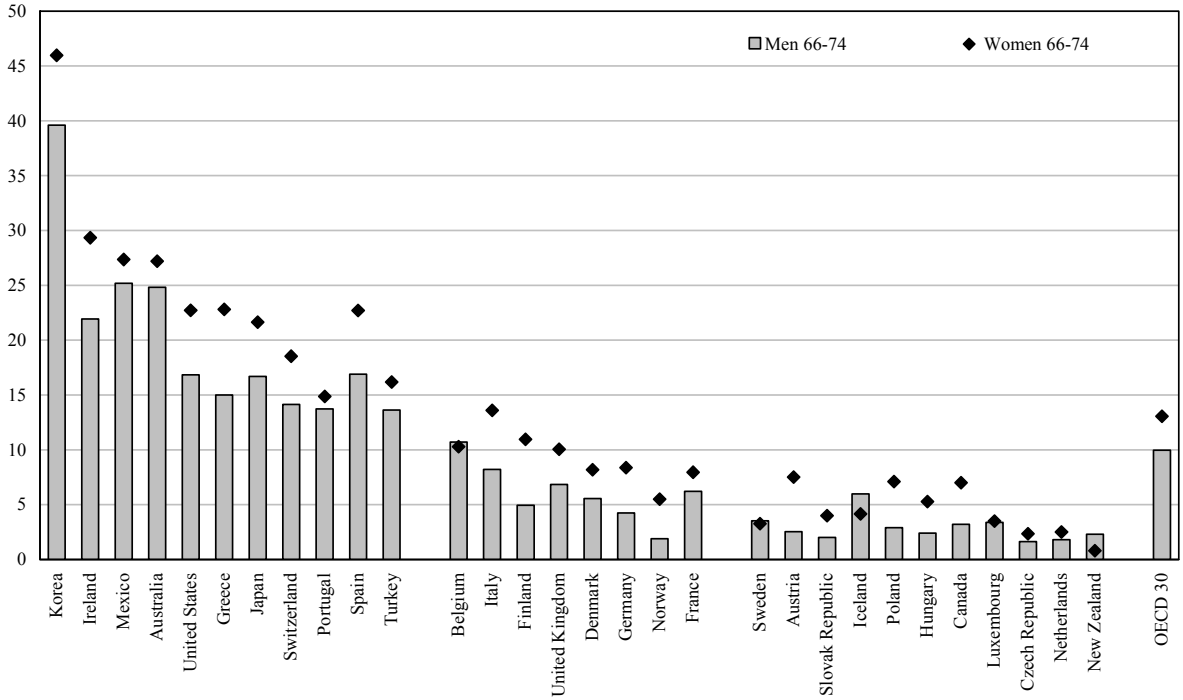



**Figure 3b**

**Poverty Rates among Men and Women for the Age Group 75 and over, Mid-2000s**

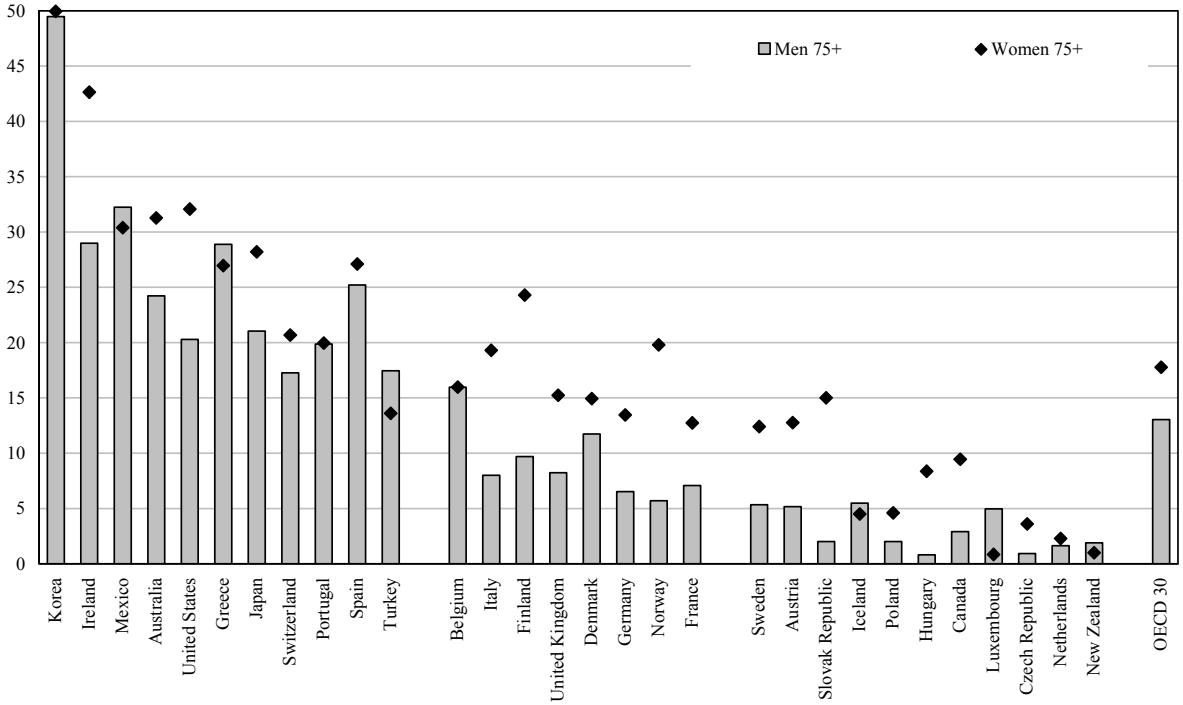


**Table 1**

## Poverty among People of Retirement Age and in Households with a Head of Retirement Age, Subdivided by Working Status of Members and by Household Type, Mid-2000s and Point Change since Mid-1990s

| Country | Poverty Among People of Retirement Age | | Poverty in Households with a Head of Retirement Age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | All | | Working | | Not Working | | Singles | | Couples | |
| | Mid-2000s | Point Changes since mid-1990s | Mid-2000s | Point Change since mid-1990s | Mid-2000s | Point Change since mid-1990s | Mid-2000s | Point Change since mid-1990s | Mid-2000s | Point Change since mid-1990s | Mid-2000s | Point Change since mid-1990s |
| Australia | 27 | 4.6 | 27 | 5.6 | 4 | 3.2 | 32 | 5.4 | 50 | –4.8 | 18 | 9.8 |
| Austria | 7 | –5.7 | 8 | –6.0 | 7 | 5.3 | 9 | –7.6 | 16 | –11.6 | 4 | 0.2 |
| Belgium | 13 | –3.5 | 12 | –2.3 | 4 | –0.6 | 13 | –3.7 | 17 | –6.8 | 10 | 0.1 |
| Canada | 4 | 1.5 | 7 | 3.2 | 2 | 0.7 | 10 | 4.8 | 16 | 7.3 | 4 | 1.8 |
| Czech Republic | 2 | –6.5 | 3 | –5.8 | [..] | [..] | 3 | –6.2 | 6 | –19.1 | 2 | 0.5 |
| Denmark | 10 | –2.1 | 10 | –2.2 | 2 | 0.6 | 12 | –2.3 | 17 | –4.4 | 4 | 0.3 |
| Finland | 13 | 5.3 | 14 | 5.9 | 11 | 7.7 | 14 | 5.5 | 28 | 12.5 | 4 | 2.3 |
| France | 9 | –3.0 | 9 | –2.1 | 1 | –5.9 | 9 | –1.4 | 16 | 0.2 | 4 | –2.4 |
| Germany | 10 | –0.6 | 8 | –1.6 | 2 | –4.7 | 9 | –1.2 | 15 | 0.2 | 5 | –1.8 |
| Greece | 23 | –6.6 | 21 | –7.0 | 7 | –10.5 | 31 | –3.1 | 34 | –4.5 | 18 | –7.1 |
| Hungary | 5 | –2.5 | 5 | –2.9 | [..] | [..] | 5 | –5.2 | 11 | –6.9 | 1 | –2.7 |
| Iceland | 5 | .. | 5 | .. | 3 | .. | 7 | .. | 10 | .. | 2 | .. |
| Ireland | 31 | 18.8 | 25 | .. | 5 | .. | 36 | .. | 65 | .. | 9 | .. |
| Italy | 13 | –2.3 | 13 | –2.1 | 3 | 0.4 | 17 | –4.5 | 25 | –7.5 | 9 | –1.2 |
| Japan | 22 | –1.0 | 21 | –1.1 | 13 | –1.8 | 30 | –7.6 | 48 | –7.9 | 17 | –1.5 |
| Korea | 45 | .. | 49 | .. | 35 | .. | 69 | .. | 77 | .. | 41 | .. |
| Luxembourg | 3 | –1.8 | 3 | –1.6 | [..] | [..] | 4 | –5.4 | 4 | –5.6 | 3 | –6.4 |
| Mexico | 28 | –4.6 | 23 | –8.6 | 19 | –9.1 | 39 | –7.9 | 45 | –5.9 | 21 | –9.2 |
| Netherlands | 2 | 0.9 | 2 | 0.8 | 2 | 1.1 | 2 | 0.7 | 3 | –0.1 | 2 | 1.3 |
| New Zealand | 2 | 0.2 | 4 | 2.5 | 1 | –3.8 | 2 | 1.6 | 3 | 2.1 | 1 | –0.1 |
| Norway | 9 | –6.8 | 9 | –7.1 | 1 | –1.1 | 10 | –7.9 | 20 | –13.8 | 1 | –2.1 |
| Poland | 5 | .. | 6 | .. | 6 | .. | 6 | .. | 6 | .. | 6 | .. |
| Portugal | 17 | –1.1 | 20 | –2.2 | 5 | –4.6 | 25 | –1.0 | 35 | –4.8 | 16 | –2.0 |
| Slovak Republic | 6 | .. | 4 | .. | [..] | [..] | 7 | .. | 10 | .. | 3 | .. |
| Spain | 17 | –1.1 | 27 | 16.8 | 12 | –4.3 | 32 | 23.3 | 39 | 32.7 | 24 | 12.6 |
| Sweden | 8 | 4 | 6 | 2.7 | 3 | 1.1 | 7 | 3.2 | 13 | 5.8 | 1 | 0.5 |
| Switzerland | 18 | 4.3 | 18 | –1.8 | [..] | [..] | [..] | [..] | 24 | 6.1 | 15 | 3.4 |
| Turkey | 15 | –8.1 | 18 | –4.1 | 20 | 0.6 | 16 | –16.4 | 38 | –6.2 | 17 | –4.0 |
| United Kingdom | 10 | –2.1 | 10 | –0.8 | 1 | 0.1 | 12 | –2.5 | 17 | –0.9 | 7 | –1.3 |
| United States | 24 | 2.9 | 24 | 3.2 | 9 | 1.4 | 34 | 5 | 41 | 3 | 17 | 3.2 |
| OECD | 13 | –0.7 | 14 | –0.7 | 7 | –1.2 | 17 | –1.4 | 25 | –1.6 | 9 | –0.4 |

Note: Poverty definition is the same as described for Figure 1. Data for mid-2000s refer to around 2000 for Japan and Switzerland. Data for changes refer to the period from the mid-1990s to around 2000 for Austria, Belgium, Czech Republic, Denmark, France, Ireland, Portugal and Spain (where 2005 data, based on EU-SILC, are not comparable with those for earlier years).
[..] indicates that the sample size is too small.
Source: OECD (2008).

Poverty differences between single elderly persons and elderly couples are most notable in Ireland: a full 56 percentage points separates the poverty experience of single elderly persons and elderly couples. Korea, Australia, and Japan show a poverty differential in excess of 30 points. Mexico, the United States, Finland, Turkey, Portugal and Norway had differences in the 19-24 point range. Note that the above countries are generally those with higher-than-average poverty rate for older people (see Section 2.1 above). In contrast, countries with relatively low levels of overall poverty rate for older people show smaller differences in the poverty rates for single elderly persons and elderly couples. This is observed particularly in Poland, the Netherlands and Luxembourg.

### *2.4 Trends in older people poverty*

The rate of poverty increase or decrease for older persons over time clearly adds important detail to the body of knowledge on the poverty risk of older persons. The OECD Income Distribution Database provides information on longer term trends (since the mid-1970s) for seven countries: Canada, Finland, Greece, the Netherlands, Sweden, the United Kingdom and the United States. Results for other 23 OECD countries are available for a somewhat shorter period: since mid-1980s.

There is a growing body of evidence that suggests that older people poverty rates in OECD countries contrast favourably with those for younger age groups. This result is summarised in Figure 4, which provides poverty rates for seven age groups (from the age group "below 18" to the age group "above 75") as a proportion of the poverty rate for the entire population. These results provided for time periods for which data are available.

- On average – across the 23 OECD countries covered by the left-hand panel of Figure 4 – the poverty rates of people aged 75 and over has fallen from a level almost twice as high as that of the population average in the mid-1980s to 1.5 times by the mid-2000s. For people aged 66 to 74 this risk is now lower than for children and young adults.
- Results for a smaller number of OECD countries, as shown by the right-hand panel of Figure 4, indicate that the reduction of relative poverty rates for elderly people is even larger when looking at changes since the mid-1970s.
- In general, poverty rates for all age groups above 50 have declined, while those for people below that age have risen. By mid-2000s, children and young adults had poverty rates about 25 per cent above the population average, while they were close to and below that average, respectively, 20 years ago.[2]

Figure 5 highlights the differences across country experiences for trends in poverty rates for older persons during two periods: between mid-1980s and mid-1990s (the left panel) and between mid-1990s and mid-2000s (the centre panel). The findings can be summarised as:

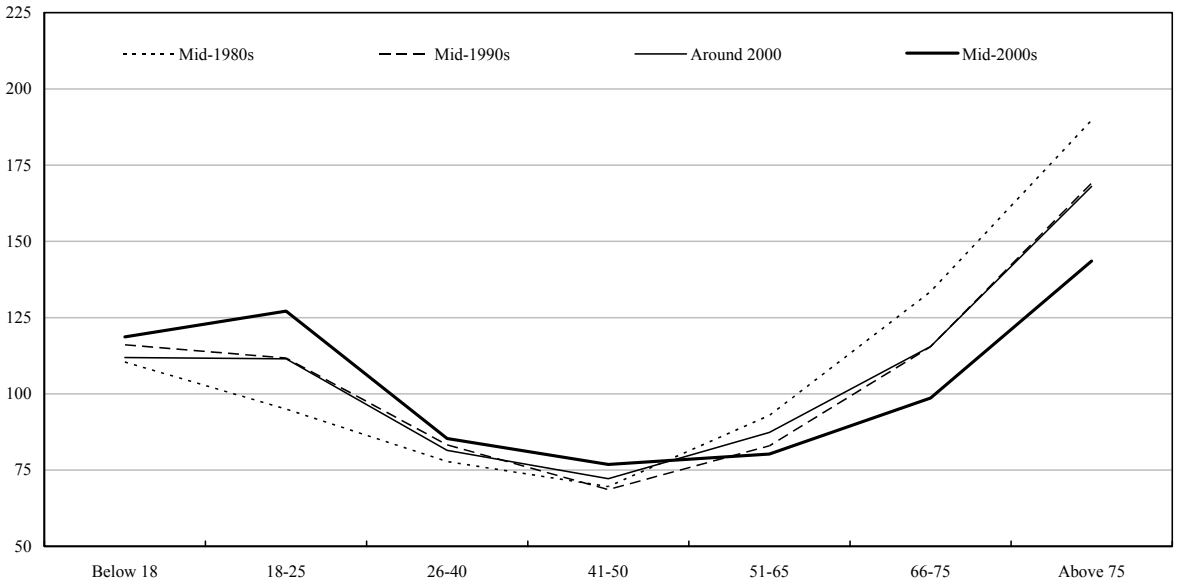
- from the mid-1980s to the mid-1990s, the un-weighted average of older people poverty rates across 24 OECD countries decreased by 0.2 percentage points. Canada, Denmark and Luxembourg observed larger decreases in poverty (5-8 points), while in Ireland and Mexico older people poverty rates increased by 10.9 and 4.6 points respectively;
- in the decade from the mid-1990s to the mid-2000s, poverty rates for older people decreased again in a majority of countries, with the average rate across 24 OECD countries declined again by 0.7 points. In six countries – Austria, the Czech Republic, Greece, Mexico, Norway and

[2] In some countries, however, the opposite pattern prevails. In particular, the poverty rate of children and/or young adults fell during the most recent decade in Australia, Spain and the United States while that of elderly people increased.

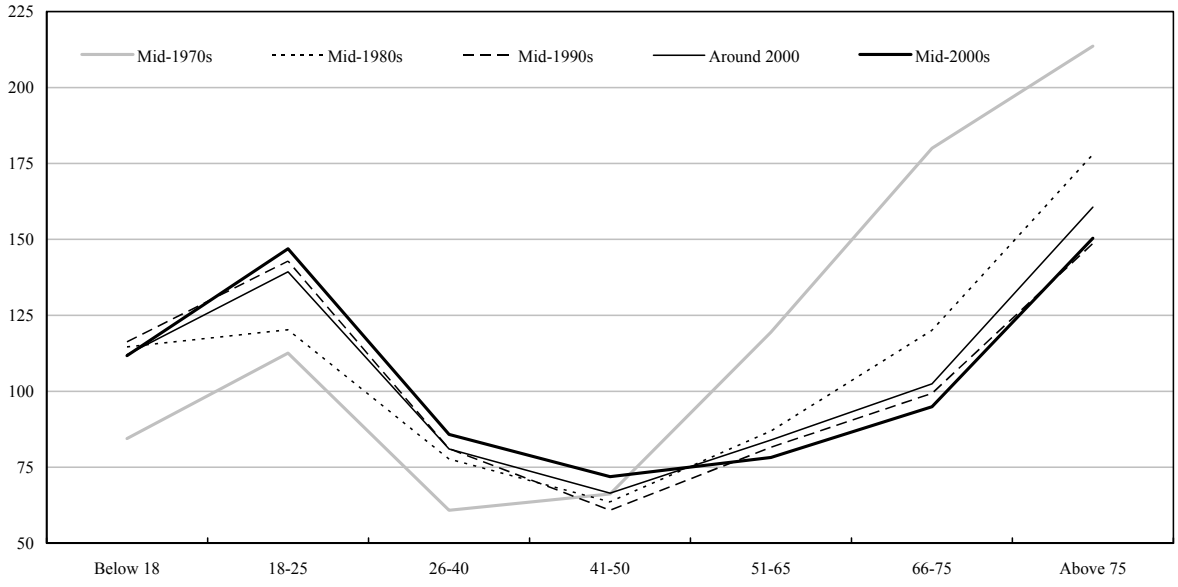
**Figure 4**

**Risk of Relative Poverty by Age of Individuals, Mid-1970s to Mid-2000s, OECD Average**
*(poverty rate of the entire population in each year = 100)*

**23 OECD Countries**




**7 OECD Countries**

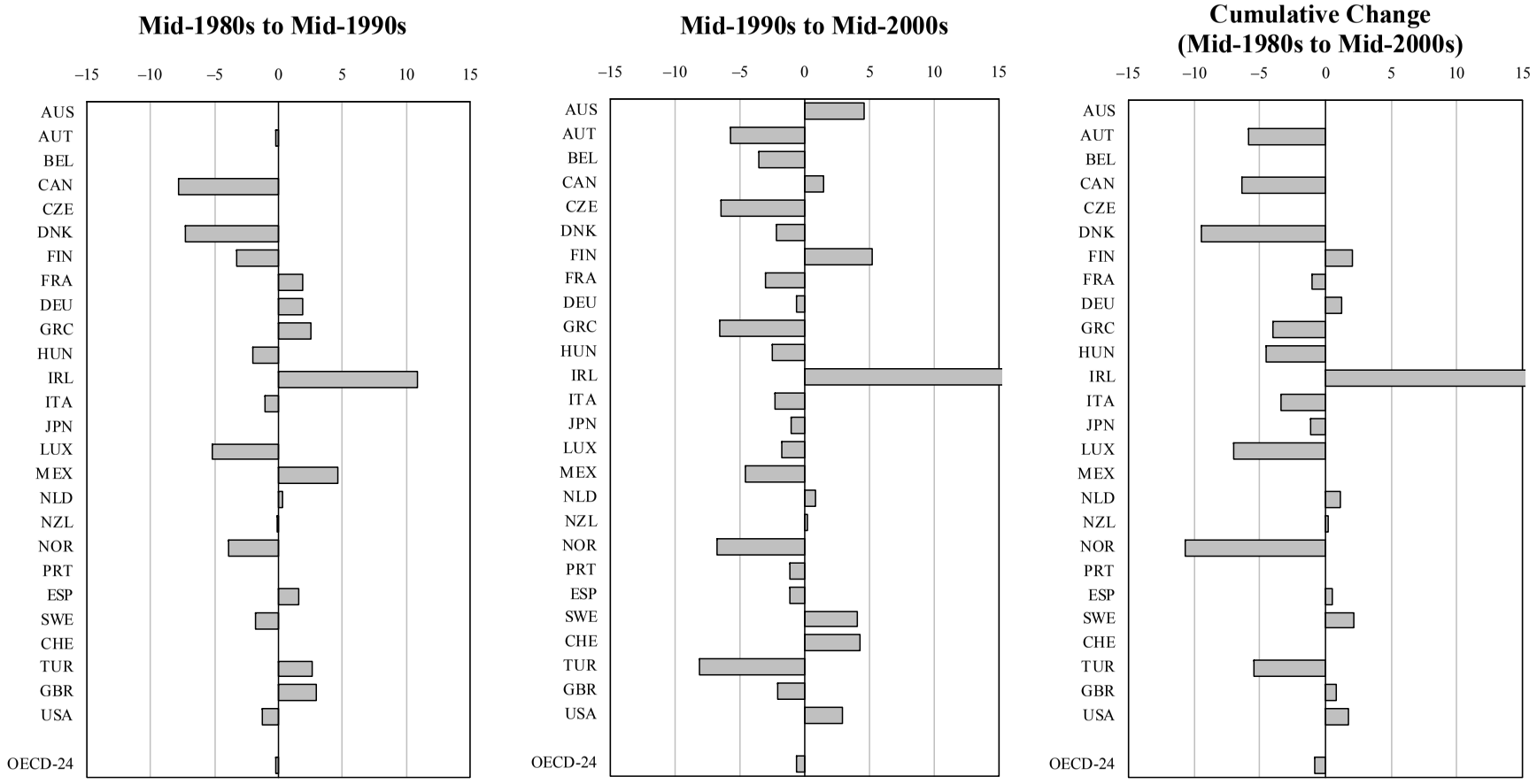



Note: Relative poverty risk is the age-specific poverty rate divided by the poverty rate for the entire population times 100. The poverty definition is the same as used for Figure 1. OECD-7 is the average for Canada, Finland, Greece, the Netherlands, Sweden, the United Kingdom and the United States, and OECD-23 is the average poverty rates across all the remaining OECD countries Data for mid-1980s refer to around 1990 for the Czech Republic, Hungary and Portugal; those for mid-2000s refer to 2000 for Austria, Belgium, the Czech Republic, Ireland, Portugal and Spain (where 2005 data, based on EU-SILC, are not comparable with those for earlier years).
Source: OECD (2008).

**Figure 5**

**Trends in Poverty Rates among Older People (Age 66+)**

*(point changes in income poverty rate at 50 per cent median level over different time periods)*




Note: Data in the first panel refer to changes in the poverty rate from around 1990 to mid-1990s for Czech Republic, Hungary and Portugal; no data are available for Australia and Switzerland. Data in the second panel refer to changes from the mid-1990s to around 2000 for Austria, Belgium, Czech Republic, Ireland, Portugal and Spain (where 2005 data, based on EU-SILC, are not comparable with those for earlier years); and to changes from 2000 to 2005 for Switzerland. OECD-24 refers to the simple average of OECD countries with data spanning the entire period (all countries shown above except Australia and Switzerland).
Source: OECD (2008).

Turkey – the decrease in poverty was particularly pronounced (at 5+ points), while sizeable poverty increases were recorded in Australia, Finland, Sweden, Switzerland and particularly in Ireland;

- for Norway, the decline in the poverty rate is a continuation of a trend from the previous period, whereas for Mexico the decline in this later period offsets the increase observed in the previous period;
- only seven countries observed a significant rise in older people poverty during this period. The most notable among them is Ireland: the poverty for older people rose by a large 18.8 points, making the cumulative change between mid-1980s and mid-2000s close to 30 percentage points.

## 3 Pension income patterns

### *3.1 Income patterns across age groups and household types*

This section describes how average income varies across age groups and across different types of household. Average disposable income varies with the age of individuals in very similar ways across OECD countries (see Figure 6 for results in a selected group of countries). In all countries, average income rises with age until the end of working life and then declines, although there are differences across countries in the age at which the highest level is reached.

Similar results are observed when looking at people living in different household types that are a reflection of different life cycle stages (see Figure 7). Average income rises when comparing single-parent households to single working age persons without children, and is at its maximum for working age couples with no children. Average income are lower for two-adult households with children (with a head of working age), for couples with a head of retirement age and for older persons living alone. The income patterns by household type is generally more varied than that by age, and there is also greater variations across countries.

### *3.2 Income composition*

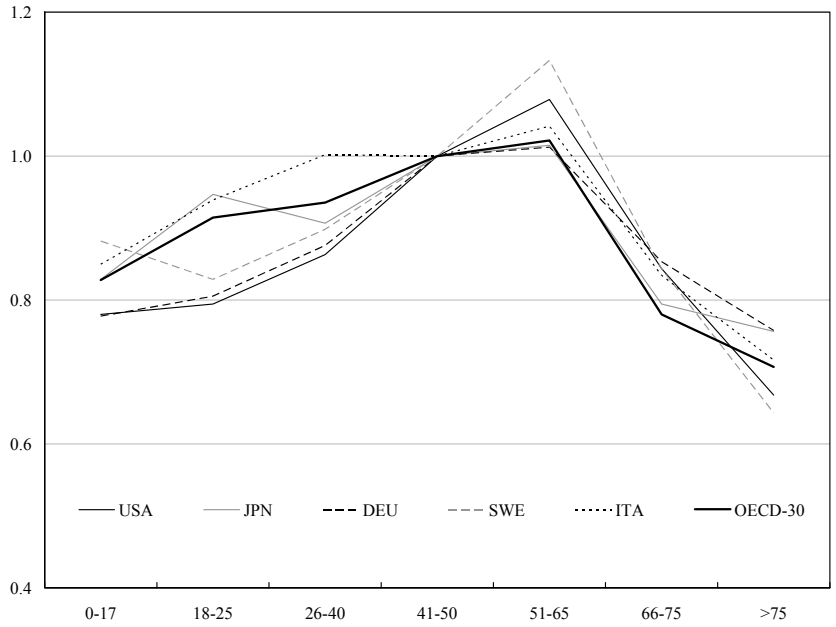
Pension systems in many OECD countries have been reformed in the last 10-15 years, and they underpin a trend towards a greater diversification of the pension income portfolio in the majority of countries. In general, there has been a move away from the public provision of pension income and towards greater reliance on capital income in the form of private personal and occupational pension income. Below, results from the OECD Income Distribution Database are presented so as to shed further light on these income developments for older persons.

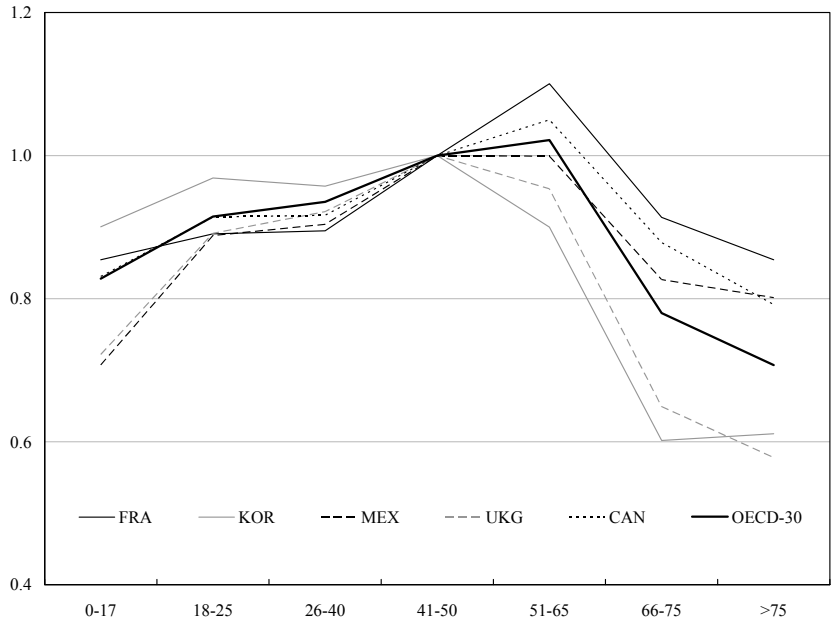
Table 2 illustrates the share of various components of income for households of retirement age. These components include capital income as well as social security cash benefits and household taxes. These results are provided for two time periods: for mid-1990s and mid-2000s. The following results stand out when looking at the share of the social security cash benefits, which contains universal, income-related as well as contributory components of public pensions.

- Not surprisingly, social security cash benefits are the most significant part of income for the population of retirement age. On average, this amounts to two thirds of their income, and to more than 90 per cent in Belgium, France, Italy, Luxembourg, Sweden and Austria.
- In contrast, social security cash benefits account for only around half of the household income of the elderly in Australia, Canada, Ireland, Japan, the Netherlands, Turkey, the United Kingdom and the United States, and they are least significant in Korea, and Mexico.

**Figure 6**

**Relative Income by Age of Individual in Selected OECD Countries**
**Equivalised Household Disposable Income, Mid-2000s**
*(persons aged 41-50 = 1)*




Source: OECD (2008).

- Out of 17 countries for which trend data is available, eight countries exhibit a decline in the share of social security cash transfers in retirement income. Two Nordic countries, Finland and Denmark, and Australia show a large decline (8+ share points) in the size of this component in retirement income.
- Retirement income saw a rise in the importance of the social security cash income in only three countries: Japan (18 share points), Portugal (13) and Italy (9).

Capital income, which contains private occupational and personal pensions and other private transfers, is the second most important component of income for older people in the majority of countries. Results show that:

- the share of capital income is particularly high in Australia, Denmark, Canada, the United Kingdom and the United States, as these countries have well developed private pension schemes;[3]

[3] The apparently high level of capital income for the retirement age population in Finland reflects the fact that, in the income questionnaire used by the OECD, mandatory occupational pensions are counted as a private transfer (hence included in capital income) rather than as government cash transfers.

**Table 2**

## Income Composition of Older Households, Mid-1990s and Mid-2000s

| Country | Mid-1990s | | | | | Mid-2000s | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Earnings | Self-employment Income | Capital Income | Transfers | Taxes | Earnings | Self-employment Income | Capital Income | Transfers | Taxes |
| Australia | 0.20 | 0.03 | 0.29 | 0.57 | –0.09 | 0.18 | 0.04 | 0.39 | 0.49 | –0.10 |
| Austria | - | - | - | - | - | 0.15 | 0.09 | 0.02 | 1.01 | –0.27 |
| Belgium | 0.09 | 0.02 | 0.13 | 0.76 | - | 0.11 | 0.03 | 0.09 | 0.97 | –0.20 |
| Canada | 0.18 | 0.03 | 0.45 | 0.52 | –0.18 | 0.17 | 0.03 | 0.48 | 0.47 | –0.15 |
| Czech Republic | 0.22 | 0.04 | 0.02 | 0.78 | –0.06 | 0.20 | 0.06 | 0.01 | 0.79 | –0.06 |
| Denmark | 0.13 | 0.04 | 0.41 | 0.90 | –0.48 | 0.13 | 0.04 | 0.46 | 0.81 | –0.44 |
| Finland | 0.08 | 0.06 | 0.79 | 0.34 | –0.27 | 0.09 | 0.06 | 0.92 | 0.18 | –0.25 |
| France | 0.08 | 0.02 | 0.08 | 0.89 | –0.07 | 0.05 | 0.01 | 0.09 | 0.91 | –0.06 |
| Germany | 0.12 | 0.02 | 0.14 | 0.86 | –0.13 | 0.10 | 0.04 | 0.17 | 0.82 | –0.13 |
| Greece | 0.12 | 0.16 | 0.12 | 0.60 | - | 0.14 | 0.11 | 0.08 | 0.66 | - |
| Hungary | 0.14 | 0.09 | 0.03 | 0.74 | - | 0.09 | 0.03 | 0.03 | 0.86 | - |
| Iceland | - | - | - | - | - | 0.36 | 0.05 | 0.13 | 0.80 | –0.34 |
| Ireland | 0.20 | 0.13 | 0.14 | 0.59 | –0.06 | 0.15 | 0.08 | 0.27 | 0.56 | –0.05 |
| Italy | 0.19 | 0.11 | 0.11 | 0.79 | –0.19 | 0.14 | 0.15 | 0.05 | 0.87 | –0.21 |
| Japan | 0.56 | 0.14 | 0.08 | 0.38 | –0.16 | 0.42 | 0.09 | 0.09 | 0.56 | –0.15 |
| Korea | - | - | - | - | - | 0.31 | 0.31 | 0.28 | 0.16 | –0.05 |
| Luxembourg | 0.13 | 0.02 | 0.09 | 0.76 | - | 0.10 | 0.04 | 0.10 | 0.91 | –0.15 |
| Netherlands | 0.10 | 0.04 | 0.45 | 0.57 | –0.14 | 0.09 | 0.02 | 0.46 | 0.53 | –0.10 |
| New Zealand | 0.11 | 0.04 | 0.36 | 0.76 | –0.27 | 0.14 | 0.04 | 0.25 | 0.77 | –0.20 |
| Norway | 0.13 | 0.06 | 0.33 | 0.71 | –0.23 | 0.12 | 0.02 | 0.35 | 0.73 | –0.23 |
| Poland | - | - | - | - | - | 0.19 | 0.06 | 0.01 | 0.93 | –0.18 |
| Portugal | 0.27 | 0.11 | 0.09 | 0.61 | –0.07 | 0.26 | 0.07 | 0.05 | 0.74 | –0.12 |
| Spain | 0.18 | 0.06 | 0.07 | 0.68 | - | 0.21 | 0.03 | 0.05 | 0.70 | - |
| Slovak Republic | - | - | - | - | - | 0.16 | 0.02 | 0.01 | 0.86 | –0.05 |
| Sweden | 0.09 | 0.01 | 0.31 | 0.95 | –0.35 | 0.12 | 0.02 | 0.30 | 0.96 | –0.40 |
| Switzerland | - | - | - | - | - | 0.69 | - | - | 0.64 | –0.33 |
| United Kingdom | 0.13 | 0.04 | 0.41 | 0.54 | –0.11 | 0.11 | 0.03 | 0.42 | 0.54 | –0.10 |
| United States | 0.27 | 0.04 | 0.39 | 0.44 | –0.14 | 0.35 | 0.05 | 0.35 | 0.42 | –0.16 |
| | | | | | | | | | | |
| OECD (17) | 0.18 | 0.06 | 0.29 | 0.66 | –0.18 | 0.17 | 0.05 | 0.30 | 0.66 | –0.17 |

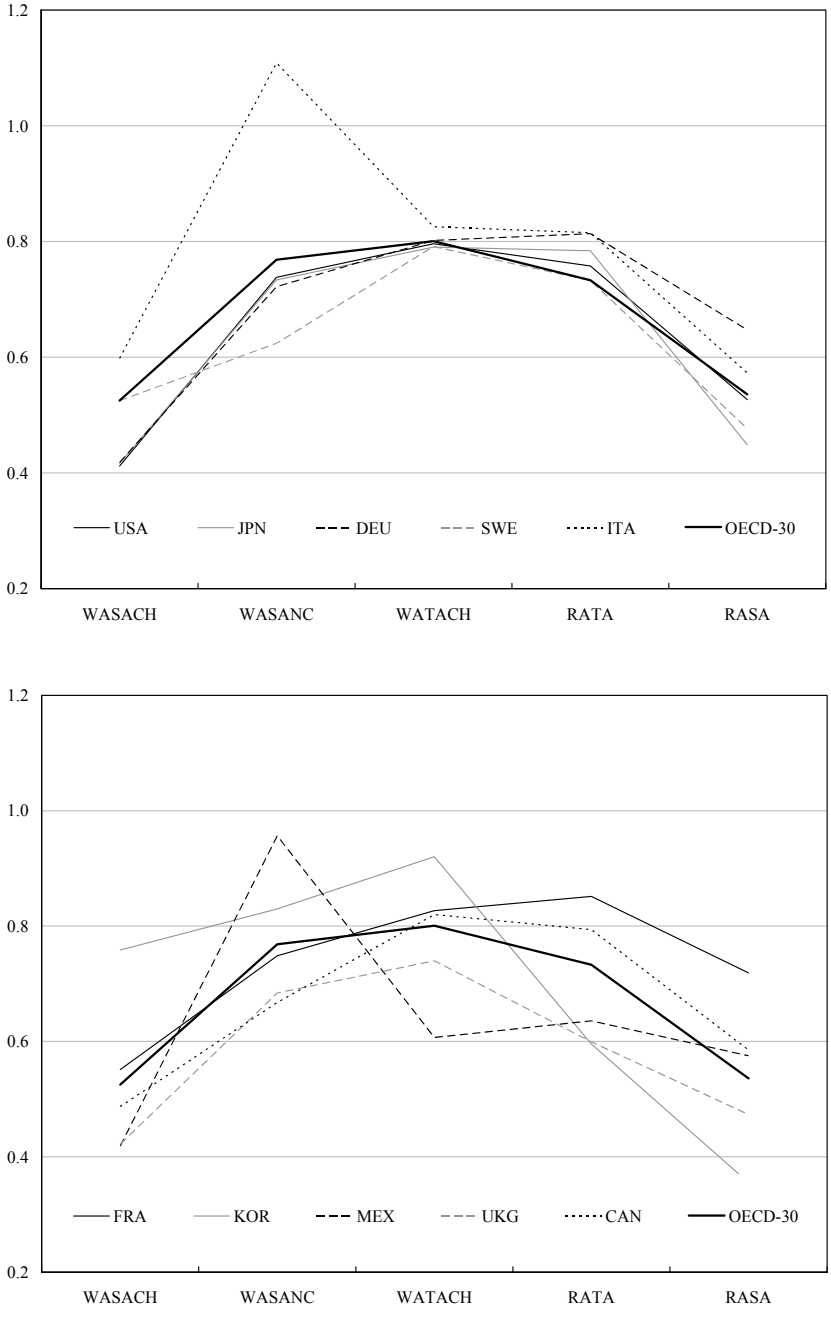
- in Finland, Denmark and Australia, the rise in the share of the capital income offsets almost exactly the fall observed in the share of the social security cash income. The rise in the capital income share in Ireland comes largely at the expense of a fall in the share of earnings and self-employment income.

The role of taxation for older households also varies widely across countries. Household taxes account for more than 40 per cent of household disposable income in Sweden and more than 50 per cent in Denmark and Iceland. The share of household taxes has decreased in Canada, Denmark, Finland, Germany, Japan, the Netherlands, and New Zealand over the period mid-1990s and mid-2000s.

It is also clear that the relationship between measured taxes and transfers differs across countries. For example, in the United States – based on the household survey data used – household taxes (at 26 per cent of household income) are nearly three times higher than public cash transfers. At the other extreme, in the Czech Republic, France, Luxembourg and the Slovak Republic,

**Figure 7**

**Relative Income by Household Type in Selected OECD Countries**
**Equivalised Household Disposable Income, Mid-2000s**
*(two or more adults without children and working-age head = 1)*




Note: WASACH = working-age head, single adult with children;
WASANC = working-age head, single adult without children;
WATACH = working-age head, two or more adults with children;
WATANC = working-age head, two or more adults without children;
RATA = retirement age head, two or more adults;
RASA = retirement age head, single adult.
Source: OECD (2008).

measured transfers account for a larger share of household disposable income than measured taxes. A major factor behind these variations is the fact that employer social security contributions – which finance a large part of the welfare state in these and some other countries – are paid by employers directly to the government, and since they do not pass through the household sector they are not recorded in household income surveys.

## 4 Redistributive role of public cash benefits and household taxes

### *4.1 Public cash benefits*

Table 3 provides information for OECD countries on how public cash benefits are distributed across income groups. The measure used for summarising this information is the "Concentration coefficient" as defined at the foot of Table 3. The key message drawn from the measure of concentration coefficient is to see how poorer income groups benefit more from a higher share of public cash benefits than their share in the overall disposable income.[4] Results show that:

- cash benefits are more progressively distributed than market income in all countries, thus they contribute to reducing inequality;
- the distribution of cash benefits for retirement age households is most progressive in Finland, followed by Australia and Denmark, while it is least progressive in Mexico, Turkey, Korea, Portugal, Poland and France;
- with the exceptions of Portugal and Turkey, transfers to people of working age are more progressively distributed than those to people of retirement age, although the differences are small in Greece, Iceland, Poland and Portugal, as well as in Italy, Luxembourg and Spain;
- the ranking of countries is broadly similar for transfers to people of retirement age and of working age, although Finland (not Australia) has the most progressive distribution of transfers to people of retirement age.

### *4.2 Household taxes*

The second panel of Table 3 shows the distribution of household taxes (income taxes and employee social security contributions). Because taxes are deducted from household income, higher values of the concentration coefficient imply a more progressive distribution of household taxes. Results show that:

- overall, there is less variation in the progressivity of taxes across countries than in the case of transfers. For the retirement age households, taxation is most progressively distributed in Australia, Ireland and the Czech Republic. This is followed by the Slovak Republic, the Netherlands and the United States;
- taxes tend to be least progressive in the retirement age households of the Nordic countries, Poland and Switzerland;
- in most but not all countries taxes are more progressive for the retirement-age population than for the working-age population, reflecting the existence of various tax concessions that exist for low-income retired people.

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[4] For greater details on the definition and suitability of the concentration coefficient, see discussion in OECD (2008), pp. 104-6. Note in particular that the concentration coefficient of transfers can be negative in the case where poorer income groups receive a higher share of transfers than their share of disposable income – with lower and more negative values implying greater progressivity.

**Table 3**

**Progressivity of Cash Benefits and Household Taxes**
*(concentration coefficients for cash benefits and household taxes, mid-2000s)*

| Country | Public Cash Benefits | | | Household Taxes | | |
|---|---|---|---|---|---|---|
| | Working Age | Retirement Age | Total | Working Age | Retirement Age | Total |
| Australia | –0.431 | –0.080 | –0.400 | 0.492 | 0.816 | 0.533 |
| Austria | 0.130 | 0.256 | 0.157 | 0.365 | 0.464 | 0.381 |
| Belgium | –0.141 | 0.169 | –0.120 | 0.363 | 0.420 | 0.398 |
| Canada | –0.173 | –0.006 | –0.152 | 0.472 | 0.586 | 0.492 |
| Czech Republic | –0.151 | 0.037 | –0.154 | 0.424 | 0.789 | 0.471 |
| Denmark | –0.303 | –0.054 | –0.316 | 0.332 | 0.336 | 0.349 |
| Finland | –0.258 | –0.138 | –0.219 | 0.419 | 0.444 | 0.428 |
| France | 0.098 | 0.285 | 0.136 | 0.354 | 0.474 | 0.374 |
| Germany | –0.066 | 0.175 | 0.013 | 0.439 | 0.485 | 0.468 |
| Greece[1] | 0.176 | 0.202 | 0.115 | .. | .. | .. |
| Hungary[1] | –0.025 | 0.119 | –0.016 | .. | .. | .. |
| Iceland | 0.018 | 0.037 | –0.041 | 0.257 | 0.296 | 0.267 |
| Ireland | –0.205 | –0.001 | –0.214 | 0.531 | 0.782 | 0.570 |
| Italy | 0.158 | 0.225 | 0.135 | 0.512 | 0.623 | 0.546 |
| Japan | 0.020 | 0.121 | 0.010 | 0.356 | 0.429 | 0.378 |
| Korea | 0.040 | 0.282 | –0.012 | 0.363 | 0.462 | 0.380 |
| Luxembourg | 0.075 | 0.145 | 0.085 | 0.404 | 0.430 | 0.420 |
| Mexico[1] | 0.407 | 0.518 | 0.373 | .. | .. | .. |
| Netherlands | –0.223 | –0.014 | –0.198 | 0.436 | 0.705 | 0.471 |
| New Zealand | –0.331 | –0.011 | –0.345 | 0.485 | 0.249 | 0.498 |
| Norway | –0.177 | 0.074 | –0.183 | 0.355 | 0.433 | 0.376 |
| Poland[1] | 0.173 | 0.198 | 0.185 | 0.382 | 0.325 | 0.379 |
| Portugal[1] | 0.315 | 0.295 | 0.247 | .. | .. | .. |
| Slovak Republic | –0.030 | 0.104 | –0.056 | 0.388 | 0.726 | 0.422 |
| Spain[1] | 0.102 | 0.175 | 0.063 | .. | .. | .. |
| Sweden | –0.153 | 0.090 | –0.145 | 0.330 | 0.312 | 0.337 |
| Switzerland | –0.176 | 0.015 | –0.170 | 0.211 | 0.202 | 0.223 |
| Turkey[1] | 0.320 | 0.288 | 0.347 | .. | .. | .. |
| United Kingdom | –0.347 | 0.035 | –0.275 | 0.486 | 0.614 | 0.533 |
| United States | –0.115 | 0.105 | –0.089 | 0.549 | 0.658 | 0.586 |
| OECD-24[2] | –0.107 | 0.085 | –0.099 | 0.404 | 0.502 | 0.428 |

Note: The concentration coefficient is computed in the same way as the Gini coefficient of household income, so that a value of zero means that all income groups receive an equal share of household transfers or pay an equal share of taxes. However, individuals are ranked by their equivalised household disposable income.
[1] Data on public cash benefits are reported net of taxes (*i.e.*, household taxes are not separately identified).
[2] Average of the 24 OECD countries with data on both gross public cash transfers and household taxes (*i.e.* all countries shown in the table except Greece, Hungary, Mexico, Portugal, Spain and Turkey).
Source: OECD (2008).

## 5 Recent pension reforms and their impact

Figure 8 presents results for 13 OECD countries on the impact of recent pension reforms on the future value of pension entitlements.[5] It simulates the impact of reforms for those workers who entered the labour market in 2004.[6] It compares the situation for a person who spent a full career under the reformed pension system with the benefits that would have been received had the system not been changed.

The results shown are reported in terms of net replacement rates: that is, the value of the pension in retirement, after taxes, compared with the level of earnings when working, after taxes and contributions. In each case, the left-hand chart shows the position of low earners: people earning 50 per cent of the economy-wide average each year of their entire working life. At the right-hand side are the net replacement rates for average earners.

In view of the effect of pension reforms on retirement income of workers at different earnings levels, countries are divided into three groups depending on the effect of their reforms on the retirement income of workers at different earnings levels.

- In the top panel (Figure 8a) are countries that protected low earners from the impact of the reforms. In France and Sweden, for example, the benefits for average earners will be about 20 per cent lower as a result of the reforms while those of low earners are scarcely changed. In Mexico and Portugal, the reduction in benefits for average earners are around 50 and 40 per cent respectively. The reduction for low earners is only around half this level in both cases. In the United Kingdom, recent reforms left the pensions of average earners unchanged, but they increased the benefits for low earners by nearly 25 per cent. All of these reforms, therefore, increased the targeting of the pension system on people who had low income when working.
- The middle panel (Figure 8b) shows four countries in which reforms will result in a similar impact on benefits for both low earners and average earners. Germany and Austria observe the highest decline in net replacement rates, followed by Japan, and this is observed for both low wage and average wage earners. No changes in net replacement rates are observed for Korea and Finland, for both low and average earners.
- The bottom panel (Figure 8c) shows countries with reforms that worked in the opposite way to the first group of countries. In Poland, for example, benefits for average earners will change very little as a result of the reform while for low earners they will fall by over 20 per cent. Similarly, average earners are expected to lose around 5 per cent of benefits in the Slovak Republic, compared with 13 per cent for low earners. These countries explicitly wanted to strengthen the link between pensions in retirement and earnings when working in the belief that this was fairer than a redistributive system and that it would reduce work disincentive distortions in the labour market.

## 6 Conclusions

Results presented in this paper provide a robust evidence that OECD countries differ significantly in terms of older people poverty rates. Using a relative country-specific poverty line, almost 13 per cent of all older people (aged 66 or above) living in OECD member countries are identified as "poor". Three country groupings are distinguished on the basis of poverty rates for older people: nine countries with low poverty rates for older people (<6 per cent), ten countries

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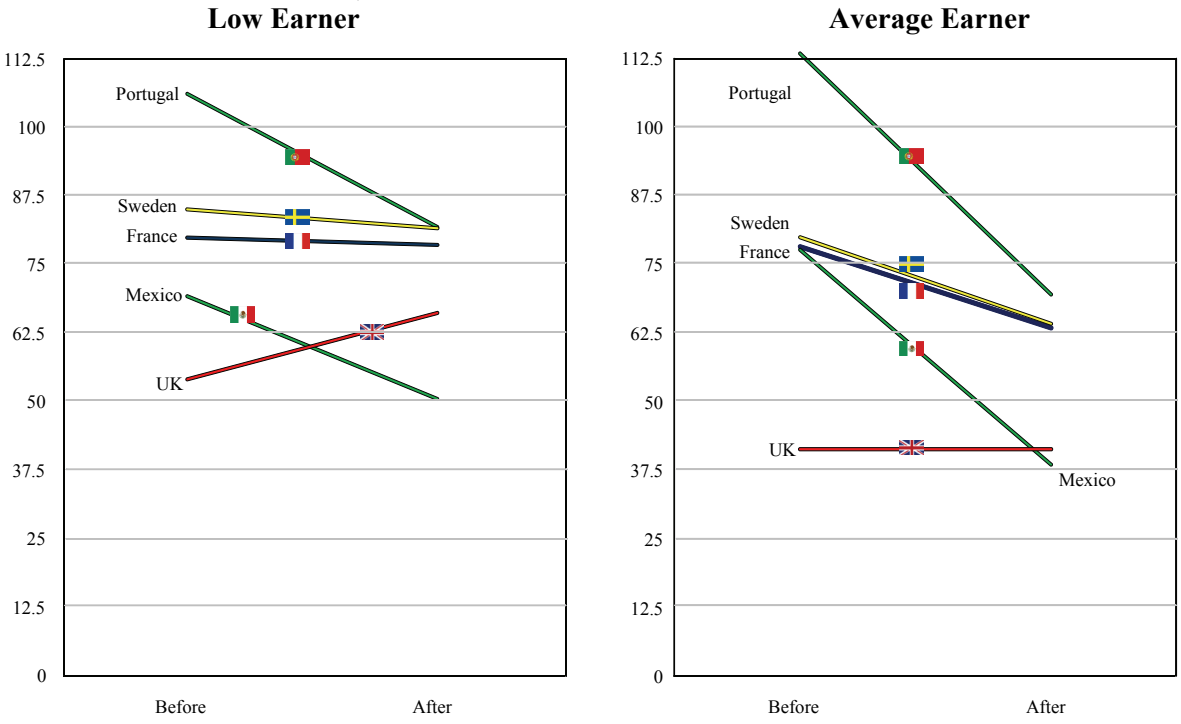
[5] These results are drawn from Martin and Whiteford (2008) and OECD (2007).

[6] For a summary of recent reforms, see OECD (2009), Zaidi and Grech (2007) and Whiteford and Whitehouse (2006).

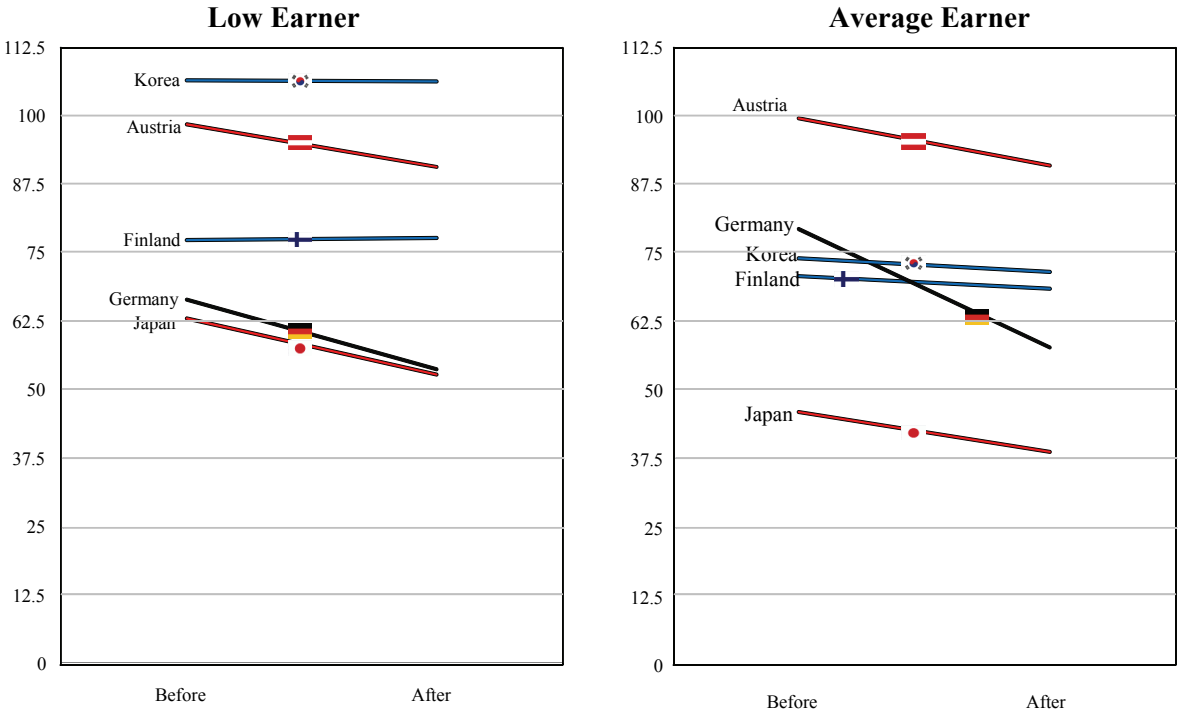
**Figure 8**

**Impact of Pension Reforms on Net Replacement Rates by Earnings Level**

**a) Reforms that Protected Low Earners**




**b) Across-the-Board Cuts in Benefits**

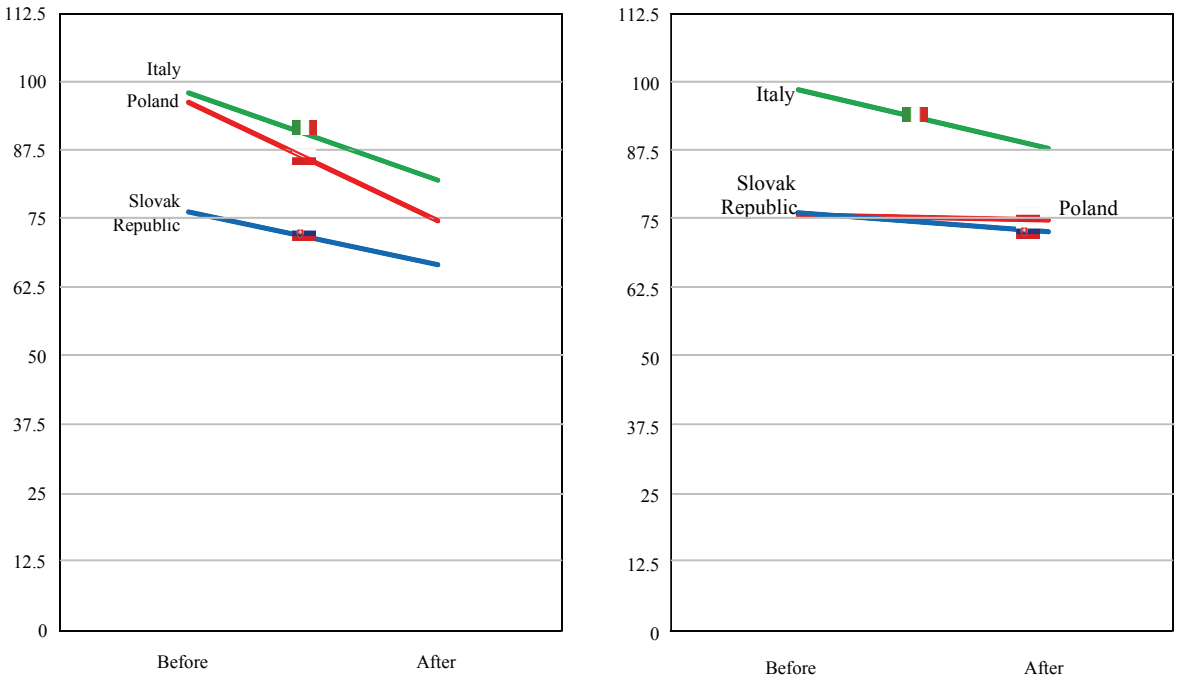



Source: Martin and Whitehouse (2008).

**Figure 8 (continued)**

**Impact of Pension Reforms on Net Replacement Rates by Earnings Level**

**c) Reforms that Strengthened the Link Between Contributions and Earnings**




Source: Martin and Whitehouse (2008).

with lower-than-average poverty rates (7-13 per cent) and eleven countries with higher-than-average poverty rates (>15 per cent). No single explanation can be meaningfully provided to explain this differentiation across the three groupings of countries. Countries with low poverty rates for older people generally have a good social safety net in the form of a basic pension (e.g. the Netherlands, New Zealand and Canada) and/or they offer strong redistribution in the earnings-related contributory pension schemes in the form of minimum guaranteed pensions.

The overlapping group of single elderly women and the oldest age cohort 75+ have, in general, a much higher poverty rate compared to other subgroups of older people. The low pension income for older women is mainly due to the fact that their working lives experienced patterns of employment which has generally low coverage of pension scheme affiliation, and also they had childcare related gaps in their employment record. One reason for the high risk of poverty for the oldest age cohort is that this group has not enjoyed a pension coverage in many countries during the earlier part of their working career. When pension systems matured, they gradually offered greater opportunities to a larger group of working age people to be affiliated with a formal mechanism to save for their pensions. Another explanation is that in many countries the indexation of pension benefits with prices only led to pension benefits lagging behind the general evolution of income.

There is a growing body of evidence that suggests that older people poverty rates in OECD countries contrast favourably with those for younger age groups. In general, poverty rates for all

age groups above 50 have declined, while those for people below that age have risen. The decline in the poverty of retirees is indeed a reflection of the success story of past pension policies in providing for adequate pension benefits. However, in view of financial sustainability concerns linked with such pension generosity in many countries, recent pension reforms have scaled down the level of pension benefits. Thus, in the absence of extending working careers, it is likely that future generations of older persons will be more often poor than the rest of the population. The evidence presented in this paper show that reforms in some countries will make their systems less redistributive whereas other countries (such as the United Kingdom and France) have strengthened the protection of low earners in their reformed system.

## ANNEX
## A SYNOPSIS OF POVERTY DEFINITION AND ITS MEASUREMENT

The poverty definition adopted in this study is the relative country-specific poverty measure: this views poverty in a nationally defined social and economic context. It is commonly measured as the percentage of population with cash income less than some fixed proportion (say, 50 per cent) of national median income. Such relative poverty measures are now commonly used as the official poverty rate in several OECD countries. The measurements are usually based on a household's yearly cash income and frequently take no account of household wealth, or inequality of resource distribution that may exist within a household.

The main poverty line used in the OECD's report *Growing Unequal?* (OECD, 2008) is based on a level of income that is set at 50 per cent of the median household income. Household income includes earnings, transfers and income from capital, and is measured here net of direct taxes and social security contributions paid by households.

The data reported here are collected through a network of OECD's national experts, who apply common conventions and definitions to the unit record data from different national data sources and supply detailed cross-tabulations to the OECD. Years of reference vary slightly across countries. For the mid-2000s, most data concern the year 2004, except for Canada, Denmark, Germany, Hungary, Ireland, Korea, the United Kingdom, and the United States for which data belong to 2005; and the Netherlands for which data belong to 2003. For the mid-1990s, most data concern the year 1995, except for Austria for which data belong to 1993; Ireland, Japan, Mexico and Turkey for which data belong to 1994; and the Czech Republic, France and Luxembourg for which data refer to 1996.

Some qualifications for results presented in this report are in order. The estimates of the elderly poverty rates are very sensitive to some of the measurement methods adopted.

- *First*, the cash income definition used here exaggerates the poverty rates of the elderly compared to other groups because no account is taken of the value of services drawn from owner-occupied accommodations. In Denmark, for example, the inclusion of imputed rents in the income definition lowers the poverty headcount of the elderly from around 10 per cent to around 4 per cent, as compared to a reduction from 5.3 to 4.7 per cent for the entire population.
- *Second*, as the old age pension is often the main (or only) income source for the elderly, their cash income is typically clustered around the prevailing pension rates. This leads to the high sensitivity of poverty estimates to small changes in the income threshold used: in Australia, for example, the income-poverty rate falls from 26 per cent for a threshold of 50 per cent of median income, to 18 per cent for a threshold of 47 per cent.
- *Third*, estimates are very sensitive to the equivalence scale used: in Australia, the elderly poverty rate at 50 per cent of median income falls from 26 per cent based on the 0.5 equivalence scale used in this report, to 17 per cent based on the "modified OECD equivalence scale" (where the first adult has a weight of 1.0, the second and subsequent adults a weight of 0.5, and dependent children a weight of 0.3, which is closely approximated by an equivalence scale of 0.6) conventionally used by the Australian Bureau of Statistics.

Household income data have other limitations as well. They do not include consumption value of durables or additional costs such as health insurance. Moreover, the income of current generation of older people reflects the pension rules of the past, and much has changed recently.

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# THE OUTLOOK FOR PENSION SPENDING AND THE ROLE OF A RESERVE FUND

*Falilou Fall[*] and Nicolas Ferrari[*]*

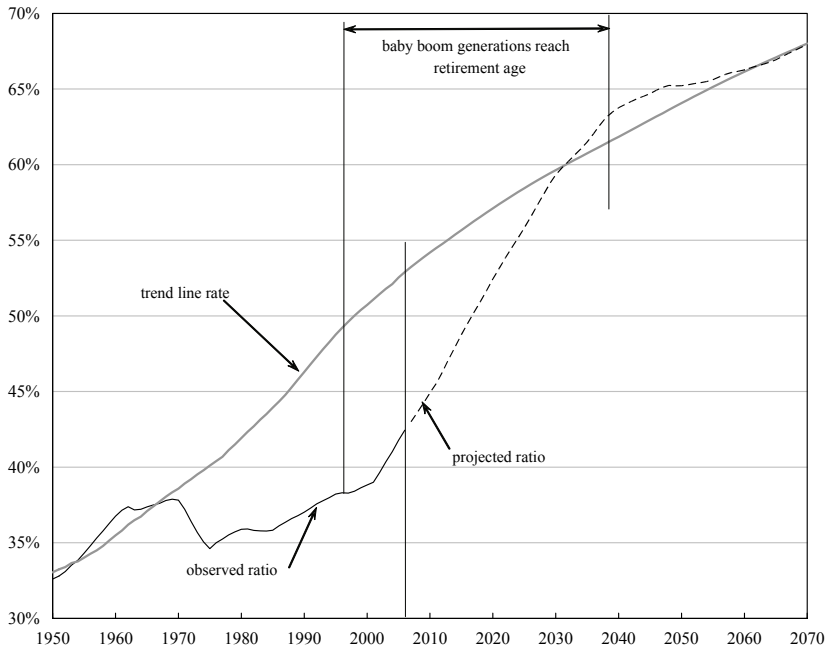
Thanks to the abundant baby boom generations, for the past several decades demographics have been highly favourable to pensions funding. This benign situation is coming to an end as these generations reach retirement. Much of the attendant increase in pension spending is set to last, thanks notably to the durable rise in life expectancy.

This is because the baby boom initially increased the proportion of children in the French population, and then, from the 1970s onwards, that of people of working age able to contribute. The increasing generosity of the French pension system was based on this highly propitious demographic situation. However, these favourable demographics partially hid the underlying ageing of the population and began to dwindle starting in 2006, as the first baby boomers took retirement. It will fade completely after 2030. After that date, the baby boom will no longer have any impact on the population's age structure, which will revert to its long-term trend.

**Figure 1**

**Population Dependency Ratio**

*(ratio of population aged 55 and over to the population aged 15-64)*




Sources: INSEE, INED, DGTPE calculations.

To smooth the temporary baby boom shock, a reserve fund ought to have been put in place starting in the 1970s, in order to build up surpluses during the entire period of favourable demographics. Instead, the system became increasingly generous, in proportions well above the leeway provided by the demographic situation, leading to the emergence of deficits. Consequently, even if it is unable to smooth the baby boom shock, the Fonds de Réserve pour les Retraites (FRR or Pension Reserve Fund) put in place in 2000 can help to smooth the rise in spending as these more abundant generations reach retirement (*i.e.,* smooth the necessary

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adjustments); alternatively, it could serve as a long-term fund to finance pensions, or it could cushion the shock brought about by the temporary drop in the birth rate at the end of the 20th century.

*The Fonds de Réserve pour les Retraites* (FRR or Pension Reserve Fund) was set up by the Social Security Finance Act in 1999. The intention was to build up a sizeable financial reserve from which it would be possible to draw down later in order to finance higher pension spending due to population ageing. At a time when public finances were briefly recovering, the aim was to spread the additional ageing-related charges over a longer period of time, notably drawing inspiration from other countries (Box 2). Under the 1999 Social Security Finance Act, amounts paid into the fund were placed in a reserve until 2020 for the benefit of the *Caisse Nationale d'Assurance Vieillesse* (CNAV or National Old Age Insurance Fund) and the pension schemes aligned with it.[1] The stated aim was to accumulate 1,000 billion francs (150 billion euros) by 2020 in order to cope with the imbalances over the period 2020-40 (see Box 3).

The FRR originated in the acknowledgment that old-age insurance spending was set to surge with the retirement of the baby boom generations. This has indeed has been happening since 2006, and the number of people subject to the CNAV scheme retiring has risen from a rate of 500,000 a year to 750,000.

## 1 After three especially favourable decades, the demographics underlying pension funding are reverting to long-term trend

### *1.1 Demographic shocks are modifying the conditions governing the funding of pensions systems*

In a pay-as-you-go pension scheme, contributions paid out of the income of the working population serve immediately to pay retirees' pensions. A pay-as-you-go pension scheme is in balance each year if total contributions paid in equal total benefits paid out. This balance is achieved when the contribution rate is equal to the product of the average replacement rate (average pension relative to average wage) and of the economic dependency ratio (number of pensioners relative to the number of contributors).

All other things being equal, population trends affect the dependency ratio, thereby modifying the pension systems' financial situation. If the trends are structural, the parameters of the pension systems will need to be modified. Thus population ageing connected with the underlying rise in life expectancy is leading to an increase in economic dependency ratio. Accordingly, there are three "levers" that can help to keep the pensions systems solvent:

- raising contributions (or other receipts);
- reducing the replacement rate;
- lengthening the effective period of contribution, thereby reducing the economic dependency ratio by postponing the average age at which people retire and by increasing economic activity rates.

In the event of a transitory demographic shock (as for example with the surplus of births in the baby boom), it is possible to let the pay-as-you-go system move temporarily away from equilibrium, either by accumulating reserves (in the event of a positive shock), or by borrowing (in

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[1] The *CNAV* is the old-age pension sector of the "general (pension) scheme", the equivalent schemes being the *ORGANIC* (*Organisation Autonome Nationale de l'Industrie et du Commerce* – Autonomous National Organisation for Industry and Trade), the *CANCAVA* (*Caisse Autonome Nationale de Compensation d'Assurance Vieillesse des Artisans* – National Autonomous Old-age Insurance Compensation Fund for Crafts and Tradespeople) and the employees' scheme with the *Mutualité Sociale Agricole* (*MSA* – Farmers' Mutual Welfare Fund).

the case of a negative shock). In that sense, a reserve fund could be seen as a fourth additional lever for the funding of the pay-as-you-go retirement system.

### *1.2 The deteriorating demographic dependency ratio is a long-term trend*

Future variations in the economic dependency ratio can be foreseen based on projections of the demographic dependency ratio, which is defined as the ratio of the population aged 55 and over (*i.e.*, the population liable to be retired) to the population aged 15-64 (the population liable to be economically active). This is expected to rise sharply in the coming decades. Between 1960 and 2005, the ratio rose by only 5 percentage points, from 37 to 42 per cent. According to the latest INSEE projections, this ratio is expected to increase by 23 percentage points between 2005 and 2050, rising to 65 per cent (see Figure 1).

*Three factors allow us to break down trends in the population structure, namely: mortality rates, birth rates, and migration.* These three factors have very different impacts on the demographic dependency ratio.

*Over the very long period, the change in the dependency ratio is very powerfully affected by the sharp gains in life expectancy achieved in the 19th and 20th centuries:* lower mortality rates are leading to a larger proportion of elderly people in the population. This long-term trend has nevertheless experienced a number of upsets due to war (the Napoleonic Wars, the Franco-Prussian War of 1870, and the First and Second World Wars, see Figure 5a and b), which sharply increased the mortality rate.

**Box 1**
**Modelling the long-term trend**

**Central scenario**

The demographic projections presented here are taken from the central scenario in the latest INSEE projections (July 2006). The scenario's main assumptions are:

- the mortality rate continues to fall at the pace observed over the past 15 years, bringing with it a life expectancy at birth of 89.0 years for women and 83.8 years for men in 2050;
- the cyclical index of fertility is 1.9 children per woman,
- the migratory balance is +100,000 people per year.

INSEE projections are available only until 2050. They have been extended beyond that date using these assumptions.[2]

The trend demographic dependency ratio (*i.e.*, the number of people aged 55 and over relative to those aged 15-64, excluding demographic shocks) was calculated projecting a fictitious population with the aid of long-term trends in mortality rates, birth rates and migration.

- Actual mortality quotients have been used for the past, except in the case of wars, when they have been smoothed. For projection purposes, the INSEE mortality rate scenario has been applied (Figure 5a and b);

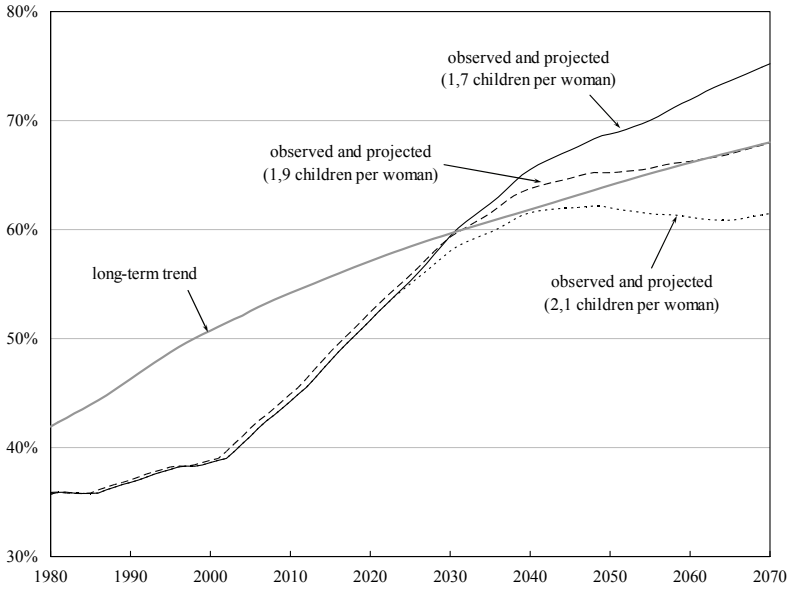
[2] More precisely, fertility by age remains at the level picked by INSEE from 2010 onwards. The profile of the migratory balance by age and sex remains at its level projected by INSEE. The rate of migratory increase remains at its 2050 level. Finally, the reduction in the mortality quotients predicted by INSEE is extended beyond 2050 (log-linear decline).

- Fertility has come down from 5.4 children per woman in 1740 to 1.9 from 1980 on (Figure 4);
- The migratory replacement rate is maintained constant at a level consistent with a net migratory inflow of 100,000 people per year.

It should be noted that the migratory assumption has little impact on the demographic dependency ratio: the gaps between the observed (and then projected) ratio and this trend ratio stems primarily from the birth-rate shocks.

**Figure 2**

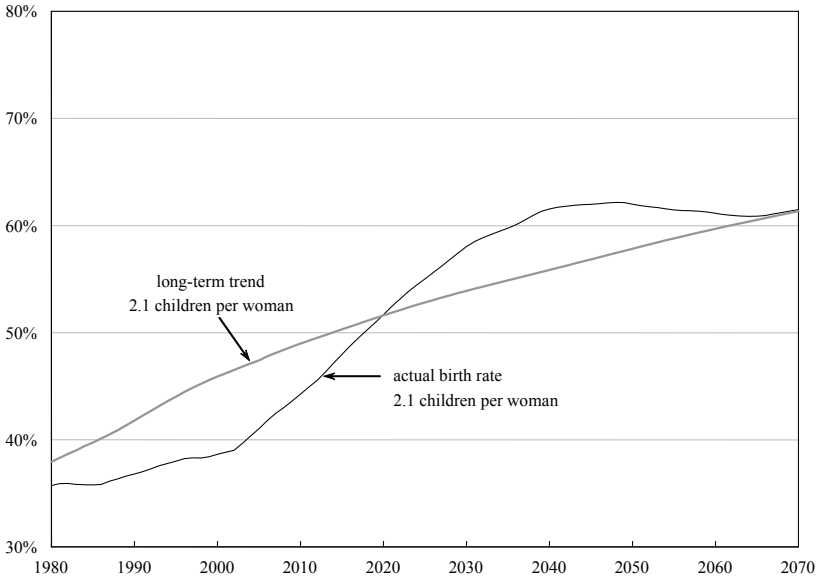
**Dependency Ratio Depending on the Actual Birth Rate**




Scope: Metropolitan France.
Source: INSEE, INED, DGTPE calculations.

**Figure 3**

**Actual and Trend Ratio in the High-birth Rate Scenario**




Scope: Metropolitan France.
Source: INSEE, INED, DGTPE calculations.

**Birth rate variant scenarios**

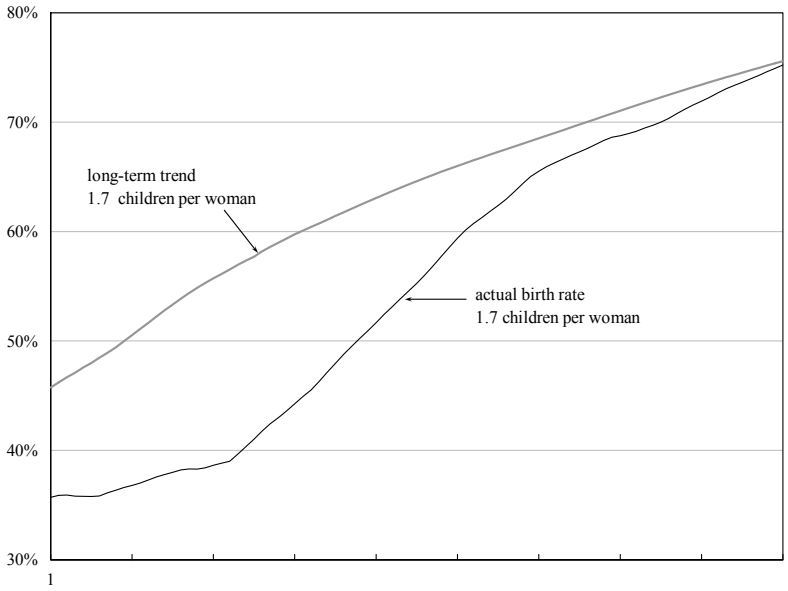
The birth-rate assumption plays a dual role here:

- it serves to project the age structure;
- it leads to the definition of the long-term birth rate equilibrium and hence to an assessment of past birth-rate deficits.

In the central scenario, we have assumed that the trend and project birth rates were equal to 1.9. But

**Figure 4**

**Actual and Trend Ratio in the Low Birth-rate Scenario**




Scope: Metropolitan France.
Source: INSEE, INED, DGTPE calculations.

in fact these rates can vary. Two types of birth-rate variants are therefore necessary, in answer to two distinct questions:

1) What would be the gap between the trend ratio under this central assumption (1.9 children per woman) and the actual ratio with a projected birth rate different from 1.9?
2) What are the birth rate shocks that need to be made good if the very long-term birth rate equilibrium is higher (2.1 children per woman) or lower (1.7 children per woman) than the assumption of 1.9 children per woman?

a) If the long-term trend is 1.9 children per woman, but the actual birth rate for the time frame considered is higher (2.1 children), the demographic ratio would never be lower than the currently envisaged trend ratio (Figure 2). Conversely, if the birth rate was lower (at 1.7 child), the ratio would be durably lower than the initially envisaged trend.

b) If one assumes that the very long-term birth rate is 2.1 children per woman, the past birth-rate deficits are very large, resulting in a significantly lower demographic dependency ratio in relation to its trend under the 1.9 children per woman assumption (see Figure 3). Conversely, if we adopt a very long-term birth-rate equilibrium assumption of 1.7 children per woman, there would be no past birth rate deficit to be made good (see Figure 4).

*The specific baby boom shock comes on top of this long-term trend*, consisting of a pronounced upturn in births from the end of the Second World War until the end of the 1960s (Figure 6). Far from being specific to France, the majority of industrialised countries experienced a similar shock. Whereas a continuation of the trend would have led rather to a cyclical fertility index of around 2 children per woman, the index approached 3 children per woman in the course of this period. The consequence of the demographic shock was to reduce the dependency ratio (Figure 1).

Conversely, during the 1980s and 1990s, the birth rate was slightly lower than its level observed since 2000 (the level retained in the projections). Assuming a long-term birth rate of

1.9 children per woman (the assumption adopted in the central scenario for the 2006 INSEE projections), this transitory birth deficit would lead to a worsening of the dependency ratio for the year 2006, sending it above its long-term trend between 2032 and 2062.

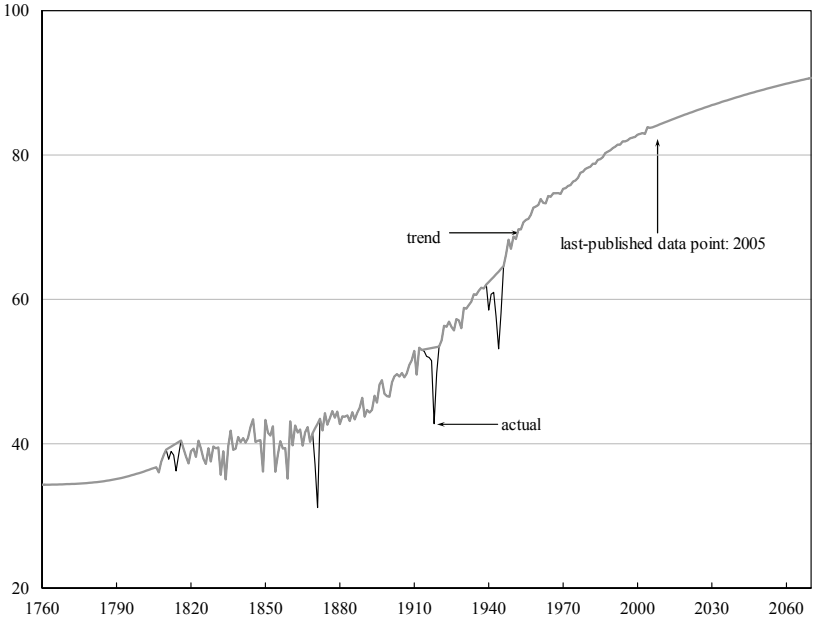
*Migratory flows are the third factor in demographic trends. This factor has little long-term impact on the dependency ratio.* This is because growth in the immigrant population increases both the working population and the retired population, in the long term. On the other hand, migratory flows can temporarily "rejuvenate" or "age" the resident population depending on the relative ages of the migrants and residents. Immigration primarily concerns people of working age, so that it tends to reduce the dependency ratio temporarily (Figure 7).

*Overall, the demographic dependency ratio trend is essentially determined by long-term birth and mortality rate trends. The ratio itself may diverge from its trend primarily due to temporary birth-rate shocks and, secondarily, due to shocks resulting from migration and mortality (such as wars).*

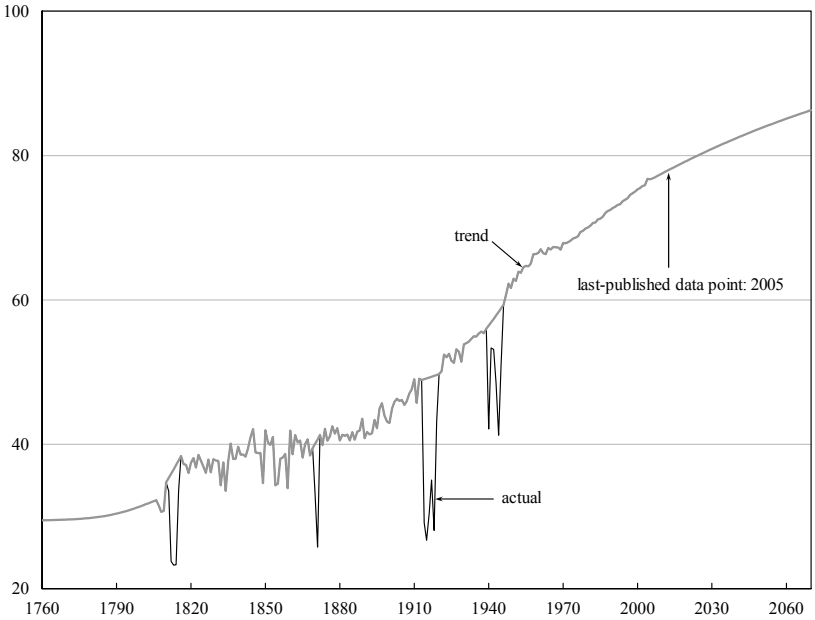
**Figure 5**

**Life Expectancy at Birth**

**a) Women**



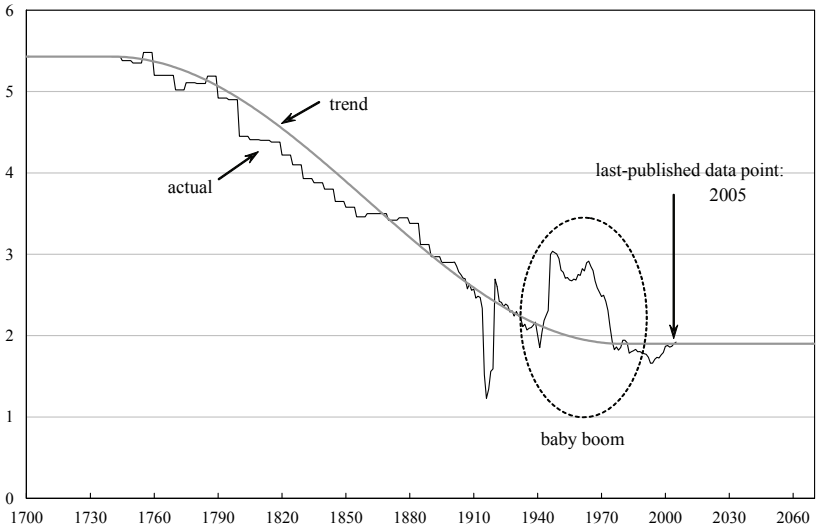

**b) Men**




Scope: Metropolitan France.
Note: Life expectancy at birth is calculated on the basis of mortality by age group recorded for the current year. The projected trend reflects mortality trends in the central scenario for INSEE projections in 2006. This scenario has been extended here from 2050 to 2070.
Source: INSEE and INED, DGTPE calculations for the trend.

**Figure 6**[3]

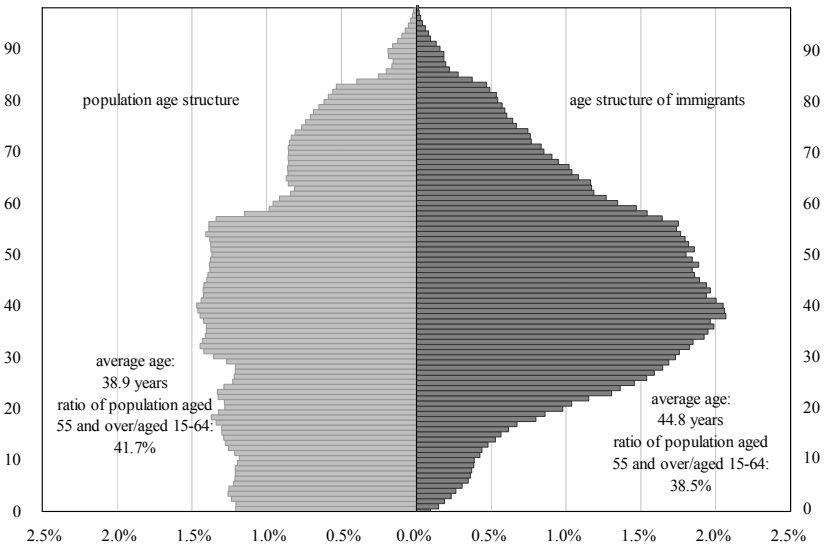
**Cyclical Fertility Index**




Scope: Metropolitan France.
Source: INSEE and INED, DGTPE calculations for the trend.

**Figure 7**

**Age Structures, 2004-05**




Scope: Metropolitan France.
Source: INSEE, INED, DGTPE calculations.

*1.3 For more than 30 years, the baby boom contributed positively to the financial balance of the pension system*

*The baby boom was a massive shock in France, reducing the demographic dependency ratio for more than half a century (see Figure 1), which facilitated funding of the pension system.* The expansion of the old-age insurance schemes between 1945 and 1983 consequently took place in exceptionally favourable demographic conditions in the years following 1970. Advantage was taken of these conditions not to build up reserves (see next section), but to increase the generosity of the pension system. Its parameters were altered as if this particularly benign transitory situation was in fact permanent.

*The retirement of the first baby boom generations has prompted a sharp acceleration in pension spending. This phenomenon marks only the beginning of the dependency ratio's return to long-term trend, the return being completed in the 2030s.*

[3] The cyclical fertility index measures the number of children a woman would have had throughout her life if the observed birth rate for the year considered at each age had remained unchanged. The fertility rate at a given age is the number of live births for women at that age in the course of the year relative to the average population of women of the same age in that.

Beyond 2030, the baby boom is roughly neutral in its effect on the demographic dependency ratio, the abundant retired baby boom generations being matched by equally abundant generations of working age. That is because the large cohorts of baby boomers proportionally increased the size of the following generations once their fertility rate reverted to a level close to the long term, permitting a renewal of generations. The trend will nevertheless be to a deterioration of the dependency ratio entailing a need to adapt the parameters of the pension system, notably by means of a lengthening of contribution periods.

### *1.4 Demographics are slightly less benign than the trend line around 2040*

*Beyond 2030, the dependency ratio is expected to worsen slightly relative to the long-term trend, for around 20 years.* This is because the birth rate was lower in the last quarter of the 20th century, below the long-term target of 1.9 children per woman, thus reducing the size of the working age population at that time horizon.

However, the uncertainty at this time horizon is considerable. In particular, the long-term demographic trend is highly dependent on the target birth rate adopted (here as in the INSEE projections) of 1.9 children per woman (see Box 1 for the impact of a change of assumption on the fertility rate).

## 2 The possible aims of a reserve fund will determine its size and its horizon

In the light of the foregoing demographic developments, the "smoothing" objective assigned to the Pension Reserve Fund set up in 1999 is ambiguous, since the expected rise in pension spending over the coming decades is not transitory. Below we review the different functions that could be assigned to the FRR.

### *2.1 A fund to smooth demographic shocks*

#### *2.1.1 The principle of a demographic shock smoothing fund*

In a pure pay-as-you-go system, pensions in a given year are funded exclusively by contributions for that year. In the case of temporary demographic shocks (such as a transitory drop in the birth rate, for example), it may be desirable to adapt the financial equilibrium constraint at each date by introducing reserves (or, conversely, by accepting a transitory debt). In that sense, a reserve fund is a means of smoothing the effects of temporary demographic shocks, fertility shocks in particular, *via* a form of collective capital funding. More precisely, it would serve to balance the system year by year, without permanently adjusting the three parameters, namely the contribution rate, the level of pensions, and the retirement age. *It is out of purpose here to try to compensate for a permanent shock such as deterioration in the demographic dependency ratio*. This will call for a gradual adjustment of the three aforementioned parameters, in particular lengthening the contribution period in order to avoid an undue deterioration in the economic dependency ratio.

#### *2.1.2 Smoothing the baby boom demographic shock?*

As explained in Section 1, a positive transitory birth-rate shock like the baby boom reduces the demographic dependency ratio for a few decades. As the smaller age groups preceding the baby boom die, the dependency ratio reverts to its long-term trend: the abundant retired baby boom generations are matched by equally abundant generations of working age (the large baby boom

population having proportionally increased the size of the following generations).

Consequently, to smooth the baby boom demographic shock (as defined in 2.1.1) it would have been necessary to build up reserves during the period in which this shock made the demographic dependency ratio more benign, *i.e.* over the entire period 1970-2030. This would have made it possible to cope with any eventual negative shock thereafter or to cushion the necessary tightening of the system as implied by the reversion to trend. Therefore, and given the high level of current and past pension system deficits, any smoothing of the baby boom shock that the FRR might provide is inherently very limited, even though the demographic context is still highly favourable.

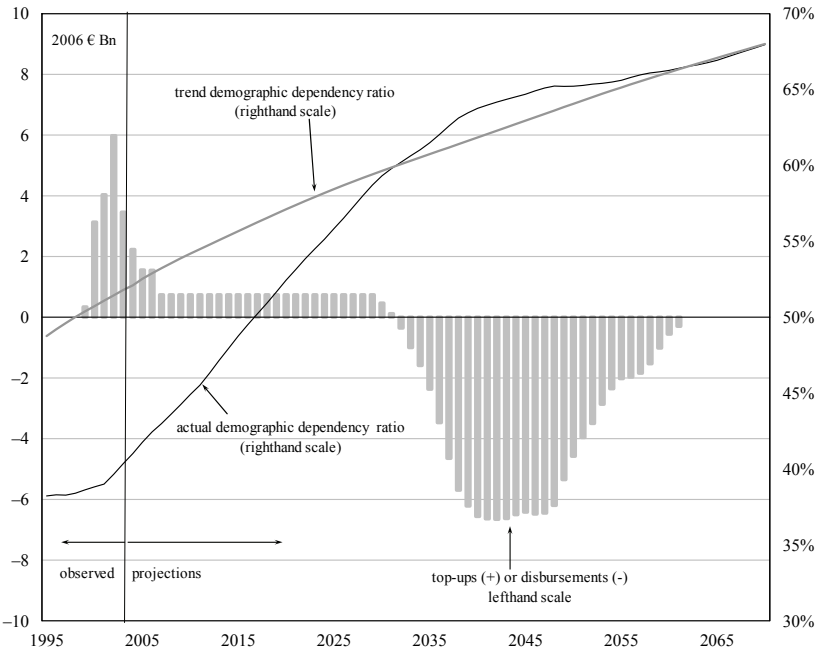
### *2.1.3 The FRR could smooth the temporary shock due to the drop in the fertility rate the end of the 20th century*

In the present circumstances, the FRR could serve to compensate during the period 2030-60 for the rise in the dependency ratio above its long-term trend due to fewer births in 1980-90 compared with the rebound since 2000, now considered to be in line with the long term trend. Additional or top-up payments into the Fund should be relatively easy to make thanks to the baby boom, which will continue to improve the demographic situation until the end of the 2020s.

This approach will entail spreading the top-up payments until around 2030. Until that date the baby boom will still imply a more favourable demographic dependency ratio than the trend. Beyond that, the ratio is expected to deteriorate relative to trend owing to the shock needing to be smoothed (namely the smaller size of contributing generations). In that case the Fund could drawdown from its reserves until around 2060. This approach would entail envisaging the Fund's extinction beyond 2060, *a priori*. However, this deadline could be revised in the light of any new shocks emerging, or if the very long-term outlook were to change.

**Figure 8**

**Using the FRR to Smooth Demographic Shocks**




Scope: Metropolitan France.
Note: Assumption of a real return of 3 per cent, a potential growth scenario in projections, derived from *5th Report of the Commission d'orientation des retraites* (French Pensions Commission). In the trend population growth scenario, the share of GDP devoted to covered pension schemes is constant.
Source: INSEE, INED, DGTPE calculations.

By limiting qualifying pensions schemes to those provided for by law (*i.e.*, the "general scheme" and schemes aligned with it), and by assuming a long-term trend of 1.9 children per woman, the current top-ups would be sufficient to avoid an increase in contributions between 2030 and 2060 relative to the long-term trend.

### 2.2 *A fund to smooth the rise in baby boom-linked spending*

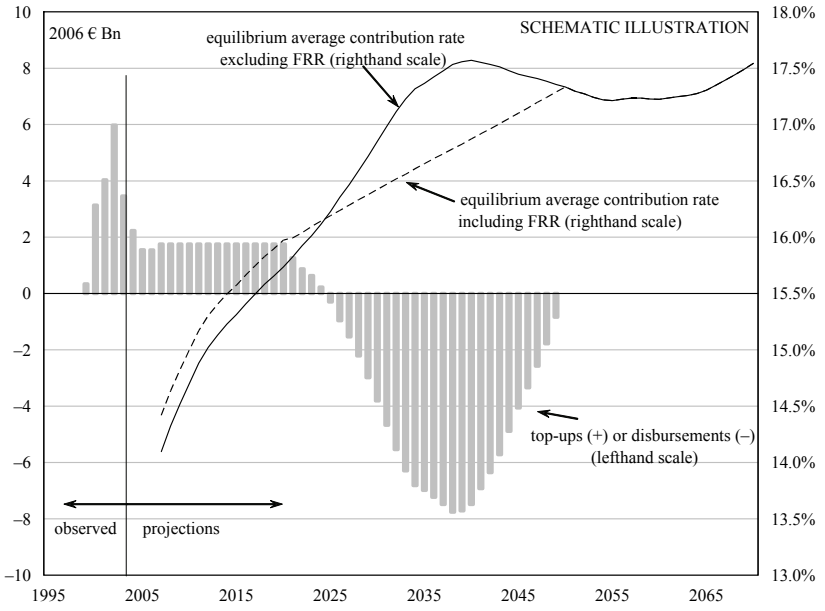
*The FRR is often defined as a fund to smooth, not the baby boom shock, but simply the "hump" in spending resulting from this generation's arrival at retirement age.* In its 3rd report, the Conseil d'Orientation des Retraites[4] proposed a smoothing function taking as its point of departure, not population trends, but future funding needs directly. The FRR was presented here as a means to accompany the pace of expected adjustments. In this case, the smoothing function was no longer linked to the gap relative to the long-term trend, but corresponds to a "linearization" of the necessary adjustments to balance the accounts of the pension schemes.[5] Thus conceived, the fund would naturally fall to zero once the shock had been smoothed.

In this approach, calibrating the FRR's smoothing function depends not only on the accelerating growth in spending resulting from the baby boom, but also from the changing parameters of the pension schemes. In addition, the date at which the Fund falls to zero is a matter of arbitrary choice, the size of the reserves required being heavily dependent on that choice.

By setting this date at 2050 (as an illustration), this approach would lead to a linearization of the necessary adjustments between 2020 and 2050: top-ups would continue at their current rate until 2020 (*i.e.*, 65 per cent of the 2 per cent "social levy" on investment income). The accumulated reserves would serve to smooth funding needs beyond that date: top-ups would progressively decline until 2025, after which disbursements from the fund would help to accompany the necessary adjustments to keep the Fund in balance. The current rate of top-ups would be sufficient for a scenario like this. It should be noted that this scenario is very fragile; it requires extending the COR's pension spending projections beyond 2050. This scenario is illustrated in Figure 9, which notably represents the changes in the average equilibrium contribution rate, defined as the relationship between benefits paid by the different pension

**Figure 9**

**Using the FRR to Smooth Spending Growth**




Scope: Metropolitan France.
Note: this figure schematically illustrates the use of the FRR in this approach. The equilibrium contribution rates cannot be seen as a result of projections.
Source: INSEE, INED, CCSS, DGTPE calculations.

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4 The *Conseil d'orientation des retraites* (Pensions Steering Commission), founded in 2000, comprises members of both chambers of parliament, representatives of the social partners, experts, and government representatives. Its purpose is to continuously monitor and perform concerted expert appraisals of the old-age insurance system and to make proposals.

5 By convention, these adjustments are generally expressed in terms of "additional contribution points" required to bring accounts into balance. But they can just as easily result from a reduction in spending or a broadening of the revenue base.

**BOX 2**
**Reserve funds in other countries**

The United States and Sweden pioneered the concept of pension reserve funds in 1944 and 1960 respectively. Subsequently, growing realisation of the effects of the demographic shock led to the creation of similar funds in most of the rich countries almost simultaneously in the 1990s. While most of these funds are smoothing funds, they differ in terms of their size, forms of governance, and sources of funding and methods of control.

*Norway*: The *Government Pension Fund – Global* was set up in 1990 and began to be built up from 1996. This fund is managed by the Central Bank of Norway and has no legal autonomy, being under the supervision of the Ministry of Financed and controlled by parliament. Its assets were equivalent to 83 per cent of GDP in 2006 (around 278 billion USD). It is funded mainly out of oil and gas revenues.

Its assets are invested in equities (40 per cent) and bonds (60 per cent) (in 2006), and entirely outside Norway. The aim of the fund is to ensure inter-generational equity in the sharing of the financial windfall generated by the country's oil and gas resources.

*The United States*: The *Social Security Trust Fund* was set up in 1940. It is an integral part of the pension system and the Board of Trustees consists of members of the Federal Government and Congress. It submits an annual report to Congress. Its funds stem mainly from pension system surpluses, employers' and employees' contributions, and additional payments by government. Its assets were equivalent to more than 15 per cent of GDP, or 2,048 billion USD in 2006, and must be invested in Treasury bonds (currently entirely in US Treasury bonds). This fund has a smoothing function but is not intended to fall to zero.

*Sweden*: The *AP-Fonden* were set up in 1960 and reorganised in 2001. These are five Independent bodies each with its own board of directors, some of whose members are appointed by the government. Their assets were equivalent to 31 per cent of GDP in 2006 or 117 billion USD, and are invested in equities (60 per cent) bonds (6 per cent) and other asset classes (4 per cent). Their aim is to smooth the pension system's expenditures and revenues.

*Japan*: The *National Reserve Fund* was set up in 1959 and was progressively transformed into an independent agency between 2001 and 2006, run by Ministry of Finance experts. Its assets were equivalent to 28 per cent of GDP in 2006, or 1,217 billion USD, invested in equities (22 per cent) and bonds (52 per cent). Although this fund has no explicit aim, it may be considered as a half-way house between a smoothing fund and a permanent fund.

schemes and the total wage bill of contributors to those schemes. It should be noted that this scenario is based on the assumption of a lengthening of the duration of contributions in order to qualify for a full pension to 164 quarters in 2012 and 166 in 2020, the assumption used in the COR's updated projections in November 2007.

### *2.3 A permanent additional pension fund*

Finally, a pension reserve fund can be designed as a permanent means of additional funding for the old-age insurance system. After the fund's build-up phase, its capital is preserved and its investment income contributes to the financing of pension spending. The fund is then akin to a

"collective pension fund". In that case, the pension system stands in a middle position between a pure pay-as-you-go system and a funded system.

This kind of fund needs a substantial capital base in order to play a significant role in the system's financing. For example, the *Charpin Report* in April 1999 envisaged a reserve equivalent to a minimum of 10 per cent of GDP (at the end of 2007, the FRR was equivalent to around 1.5 per cent of GDP). This approach calls for a substantial and durable process of accumulation. Given today's very limited financial leeway, this would imply a major financial effort. It would have been possible and less costly to implement this, had the advantage of the benign baby boom demographic shock been taken several decades ago.

Few countries have followed this path. The only countries with reserves representing 10 per cent or more of GDP in 2006 were Norway (83 per cent of GDP), Jordan (46 per cent), Sweden (31 per cent), Japan (28 per cent), South Korea (21 per cent), the United States (16 per cent) and Ireland (11 per cent) (Box 2). Either these funds were set up a long time ago, as in the cases of Jordan, Japan, Sweden, South Korea and the United States, or they have benefited from an oil and gas "windfall" as in Norway's case, or again from particularly robust economic growth as in Ireland's case.

### *2.4 A fund for the short-term smoothing of economic shocks*

*A possible variant scenario might be a fund for the short-term smoothing of economic shocks*. This would have a short horizon, corresponding to 5 to 10-year economic cycles, requiring smaller reserves. On this view, the fund would be intended to be permanent.

## 3 Conclusions

The main purpose of this study was to analyse the demographic factors and their impact on pension systems, and to consider the role a reserve fund can play in the context of the divergence from the long-term equilibrium. The study deliberately does not deal with the question of the financial management of the reserves. In particular, in the projections presented in Section 2, a purely normative assumption has been used for the return on reserves, corresponding to the average return on bonds over the long period (namely a 3 per cent real return).

Actually, a reserve fund's investments may be more profitable than repayment of Government debt, thereby generating leverage. This is because, despite a substantial short- and medium-term risk, asset prices exhibit a reversion to a trend over the long period. Consequently, a reserve fund can go overweight in risky (and hence high-yield) asset classes for as long as the disbursement horizon is distant, thus benefiting from attractive returns combined with limited long-term risk. By defining its schedule of income and disbursements, the FRR can optimise its returns for a given level of risk. However, even with a distant and well defined disbursement horizon, investment in the FRR would still be riskier than paying down the public debt.

Leverage is obviously not contradictory with the Fund's assigned objective (see above). But this leverage cannot be taken as the prime function of a reserve fund, and its size cannot be precisely calibrated on this basis.

**BOX 3**
**The history of the FRR**

Taking its cue from foreign examples and the report of the *Conseil d'Analyse Economique* (Council for Economic Analysis),[6] the French Government decided in September 1998 to set up a reserve fund for the pay-as-you-go pension system. This fund was meant to be constituted "without additional (employer and employee) contributions" out of exceptional resources and the surpluses of welfare schemes and those of the Caisses d'Épargne savings banks. It was thus expected to go "a long way towards" solving the pension system shortfall looking to 2005-2010. Consisting of "several tens of billions of francs", the fund was required to invest primarily in French government securities and bonds. It was to be established and administered in consultation with the social partners.

The FRR was set up by the 1999 Social Security Funding Act within the *Fonds de Solidarité Vieillesse* (FSV Old Age Solidarity Fund). The bill's preamble stated that this reserve fund was being set up in order to preserve the future of the pay-as-you-go pension system. Three categories of income could be allocated to it, namely available surpluses from the *Contribution Sociale de Solidarité des Sociétés* (social solidarity contributions paid by companies), the surplus on the "solidarity section" of the *Fonds de Solidarité Vieillesse*, and any other resources designated by law or regulations. The Government planned to allocate 2 billion francs in 1999 under the first of these categories, with the possibility of allocating additional resources in the course of the year.

In April 1999, the *Charpin Report* raised a number of questions regarding this newly-created fund, namely: what was its objective, between "smoothing the expected increase in contribution rates" and permanently supplementing the pension schemes' resources? How to replenish this fund on the basis of this objective? What type of investment should the fund favour? And what should be the fund's form of governance?

The Government announced its intention to strengthen the reserve fund in 2000. Based on the financial projections contained in the Charpin Report, the time horizon for the fund's utilisation was put back, with disbursements starting no longer in 2005 but in 2020. The plan was to finance the fund thanks to the maintenance of a benign demographic situation until 2006, and thanks to a return to growth and full employment. The intended resources were spelled out: 500 billion francs from CNAV, FSV and CSSS surpluses were to be added to the fund's 20 billion francs at the end of 2000; of the additional 500 billion, 150 billion would be drawn from the social levies on investment income, and 330 billion from these reserves' own interest and investment income. Overall, the Fund was expected to exceed 1,000 billion francs looking to 2020. It should be noted that the Fund was set up at a time when the public finances were recovering (even though the general government financial balance has been continuously negative), notably on the strength of the robust economic growth in the late-1990s. The FRR became autonomous on 1 January 2002, taking the form of a Government administrative public institution (*établissement public de l'État à caractère administratif*) under State supervision, with a Management Board and a Supervisory Board. The 20-member Supervisory Board is made up of 4 members of parliament, five representatives of social security "insureds" designated by the five trade union confederations, five

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[6] Davanne, O. (1998), "Eléments d'analyse sur le système de retraite français" (Elements for an Analysis of the French Pension System), *Retraites et épargne*, CAE, July.

representatives of employers and self-employed workers (two designated by the Medef-employers' federation, one by the CGPME-federation of SMEs, and one by the UPA-crafts and trades people's federation), four State representatives, and two qualified personalities.

- The Supervisory Board is responsible for setting broad guidelines for the Fund's investment policy, appointing the Statutory Auditors, controlling the Fund's performance, closing the financial statements, and drawing up a public annual report on its management.
- The Management Board of the Pensions Reserve Fund consists of three members and is chaired by the Chief Executive of the *Caisse des dépôts et consignations*. The Management Board manages the institution and is "accountable for its proper functioning". It is notably responsible for submitting broad guidelines for the Fund's investment policy to the Supervisory Board and for implementing the said guidelines, drafting specifications for invitations to tender to manage the assets of the FRR (via mandates entrusted to investment firms).

In 2003, the Supervisory Board of the Fund laid down the broad guidelines for the Fund's investment policy, appointed the asset managers' selection committee, and issued the first invitation to tender for asset management mandates. The strategic allocation is diversified, with both Eurozone and non-Eurozone equities and bonds. The predominance of equities serves to achieve high returns, the associated risk being smoothed by the distant horizon for disbursements. The process of investment gathered momentum in 2004.

The strategic allocation formulated in 2003 was refined in 2006, based on an assumption of constant disbursements over the period 2020-2040. This change of objective and the lengthening of the disbursement period has led to a shift in the strategic allocation in the direction of greater risk, an increase in the equity weighting (from 55 to 60 per cent), greater diversification, with an increase in the proportion of non-Eurozone investments and investments in property, infrastructures, raw materials and private equity.

# COMMENTS ON SESSION 3
# PENSION REFORM, REDISTRIBUTION, MACROECONOMIC IMPACT

*Carlo Cottarelli*[*]

The two papers on which I was asked to comment – "Macroeconomic Implications of Pension Reform" by Ray Barrell, Ian Hurst, and Simon Kirby; and "Poverty and Income of Older People in OECD Countries" by Asghar Zaidi – cover quite different topics and I will have to take them up in turn.

## 1 Comments on "Macroeconomic Implications of Pension Reform or How to Pay for the Crisis" by Ray Barrell, Ian Hurst and Simon Kirby

The paper by Ray Barrel and others uses the global macro model of the National Institute of Economic and Social Research to assess the macroeconomic effect of pension reform and, more specifically, of increases in the perception of expected life, and of increases in working life.

This is a very useful paper. The National Institute model, has many features that make it useful for the purpose of assessing the macroeconomic effects of the pension reforms, including being a general equilibrium model, its possible use for assessing the behavior of small but also large open economies, and, last but not least, the fact that its parameters have been estimated not imposed, unlike other general equilibrium dynamic models.

This said, I have some observations to offer, and some related questions.

First, as underscored by the website of the National Institute, the National Institute model (NiGEM) is "designed to be a flexible model, where assumptions on behavior and policy can be changed. Hence, there is no such thing as "the NiGEM simulation results suggest" but rather, "under these assumptions, the NiGEM simulation results suggest". In this respect, the paper does clarify what the assumptions are for the various scenarios, but the authors could have underscored better where some results depend on certain assumptions. More to the point, I would suggest undertaking more sensitivity analysis with respect to the various assumptions, including the speed through which agents respond to reforms. I will come back to this.

Second, the paper explores the macroeconomic effect of an increase in the perception of expected life. It argues that raising the retirement age will increase people's perception of their life expectancy. The question is whether there are any empirical studies to support this assumption.

Third, the paper looks first at the effect of an increase in expected life, for a given working life, then at an increase in working life, given expected life, but it does not look at a combination of the two, which would have been interesting.

Fourth, I am a bit skeptical about the quantitative results achieved for the euro area. For example, the equation describing the transfers to the population for pensions and unemployment benefits is the same across all countries and, therefore, does not take into account country-specific features of the pension system. So, I am not sure I can trust the key numerical result of the paper, namely that raising the retirement age by 2 years in the euro area would save 40 percentage points of GDP in the long run. More work is needed here.

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[*] IMF, Senior economist, Pension Corporation.

The opinions expressed herein are those of the author and do not necessarily reflect those of the European Central Bank or the Eurosystem.

Fifth, it would have been interesting to assess some of the results in light of the current crisis. For example, the paper assumes that the availability of increased labor following an increase in the retirement age is fully anticipated, which will provide the market enough time to adjust. In practice, however, how fast markets will adjust would depend on the state of the macro economy. For instance, it would be difficult to raise capital investment in the current global economic slowdown to accommodate the increased labor supply.

This raises my last and more general point, a point that is of key policy relevance. I am referring to the fiscal costs of the current crisis. I fully agree with the authors that pension reform, to be implemented gradually but legislated quickly, should be a key component of a strategy to finance the fiscal costs of the crisis, or, in other words, to allow governments to run in the short run expansionary policies while maintaining credibility in the long run solvency of public finances. However, from a purely accounting/budgetary perspective, saying that the cost of the crisis will be 40 per cent and that we can finance this by increasing the retirement age by 2 years is a bit misleading, because even before the crisis, increasing the retirement age by 2 years or more was necessary to ensure debt stability in the long run in European countries.

This said, I think the policy message remains appropriate. We should worry less about an increase in public debt, even as large as the one that we are experiencing now in all advanced countries, if, at the same time, these countries can show the ability to undertake reforms that will address the unresolved long-term pension problem. The paper recently prepared by the Fiscal Affairs Department of the IMF on "The State of Public Finances: Outlook and Medium-Term Policies After the 2008 Crisis" (http://www.imf.org/external/np/pp/eng/2009/030609.pdf – published on our website on March 6 and forthcoming as an IMF Occasional Paper) includes an interesting statistic. In NPV terms, the fiscal cost of the crisis is about 10 per cent of the future cost arising from aging for advanced G-20 countries. So you can go a long way in strengthening the perception of long-term solvency, in spite of the short-term costs of the crisis, by reforming the entitlement system.

## 2 Comments on "Poverty and Income of Older People in OECD Countries" by Asghar Zaidi

The paper is mostly descriptive. It does includes some interesting statistics on poverty across OECD countries. However, my general comment is that its findings could potentially be very sensitive to the measurement methods and the definition of poverty adopted. Therefore, some sensitivity analysis would be required to strengthen the robustness of the results.

The most relevant case in point is that the paper should acknowledge that the discussion of absolute versus relative poverty concepts is not settled, and take this into account by showing how sensitive the results are with respect to the use of alternative measures of absolute poverty. Important drawbacks of relative poverty measures, some of them particularly relevant in the case of pensioners, include:

- first, the fact that the purchasing power of the poor is obviously very different across countries. It would be, therefore, useful to define a consumption basket that could be considered as the minimum standard. The concept of a consumption basket is also more in line with the fact that individuals derive utility from consumption rather than from income;
- second, the focus on relative poverty can lead to misleading representations of poverty developments. Examples are mentioned in the text of the paper but mentioning them is not a solution. For example, in countries that experienced sharp growth spurts in recent years, where the income of the working population increases significantly while not affecting the

income of the old by the same extent, the use of the relative poverty indicators results in concluding that poverty in old age has increased;

- the focus on relative poverty could also lead to justify redistribution in favor of individuals who may hold sufficient assets or income to live comfortably;
- in this connection, the fact that measurements of poverty in this paper do not take into account household wealth should be highlighted. With growing household access to financial markets in many OECD countries in the sample, people in retirement could potentially receive significant interest or other non pension-related income arising from their wealth.

# COMMENTS ON SESSION 3
# PENSION REFORM, REDISTRIBUTION, MACROECONOMIC IMPACT

*Glenn Follette*[*]

## 1 Introduction

I, too, want to thank and congratulate Daniele Franco and his team for putting together this wonderful conference. I hope that my remarks will be as helpful as those of the earlier speakers. I was asked to comment in particular on Adi Brender's piece on the "Distributive Effects of Israel's Pension System" and Mallavarapu Ramaiah's "Some Reflections on Pension Reforms in India". These papers demonstrate the complexities of actual pension systems and the importance of the details in designing such programs. Because these design features depend on the goals of the pension system, it is critical to begin by outlining the principal goals of pensions and pension policies.

Let me posit the objectives for government pension policy. Of course, the overarching aim of pension programs is to provide financial well-being during retirement. Policymakers evaluate this goal by paying particular attention to several criteria: 1) the system's ability to alleviate poverty among the elderly, 2) the adequacy of retirement income relative to income during the working years, 3) the distribution of income within and across cohorts, and 4) the distribution of risk bearing and risk sharing within and across cohorts. Risk can come from various sources, including shocks to labor market and household composition, the variability of investment returns while working, and the risk from inflation and outliving ones assets when retired. As we have seen in the earlier sessions, the trick in designing a pension system is to meet these goals without distorting labor supply or savings decisions while maintaining solid public finances. This has proved difficult and has led to much reform of the pension sector. I think that most recent reforms have been driven by the desire to reduce government budget imbalances.

The design of each country's pension system and the reforms undertaken depend in large part on the relative importance of each of these goals. One canonical design is the three pillars. The three pillars are:

1) a universal poverty-level pension that is government-provided by nature.
2) a mandatory earnings-related pension, which could be either a defined benefit (DB) or defined contribution (DC) plan and which is funded by the individual, employer, or government.
3) voluntary retirement savings, where the government role may include fomenting reliable financial institutions with suitable investment products, introducing dedicated individual retirement accounts with restrictions on withdrawals and favorable tax treatment of contributions, investment returns, and/or disbursements.

With respect to the goals I outlined above, the first pillar protects the elderly from absolute poverty, but does not protect them from a large decline in their standard of living relative to their working years. It also provides some redistribution of income and risk sharing. The second pillar is in place to ensure adequate retirement income, the second goal. The design choices of how it is funded and whether it is a DB or DC plan has important implications for the distribution of income and risk sharing. Policymakers use the third pillar if the first two pillars do not generate enough retirement income or to offset distortions or incentives elsewhere. Israel has adopted a version of the three pillars. In contrast, India's structure appears to lack the first pillar, the second pillar is not

[*] Federal Reserve Board.

completely formed as it has very low coverage across workers, and the third pillar is also under construction. Looking at the choices made by India and Israel, it appears that India puts relatively less weight on the goals of old-age poverty prevention and income redistribution than does Israel.

## 2 Comments on "Distributive Effects of Israel's Pension System" by Adi Brender

Let me turn to Adi Brender's paper on Israel. It clearly laid out the key parameters of the pension system and the simulations of the combined Old-age Allowances (OAA) and pension program were quite instructive. Israel has shifted from a DB plan to a somewhat smaller DB plan (the OAA) augmented by a DC plan with tax benefits. The DC plan is now mandatory. Thus, the plan resembles the three pillars. Brender uses 10 household types to examine the distribution of net benefits of the pension system and adequacy of retirement income. He simulates retirement income and taxes for households assuming that the DC plan is utilized up to the limit by all households and the real rate of return on the portfolio is 3.5 per cent. The simulations were quite helpful in understanding the working of the system. That said, the simulated households should be linked up with the quintile measures shown in many of the tables. For example, I think it might be helpful to reorganize the 10 types of households into 9 types with three levels of income and three types of family structures: first quintile, middle quintile and top quintile; single, married one-worker, married two-earner. This would allow the reader to link the simulations to the quintile-based analysis.

His first conclusion is that gross OAA benefits are distributed fairly evenly across households. As shown in Table 11, the complex formula for OAA benefits essentially boils down to $7 million NIS for single households and $1.1 million in benefits for couples. Given that $1.1 million NIS, when annuitized, is equivalent to 94 per cent of the wages of a continuously employed manual worker, it appears that the OAA is effective at providing poverty protection for low-income couples. Indeed, even for single households, where the benefit is only $0.7 million NIS, the replacement rate is 50 per cent of wages and the benefit is roughly equal to the poverty line. According to these calculations, the first pillar is well designed at preventing poverty among the elderly. That said, these stylized households may not capture all the variation in work and household formation experiences. For example, the paper on pension adequacy in Belgium, Italy and Germany (Dekkers *et al.*) suggests that the "messiness" of real life sometimes ends in poverty in old age – with systems that appear to be more generous than the Israeli system. Thus, I would like to know more about the adequacy of the OAA at poverty prevention for low- and moderate-income families for a wider range of work/marriage histories. I understand how challenging this would be and that it may be beyond the scope of this work; however, this is critical for judging whether the OAA is sufficient, a key determination of the paper.

The second major conclusion of the paper is that the mandatory DC program is too large for many households as it will deliver too much income in the retirement years and result in too little disposable income during working years. For example, because the OAA delivers benefits equal to 94 per cent of earnings (Table 12), low-income couples do not need additional pension income beyond the OAA to maintain their working years' standard of living (see type 1). By contrast, low-income singles (type 6), with only a 50 per cent replacement rate, will need additional income. In addition, OAA benefits for middle- and upper-income households are insufficient for adequate retirement income. For middle-income households, it appears that the OAA replacement rates are similar to those delivered by the U.S. social security system and that a second pillar is clearly needed for the middle-income group. However, the mandatory DC plan will generate too much

saving for most households as is shown by column 2 of Table 12, particularly for low-income households.[1]

As a result, Brender recommends that the DC plan not be made mandatory because doing so will cause lower income groups to save too much. This would not be a problem if households could offset the over-saving elsewhere. However, I suspect that over-saving in the retirement accounts will be difficult to offset by lower saving elsewhere – e.g., less precautionary saving or less housing wealth. Therefore, with saving too high during working years, households may adjust by reducing labor supply as workers near the retirement age, thus creating a material distortion in labor supply.

But is a voluntary DC plan the best solution? In the U.S., voluntary savings plans such as IRAs and 401(k)s have only 60 per cent take up rate and fairly low levels of asset accumulation. This suggests that if the pension plan were voluntary, then many households would enter retirement with too little saving because they would rely only on the OAA. Brender presents evidence that indicates that many Israeli households do save in voluntary accounts, but that contributions rates are low for low-income employees. My reading of his evidence is that it is consistent with the U.S. experience and thus that a voluntary plan would lead to too little retirement income for many households.

An alternative response to the over-saving problem would be to make several adjustments to the parameters of the OAA and DC programs. First, since overall replacement rates are too high, the mandatory pension program could be scaled back significantly, perhaps by a third. This would reduce the amount of over-saving at the low end but would not eliminate it. Second, the relative importance of the OAA and the pension plans could be shifted towards pensions – which are proportional to income – and away from the flat benefit. In itself, this would help flatten the net replacement rate and reduce the tendency for over-saving at the bottom end of the distribution. Third, because shifting from the OAA to pensions would shift the net tax burden towards lower income families, that aspect could be undone by subsidizing a portion of the pension savings. With these three changes, the two pillars could be adjusted to largely eliminate the over-saving problem without creating an under-saving problem.

The third major contribution by Brender is his examination of the distributional aspects of the combined OAA/pension programs. He concludes that net benefits (gross benefits plus tax benefits, net of contributions) are distributed fairly evenly across households in terms of shekels per adult. Brender makes an important point that one needs to look at the whole tax system to make a judgment on progressivity, especially since it is not self-financing.

One extension to Brender's paper would be to examine the adequacy of the new pension system under different assumptions about rates of return. The new system also shifts investment risk to workers, which will create more variation in replacement rates than shown here where the real return is assumed to be constant. This also may affect desired target replacement rates as actual replacement rates will vary.

## 3 Comments on "Some Reflections on Pension Reforms in India" by Mallavarapu Ramaiah

[1] The replacement rates reported by Brender exclude any income or assets outside the OAA and DC plans. Thus actual resources available at retirement would be even higher. However, Brender's calculations exclude simulated mortgage payments from income during working years. By comparing post-retirement income to pre-retirement income excluding mortgage payments, he implicitly assumes that housing wealth is de-cumulated during retirement.

Turning to Ramaiah's "Some Reflections on Pension Reforms in India," my first suggestion is that Ramaiah should include a short description of the goals of the pension reform and which features of the reforms addressed these goals. Before the recent reforms, India essentially had a defined benefit plan with low coverage – civil servants and a portion of those in the formal economy, only 12 per cent of the workforce – which was seen as unsustainable. The new system is a defined contribution plan that is mandatory for civil servants and those in the formal workforce. The only subsidy/transfer from the government is in the form of tax benefits for the DC program. According to the paper, the key benefits from recent reforms include: a more sustainable pension system, a unified regulatory framework, improved system parameters such as portability across employers, and the creation of pension institutions that can be expanded into other sectors. However, coverage has not been expanded, and risk, in many dimensions, has been shifted from the government/taxpayer to the household. The net benefits, as they come from tax preferences, are probably regressive, but one also has to account for the other taxes to finance the system to make a judgment on the overall progressivity of the pension reforms.

This description leads me to several questions. As noted in the paper, India's demographics are very favorable. Over what horizon was the former system putting pressure on government finances? How much improvement in public finances was accomplished as a result of the reforms? Shifting from pay-as-you-go to funded systems for new entrants leaves a financing hole for the pay-as-you-go system. How was that filled? According to U.S. experience, preferential tax treatment may not boost voluntary saving for retirement significantly. What options are being contemplated to expand coverage in the private sector?

Turning to the design of the DC plan, the paper lacks some of the key parameters of the DC plan, such as size of contributions, expected replacement rates, and the type of disbursement at retirement (nominal annuity, real annuity, lump sum). DC plans for low-income workers tend to have relatively high administrative costs. It is asserted that the Indian system has low costs compared to prevalent charges in the Indian mutual fund industry, but no data are provided. How do the administrative costs for the Indian plan compare to other countries' experiences? Are the centralized recordkeeping and administration costs subsidized by the government, and does centralization materially reduce costs? According to the paper, individuals choose fund managers, and these funds have limited amount of flexibility over portfolio choice.

Ramaiah provides a substantial discussion concerning the composition of portfolios (between equities and bonds) and the creation of an "auto choice" plan with an age-varying portfolio. Given the relatively low limits contemplated for equity investments, it appears to me that the riskiness of bond portfolios may be under-appreciated in this discussion. For example, Shiller (2005) shows the rates of return are much higher for equity portfolios than for bond portfolios and the riskiness between the two is little different when examined over long periods of time.[2] The recommendations are heavily weighted towards bonds, but bond portfolios may have significant inflation risk. Are inflation–protected securities available for the investment funds, or is the government contemplating issuing them? Moreover, there is no discussion about whether the pension benefits will be delivered as a real or nominal annuity. Inflation protection of the benefit during retirement may be as an important element of risk for the household as is the portfolio return during working years.

## 4 Conclusion

[2] Shiller, R. (2005), "The Life-cycle Personal Accounts Proposal for Social Security: An Evaluation", NBER, Working Paper, No. 11300, April. The equity portfolio exhibited a wider range of returns, but the lowest outcome was higher than the 25$^{th}$ percentile outcome of the bond portfolio. Thus, the extra variance was all at the high end of returns, not a greater chance for losses.

Israel has adopted a three pillar structure for its pension system. The new system should provide good protection against poverty, *more* than adequate income security, and an adequate amount of risk sharing via the minimum benefit. Brender shows that the combined program may be too large and that better integration of the two systems is needed. India has adopted the second pillar via a mandatory DC plan (for some sectors) and is trying to improve the third pillar by improving financial institutions and by giving retirement savings favorable tax treatment. Its challenges will be to complete the roll-out of the current program, to extend the quite limited coverage, and to create a first pillar. Both papers indicate that the changes improve public finances, but the magnitude of the adjustment should be indicated. Also, it is unclear whether imbalances still remain.

## COMMENTS ON SESSION 3
## PENSION REFORM, REDISTRIBUTION, MACROECONOMIC IMPACT

*Laurent Paul*[*]

First and foremost, let me express my gratitude to Daniele and his colleagues at the Banca d'Italia for their warm welcome and the wonderful organization of this Perugia symposium.

Economists, in my view, forget too easily that the ultimate objective of economic policy is not price stability or the soundness of public finances but poverty reduction. Therefore I am happy to be asked to comment two articles that deal with that issue.

The article by Franco *et al.* uses micro data to illustrate disparities existing across European countries in terms of level of poverty. Its main conclusions are: (1) poverty rates differ significantly among countries and across categories (children, adults and elderly); (2) the highest poverty rates for children and the elderly are found in the group of Anglo Saxon and Southern European countries; and (3) but, whatever the group of countries, it highlights a pro-old bias in the design of public policies which seems to give more assistance to the elderly compared to children.

The article by Dekker *et al.* aims at assessing, thanks to a micro simulation model and on the basis of the Ageing Working Group (AWG) projections, the foreseeable impact on pensioner's income of the recent reforms of PAYG schemes implemented in three countries: Belgium, Germany and Italy. Its main conclusions are not surprising for fiscal experts: (1) a large decline of pension levels and replacement rates must be expected; (2) demographic ageing has a significant impact on the future adequacy of pensions. Indeed, the risk of poverty pertaining to pension benefit recipients strongly increases by 2020 and then tends to decrease a bit; and (3) impact of parametric reforms (Belgium, Germany) and systemic reforms (Italy) on redistribution and poverty go into the same direction but the magnitude differs (it is higher in the case of Italy).

If we attempt to make a synthesis, we can say that both articles have a common feature. They deal with the impact of public policies on the poverty rate. It is true that poverty is also sensitive to factors like demography, economic, social or cultural conditions, and its level and distribution across the age categories are to a large extent dependent on the design of public policies. Thus, the two articles raise important converging questions:

- how can we account for the pro old bias and should it be corrected?
- do the reforms aimed at curbing the rise in pension expenditure endanger the necessary solidarity between generations?

The first issue raised by the two articles is the definition of poverty. The answer is not evident as poverty is a multi-dimensional concept which can be captured with different indicators:

- the easiest way to define poverty is to consider monetary indicators as Franco *et al.* do. In Europe, Eurostat computes for each country a poverty threshold equal to 60 per cent of the median income in the country under review. This indicator is easy to monitor and series are available on a long period. But the measure of poverty is relative as the indicator is based on the living standards of households in each country;
- there are also composite indicators on human development computed by the United Nations or the World Bank and which take into account different parameters like life expectancy, housing conditions, access to medical care, education, drinking water, etc…;

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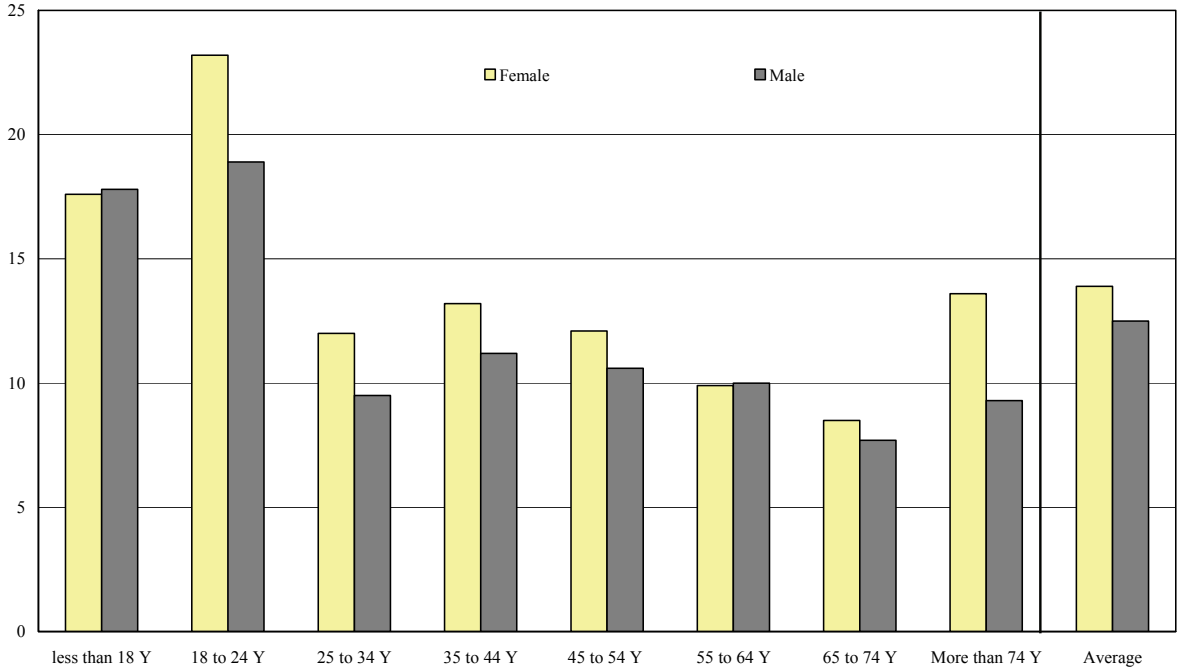
**Figure 1**

**Proportion of Persons below the Poverty Rate (60 per cent of Median Revenue) in France**
*(percent)*




Source: French National Statistical Office.

- then, there exists subjective poverty indicators aimed at capturing the way people assess their own living standards. Indeed, how living conditions are felt can be significantly different from the picture given by statistics taking into account your environment.

Obviously no indicator is able to describe the whole reality. In addition, you must keep in mind that poverty has always some national specificity. First, each society is more or less tolerant towards poverty, which will define the level of public redistribution; Furthermore, redistribution can go through other channels than public intervention. Last when you examine the poverty rate today, you always have to find its main origins in the past, as poverty remains to a large extent an inheritance of history.

To illustrate the impact of public policies, I inserted in my discussion the figure above about the distribution of poverty across the age for France in 2007.

The figure is consistent with the general conclusions of the Franco *et al.* article. Poverty rates are higher for the younger It is a little surprising in the case of France as the country developed a very generous family allowance scheme (which partly explains why France kept a relatively high fertility rate). But family allowances are not means-tested and are therefore insufficiently targeted on families with low revenue. An additional problem is the very high rate recorded for young adults between 18 and 24. In France young adults are especially hit by poverty because of high unemployment for those leaving the education system without any diploma and also because of the existence of a hole in the nest of public benefits. Indeed, young adults are no more eligible to family allowances which stop at the age of 20 and the minimum benefit for adults in state poverty

starts at the age of 25. This illustrates how the design of public policies can play a very important role to explain the distribution of poverty in the population.

The article by Franco *et al.* draws a very comprehensive picture of the state of poverty in the European Union 27 countries. Furthermore, it raises very relevant issues on the stance of public policies aimed at reducing poverty and their apparent pro old bias.

My first comment is about the limits inherent to monetary poverty indicators. First, they are relative indicators that give a picture of poverty rates for each country but say nothing about poverty levels. Thus comparisons between countries are made more difficult (better to be poor in Sweden than in Romania). Moreover these indicators are computed on a national basis which let room to huge disparities across regions within a single country (e.g., North and South of Italy). Lastly they are based on the official data and they do not take into account the informal economy, self consumption or the extent of family support, all phenomenon's that can greatly reduce poverty. Conversely, drop outs such as illegal migrant workers are beyond the scope of official indicators.

Moreover, although I do not question the existence of a pro old bias as reflected by the distribution of public expenditure across the age, I wonder whether this bias should be corrected by the fact that young people, even if they get less direct benefits from the public administrations compared with the elderly, do get indirect assistance through the allowances received by their parents. Thus, children poverty could be partly overestimated.

At the end, the article by Franco *et al.* raises a very important question for the European countries. Should social policies be reoriented in favour of the young people? At first thought, I would be tempted to say yes for the two following reasons. First, we need to increase potential growth in Europe. And to reach that objective one instrument is to help active or future active people in order they improve their contribution to the labour force. Then there is the argument of effectiveness: reducing children poverty should contribute to contain the elderly poverty in the future because poverty is frequently received in inheritance.

In addition, I think that understanding the roots of poverty cannot be based only on a picture of poverty rates at a given date. What is also very important is to assess why the persons have been trapped in this situation. It can be done through comparative studies over time and microeconomic analysis aimed at finding if poverty traps are existing or which trajectories fuel the population in poverty state in each country.

The article by Dekkers *et al.* takes a prospective view centred on the impact of recent reforms of pension regimes on the income level of retirees. Indeed this issue is crucial. Taking the example of France, although the same trend was observed in most of European countries, the elderly poverty continually receded as from 1945 thanks to several factors (extension of the coverage of pension systems, more generous pensions, and an increase in the women participation rate). Today, the poverty rate is lower than that of the working population but a reversal risks occurring under the impact of the rise of unemployment which makes it difficult to get full pension benefits and population ageing which threatens the financial balance of pay as you go pension systems.

As a preliminary remark, the AWG cannot be criticized for having disregarded the issue of poverty as its mandate is to assess the foreseeable development of the financial balance of pension regimes and not the adequacy of pension benefits;

I will not comment the results of the MIDAS model but I think we should be cautions with their interpretation.

First, one should keep in mind that the model does not thake into account income other that pensions in the framework of public systems. Capital income is not in the scope of this study nor

capitalization funded schemes developed as a replacement to the lesser generosity of PAYG systems.

Also the model is based on Gini coefficients which feature the development over time of pension distribution. This constitutes a relative value analysis which does not necessarily imply a rise in poverty but merely an increase in the risk of poverty. Indeed, you can record at the same time a reduction of poverty if a system of minimum pension is implemented by the government. At last, like any long term projection, adjustments even very small in the parameters related to demography and economic growth may substantially change the results.

A very important question is raised by the paper. Should the objectives of current pension regime reforms be twofold: sustainability and reduction of poverty?

The main problem in my view is the insurance logics inherent to a pension scheme and the need for solidarity is difficult to mix. PAYG schemes or funded schemes as well imply a close link between the financial effort of contributors and the benefits they will be entitled when they retire. Certain specifics risks (spouse survival, disability) may be covered within these schemes through risk pooling. However, for those who have not contributed at all or too little, a specific financing has to be found to guarantee a minimum pension which can be brought only through the State budget.

The article by Dekkers *et al.* gives relevant simulations on the foreseeable development in pension income compared to income received during working life. Within this framework, I would suggest the authors some ways to go further by testing additional variables which could produce a substantial impact on the central scenario:

- an increase in women participation rates;
- changes in migration flows;
- an extension of the number of retirees holding simultaneously an activity.

At last, I wonder whether it is possible to extend the model in order to take into account other factors that can interfere in the elderly poverty rate such as the household capital and the impact of public policies.

**Session 4**

# PENSION REFORM AND FISCAL POLICY

# CHOOSING A PENSION REFORM: A FRAMEWORK FOR THE SOCIAL PLANNER

*Frédéric Gonand* [*]

*This paper investigates the issue of which reform of the pay-as-you-go pension system a social planner should choose given its aversion to intergenerational inequality and its discount rate of the welfare of future generations. For this purpose, an applied normative economics methodology is develops which uses as a starting point the results of a dynamic general equilibrium model with overlapping generations (GE-OLG). This model simulates the economic impact of different PAYG pension reforms in the United States, Japan, France and Germany.*

*It shows that a social planner can hardly decide for one pension reform or another on the exclusive basis of the GDP criterion (except in the case of tax hikes balancing the regime which have sizeable detrimental effects on the growth rate).*

*Taking account of the intergenerational redistributive effects of the reforms thus becomes crucial for the social planner because it allows for discriminating between different possible scenarios. Freezing the age of retirement in an ageing context triggers strong intergenerational redistributive effects, whereas reforms incorporating a rise in the average age of retirement limit strongly these intergenerational redistributive influences. However, in the four countries considered here, no pension reform is found to be Pareto-improving. Compared to a no-reform, baseline tax hikes scenario, PAYG pension reforms weigh down more or less on the intertemporal welfare of the baby-boomers and increase the welfare of their children and of future generations.*

*Social welfare functionals encapsulating a variable degree of aversion to intergenerational inequality and a variable discount rate of the welfare of future generations show that the social planner in the United States and Japan is likely to favor reforms bolstering private savings at unchanged age of retirement. In Germany and France, the social choice favors scenarios increasing the age of retirement. In all countries, the status quo corresponding to tax hikes balancing the pension regime characterizes a social planner with rawlsian preferences.*

## 1 Introduction and main results

1 This paper investigates the issue of which reform of the pay-as-you-go pension system a social planner should choose given its aversion to intergenerational inequality and its discount rate of the welfare of future generations.

2 With population ageing, reforms of PAYG systems have become of paramount importance in most OECD countries. They typically involve either a rise in the contribution rate, a decline in the replacement rate and/or an increase in the average age of retirement – otherwise public debt would follow an unsustainable path in most cases.[1] Such reforms can have a significant impact on capital accumulation and labor supply, thus on economic growth and aggregate welfare. From a microeconomic point of view, the impact of pension reforms on households' welfare also depends on their age when the reform is announced. Accordingly, pension reforms bring about intergenerational equity issues. Overall, the choice for a pension reform by a social planner caring about growth as well as intergenerational equity is not trivial *a priori* and deserves investigation.

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[1] See European Commission (2006) for long-term projections of debt levels on unchanged policy settings.

3 In this paper, the simulations of the effects of pension reforms on macroeconomic variables, growth, households' intertemporal utility and social welfare rely on results from a computable, dynamic general equilibrium model with overlapping generations (GE-OLG) parameterised on data available for 4 countries with different demographic patterns (the United States, Japan, France and Germany). Such a modelling framework fits well with the need to measure the impact of ageing on growth since it encapsulates a production function, and with the need to address intergenerational issues thanks to overlapping generations. The available empirical literature shows that the dynamics of GE-OLG models and, accordingly, the associated policy recommendations, are robust for reasonable values of its parameters.

4 This paper focuses on the issues related with the modelling of the social planner's decision. It is mainly an exercise of applied normative economics. Accordingly, it provides with only a brief and non-technical presentation of the modelling characteristics of the GE-OLG model used. The interested reader is referred to Cournède and Gonand (2006) which presents a GE-OLG model with endogenous labour market. The version of the model used in this paper does not include, however, any health-care regime, public debt and non-ageing-related public spending, as in Cournède and Gonand (2006). In other words, this paper is concerned with the decision of the social planner as concerns pension reforms only, not the decision of a government trying to restore the sustainability of the finances of the whole public sector as in the referred paper.

5 Four standard scenarios of PAYG pension reforms are considered in this exercise. The average retirement age is unchanged in a first pair of scenarios where the pension system remains balanced each year during the next decades thanks to either higher tax rates (scenario 1) or lower replacement rates for future retirees (scenario 2). Scenario 1 can be thought of as a no-reform, reference scenario. A second pair of scenarios incorporates increases in the effective average age of retirement by one year and a quarter every ten years from 2005 until 2045, in line with forecasts of future life expectancy increases.[2] The small residual imbalances of the PAYG regime are covered either by adjusting the pension tax rate (scenario 3) or the replacement rate (scenario 4).

6 Results obtained from the GE-OLG model show that the GDP growth rate is higher in scenarios 2, 3 or 4 than in scenario 1 by around +0.2 per cent per year on average. Pension reforms indeed bolster labour supply and/or capital accumulation whereas raising taxes to balance the regime, as in scenario 1, fosters neither the former nor the latter. Since the favourable impacts of reforms on growth are very comparable, a social planner can hardly decide for one pension reform or another on the exclusive basis of the GDP criterion. Taking account of the intergenerational redistributive effects of the reforms thus becomes crucial for determining the social choice.

7 If the age of retirement is unchanged, as in scenario 2, the pension reform triggers strong intergenerational redistributive effects compared to the baseline, with many baby-boomers bearing most of the welfare cost associated with lower pensions while younger generations clearly benefit during their whole active life from much lower tax rates than in the baseline scenario 1. Scenarios incorporating a rise in the average age of retirement (scenarios 3 and 4) strongly smooth the intergenerational redistributive effects associated with the pension reform. The loss of leisure over the life cycle is shared among all cohorts of active age when the reform is announced.

8 However, no pension reform is Pareto-improving in the four countries considered in this exercise. Compared to the baseline scenario 1, PAYG pension reforms all tend to weigh down more or less on the intertemporal welfare of the baby-boomers and to increase more or less the welfare of their children and of future generations. In the absence of any Pareto-improvement, the social choice is not trivial and the use of a social welfare function is required.

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[2] In these scenarios, age-specific participation rates of older workers are assumed to increase in line with the changes in the retirement age.

9 Two types of social welfare functions are considered here which both aggregate intertemporal utilities of the households and encapsulate a variable degree of aversion of the social planner to intergenerational inequality and a variable discount rate of the welfare of future generations. A first type of function ranks intertemporal utilities by decreasing order and then weights the utility of a cohort the more as it is lower (Gini generalised function). A second type applies an increasing and concave transformation when aggregating the utilities of the cohorts (Kolm Pollack function). Depending on the value of the parameter measuring the degree of aversion of the social planner to intergenerational inequality, social preferences tend to the utilitarianism of the mean, the maximin or lie in-between.

10 Overall, the social planner in the United States and Japan is likely to implement a PAYG pension scenario diminishing the replacement rate for future retirees while leaving the age of retirement unchanged (scenario 2). In Germany, the social choice favors scenario 3 which encapsulates a rising age of retirement and a slightly higher tax rate. In France, a social planner which does not care about the welfare of future generations but is reasonably averse to intergenerational inequality among living cohorts, increases the average age of retirement and slightly diminishes the replacement rate (scenario 4). In all countries, the *status quo* – defined here as scenario 1 with only tax hikes balancing the regime – can only be implemented by a social planner with rawlsian preferences.

11 This paper is divided into three sections. Section 2 briefly presents the GE-OLG model which provides with the data used in Sections 3 and 4. Section 3. analyzes the intra-generational redistributive effects of the four scenarios considered here. Section 4. develops a normative economics analysis aiming at determining the conditions of the social choice when reforming PAYG pension systems. Section 5 concludes by summing up the main results.

## 2 A short presentation of the model providing the data

12 This paper uses the results of a general equilibrium model with overlapping generations (GE-OLG) and endogenous labour market which is a modified version of Cournède and Gonand (2006). Contrary to the latter paper, the version used here does not include any health-care regime, public debt and non-ageing-related public spending. In other words, this paper is concerned with the decision of the social planner as concerns pension reforms only, not the decision of a government trying to restore the sustainability of the finances of the whole public sector as in the referred paper.

13 The dynamics of the GE-OLG model are exclusively driven by demographics, the pension reforms and the behavioural responses of economic agents. In line with most of the literature on dynamic GE-OLG models, the model used here does not account explicitly for effects stemming from the external side of the economy. Accounting for external linkages would smooth the dynamics of the variables but only to a limited extent. Home bias (the "Feldstein-Horioka puzzle"), exchange rate risks, financial systemic risk and the fact that many countries in the world are also ageing and thus competing for the same limited pool of capital all suggest that the possible overestimation of the impact of ageing on capital markets due to the closed economy assumption is small, especially for the United States.

14 The model embodies around 60 cohorts each year (depending on the average life expectancy), thus capturing in a detailed way changes in the population structure. Demographic projections are obtained from a specific simulation model (Gonand, 2005) and rely on official demographic assumptions. Participation and unemployment rates by age-groups are frozen from

2000 onwards, unless in scenarios with rising retirement ages which include corresponding changes in the participation rate of older workers.[3]

15 The household sector is modelled by a standard, separable, time-additive utility function and an intertemporal budget constraint. The instantaneous utility function has two arguments, consumption and leisure. The average individual of a given cohort decides how much to work, consume and save so as to maximise the discounted value of his/her lifetime utility subject to his/her intertemporal budget constraint. Households endogenously choose how long they work, but their decision to participate in the labour force is exogenous. In other words, the intensive margin of labour supply is endogenous in the model while the extensive margin is exogenous. Households receive wage and pension income and pay proportional taxes on labour income to finance the PAYG pension regime. The pension income depends on the age of the individual and the age at which he/she is entitled to obtain a full pension.[4] The pensions are not wage-indexed. The annual saving is invested in the capital market and the interest payments are capitalised into individual wealth.[5]

16 Production is modelled through a standard constant elasticity of substitution (CES) function with two inputs: capital and efficient labour. Exogenous technical progress drives the variation of multi-factor productivity (MFP) over time (+1.5 per cent *per annum*). As mentioned above, working time – thus the stock of hours worked – is endogenous and results from households' optimising behaviour. Accordingly, the labour force, defined as the total stock of hours worked in the economy, is endogenous in the model.

17 The intertemporal equilibrium of the model is obtained through a simple numerical convergence applying to the intertemporal vectors of demand and supply of capital per unit of efficient labour. The convergence process begins with an educated guess for the demand of capital per unit of efficient labour, from which the model derives a supply of capital by households per unit of efficient labour. A Gauss-Seidel algorithm is used so that both vectors converge.

18 Four scenarios of reform of PAYG pension systems are considered:

- in a first pair of scenarios, the average retirement age is unchanged. In scenario 1, the PAYG pension regime is balanced each year through higher contribution rates while the replacement rate and retirement age remain unchanged. Scenario 1 is used as a no-reform, reference scenario. In scenario 2, the tax rate financing pensions is frozen from 2005 on and the PAYG system is balanced thereafter by gradually decreasing replacement rates for *new* retirees. As households anticipate future cuts in the replacement rate, they rethink their labour supply, consumption and saving plans accordingly. More specifically, lower replacement rates motivate agents to increase savings in order to sustain consumption levels upon retirement;
- a second pair of scenarios incorporates increases in the effective average age of retirement by one year and a quarter every ten years from 2005 until 2045, in line with forecasts of future life expectancy increases. Age-specific participation rates of older workers are assumed to increase in line with the changes in the retirement age. The (small) residual imbalances of the PAYG regime are covered by adjustments in the pension tax rate in Scenario 3 or the replacement rate for new retirees in Scenario 4.

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[3] The year 2000 is used as a starting point for participation and unemployment rates because the unemployment gap was then close to nil in OECD countries.

[4] If he/she is over 50 but below the full-right retirement age, he/she receives a pension reduced by a penalty.

[5] The life-cycle framework used here introduces a link between saving and demographics. In such a setting, aggregate saving rate is positively correlated with the fraction of older employees in total population, and negatively with the fraction of retirees. When baby-boom cohorts get older but remain active, aging increases the saving rate. When these large cohorts retire, the saving rate declines.

19 Table 1 shows some results obtained for the four pension reform scenarios in the GE-OLG model. It suggests that ageing weighs down significantly on the GDP per capita annual growth rate. However, the GDP per capita growth rate is also higher in scenarios 2, 3 or 4 than in scenario 1 by around +0.2 per cent per year on average. Pension reforms indeed bolster labour supply and/or capital accumulation whereas raising taxes to balance the regime fosters neither the former nor the latter.

20 However, the differences between scenarios 2, 3 and 4 as regards economic growth and aggregate welfare are very small. Scenario 2 performs slightly better on both accounts in the United States and Japan and scenario 3 in Germany. Results on French data are completely indecisive.

21 The differences between pension reforms as concerns economic growth and aggregate welfare are too small to allow for delivering strong normative conclusions and policy recommendations. Accordingly, a social planner can hardly decide for one pension reform or another on the exclusive basis of the GDP criterion. Taking account of the intergenerational redistributive effects of the pension reforms thus becomes crucial for determining the social choice.

## 3 Analysing the intergenerational redistributive effects of pension reforms with Lexis surfaces and intertemporal utilities

22 A first look at the losers and winners in the pension reforms modelled here is possible by computing Lexis surfaces. A Lexis surface represents in 3 dimensions the level of a variable associated with a cohort of a given at a given year. The variable considered here is the gain (or loss) of current welfare of a cohort in a scenario relative to its current welfare in the baseline scenario 1.[6]

23 A few notations are in order here. Let's define a function $\Phi_{SCi}(a, t)$ such that:

$$\Phi_{SCi}(a,t) = \frac{\left[U(c_{t,a}, l_{t,a}\right]_{SCi}}{\left[U(c_{t,a}, l_{t,a}\right]_{SC1}} - 1$$

where $\Phi_{SCi}(a, t)$ stands for the gain (or loss) of current welfare of a cohort aged $a$ at year $t$ in a scenario $i$ (with $i \in \{1,2,3,4\}$) relative to its current welfare in the baseline scenario 1. $[U(c_{t,a}, l_{t,a})]$ stands for the current utility level of the cohort aged $a$ at year $t$ in scenario $i$, which depends on the optimal level of consumption ($c_{t,a}$) and the optimal level of leisure ($l_{t,a}$) both computed in the GE-OLG model. By definition, the graph of this function is a Lexis surface.

24 Figures 1 to 3 show the Lexis surfaces obtained on French data in scenario 2, 3 and 4 respectively. Lexis surfaces for the United States, Japan and Germany (which are not shown here) display similar patterns with only orders of magnitude changing (see below). Before the reform is implemented in 2005, $\Phi_{SCi}(a, t)$ is zero for every cohort because the informational set of the households before 2005 is assumed to correspond to the one of the baseline scenario 1. From 2005 on, the deformations of the Lexis record the intergenerational redistributive effects triggered by the reforms:

- a declining replacement rate for new retirees after 2005 (scenario 2) at unchanged age of retirement entails sizeable intergenerational effects. It weighs down on current welfare for cohorts aged 37 or more while younger cohorts and future generations are favoured as

[6] Current welfare refers here to the instantaneous welfare of a cohort, or equivalently its welfare at a given year, which is computed from the instantaneous utility function of a household in the GE model.

**Table 1**

## Impact of PAYG Pension Reforms on Different Variables of the GE-OLG Model

### United States

| *(yearly average)* | 2001-10 | 2011-20 | 2021-30 | 2031-40 | 2041-50 | Average 2001-50 |
|---|---|---|---|---|---|---|
| **Scenario 1: Increasing tax rates, replacement rate and age of retirement unchanged** | | | | | | |
| GDP per capita growth rate | 1.6% | 1.3% | 1.0% | 1.2% | 1.5% | **1.3%** |
| Tax rate of the PAYG pension regime balancing the regime | 6.3% | 7.9% | 9.6% | 9.6% | 8.8% | |
| Replacement rate for new retirees | 58% | 58% | 58% | 58% | 58% | |
| Average age of retirement *(years)* | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | |
| Interest rate (real, 1989=3.5%) | 3.3% | 3.1% | 3.0% | 3.1% | 3.2% | |
| Dependency ratio[(1)] | 20% | 24% | 29% | 32% | 32% | |
| **Scenario 2: Tax rates unchanged, diminishing replacement rate, age of retirement unchanged** | | | | | | |
| GDP per capita growth rate | 1.7% | 1.4% | 1.2% | 1.3% | 1.6% | **1.4%** |
| Tax rate of the PAYG pension regime | 6.1% | 6.1% | 6.1% | 6.1% | 6.1% | |
| Replacement rate for new retirees balancing the regime | 53% | 37% | 36% | 39% | 41% | |
| Average age of retirement *(years)* | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | |
| Interest rate (real, 1989=3.5%) | 3.3% | 2.9% | 2.8% | 2.8% | 2.8% | |
| Dependency ratio[(1)] | 20% | 24% | 29% | 32% | 32% | |
| **Scenario 3: Increasing age of retirement, replacement rate unchanged, slight adjustement of the tax rate** | | | | | | |
| GDP per capita growth rate | 1.7% | 1.4% | 1.1% | 1.2% | 1.6% | **1.4%** |
| Tax rate of the PAYG pension regime balancing the regime | 5.9% | 5.8% | 6.4% | 5.7% | 4.2% | |
| Replacement rate for new retirees | 58% | 58% | 58% | 58% | 58% | |
| Average age of retirement *(years)* | 62.2 | 63.3 | 64.6 | 65.8 | 66.9 | |
| Interest rate (real, 1989=3.5%) | 3.4% | 3.2% | 3.1% | 3.3% | 3.5% | |
| Dependency ratio[(1)] | 20% | 20% | 22% | 23% | 21% | |
| **Scenario 4: Increasing age of retirement, tax rate unchanged, slight adjustement of the replacement rate** | | | | | | |
| GDP per capita growth rate | 1.7% | 1.4% | 1.1% | 1.2% | 1.6% | **1.4%** |
| Tax rate of the PAYG pension regime | 6.1% | 6.1% | 6.1% | 6.1% | 6.1% | |
| Replacement rate for new retirees balancing the regime | 63% | 56% | 55% | 68% | 91% | |
| Average age of retirement *(years)* | 62.2 | 63.3 | 64.6 | 65.8 | 66.9 | |
| Interest rate (real, 1989=3.5%) | 3.4% | 3.2% | 3.2% | 3.4% | 3.5% | |
| Dependency ratio[(1)] | 20% | 20% | 22% | 23% | 21% | |

### Japan

| *(yearly average)* | 2001-10 | 2011-20 | 2021-30 | 2031-40 | 2041-50 | Average 2001-50 |
|---|---|---|---|---|---|---|
| **Scenario 1: Increasing tax rates, replacement rate and age of retirement unchanged** | | | | | | |
| GDP per capita growth rate | 1.0% | 1.0% | 1.0% | 1.2% | 1.0% | **1.0%** |
| Tax rate of the PAYG pension regime balancing the regime | 9.5% | 11.6% | 13.0% | 13.7% | 16.1% | |
| Replacement rate for new retirees | 51% | 51% | 51% | 51% | 51% | |
| Average age of retirement *(years)* | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | |
| Interest rate (real, 1989=3.5%) | 3.0% | 3.0% | 3.0% | 3.0% | 2.8% | |
| Dependency ratio[(1)] | 29% | 37% | 44% | 49% | 57% | |
| **Scenario 2: Tax rates unchanged, diminishing replacement rate, age of retirement unchanged** | | | | | | |
| GDP per capita growth rate | 1.0% | 1.1% | 1.2% | 1.3% | 1.2% | **1.2%** |
| Tax rate of the PAYG pension regime | 9.0% | 9.2% | 9.2% | 9.2% | 9.2% | |
| Replacement rate for new retirees balancing the regime | 44% | 37% | 35% | 32% | 26% | |
| Average age of retirement *(years)* | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | |
| Interest rate (real, 1989=3.5%) | 3.0% | 2.9% | 2.7% | 2.6% | 2.4% | |
| Dependency ratio[(1)] | 29% | 37% | 44% | 49% | 57% | |
| **Scenario 3: Increasing age of retirement, replacement rate unchanged, slight adjustement of the tax rate** | | | | | | |
| GDP per capita growth rate | 1.0% | 1.0% | 1.2% | 1.3% | 1.1% | **1.1%** |
| Tax rate of the PAYG pension regime balancing the regime | 9.4% | 10.4% | 9.6% | 9.1% | 10.6% | |
| Replacement rate for new retirees | 51% | 51% | 51% | 51% | 51% | |
| Average age of retirement *(years)* | 66.2 | 67.3 | 68.6 | 69.8 | 70.9 | |
| Interest rate (real, 1989=3.5%) | 3.0% | 3.0% | 3.1% | 3.1% | 3.0% | |
| Dependency ratio[(1)] | 29% | 35% | 36% | 38% | 43% | |
| **Scenario 4: Increasing age of retirement, tax rate unchanged, slight adjustement of the replacement rate** | | | | | | |
| GDP per capita growth rate | 1.0% | 1.1% | 1.2% | 1.3% | 1.2% | **1.2%** |
| Tax rate of the PAYG pension regime | 9.0% | 9.2% | 9.2% | 9.2% | 9.2% | |
| Replacement rate for new retirees balancing the regime | 47% | 44% | 53% | 49% | 41% | |
| Average age of retirement *(years)* | 66.2 | 67.3 | 68.6 | 69.8 | 70.9 | |
| Interest rate (real, 1989=3.5%) | 3.0% | 3.0% | 3.0% | 3.0% | 2.8% | |
| Dependency ratio[(1)] | 29% | 35% | 36% | 38% | 43% | |

[(1)] Population receiving a pension /labour force.

**Table 1 (continued)**

## Impact of PAYG Pension Reforms on Different Variables of the GE-OLG Model

### France

| *(yearly average)* | 2001-10 | 2011-20 | 2021-30 | 2031-40 | 2041-50 | Average 2001-50 |
|---|---|---|---|---|---|---|
| **Scenario 1: Increasing tax rates, replacement rate and age of retirement unchanged** | | | | | | |
| GDP per capita growth rate | 1.1% | 0.9% | 0.7% | 0.8% | 1.1% | 0.9% |
| Tax rate of the PAYG pension regime balancing the regime | 19.5% | 22.8% | 27.0% | 28.5% | 28.5% | |
| Replacement rate for new retirees | 64% | 64% | 64% | 64% | 64% | |
| Average age of retirement *(years)* | 59.0 | 59.0 | 59.0 | 59.0 | 59.0 | |
| Interest rate (real, 1989=3.5%) | 3.8% | 3.6% | 3.7% | 3.9% | 4.1% | |
| Dependency ratio[(1)] | 44% | 54% | 64% | 71% | 76% | |
| **Scenario 2: Tax rates unchanged, diminishing replacement rate, age of retirement unchanged** | | | | | | |
| GDP per capita growth rate | 1.1% | 1.2% | 1.0% | 1.2% | 1.3% | 1.1% |
| Tax rate of the PAYG pension regime | 19.1% | 19.1% | 19.1% | 19.1% | 19.1% | |
| Replacement rate for new retirees balancing the regime | 58% | 45% | 43% | 44% | 41% | |
| Average age of retirement *(years)* | 59.0 | 59.0 | 59.0 | 59.0 | 59.0 | |
| Interest rate (real, 1989=3.5%) | 3.7% | 3.4% | 3.3% | 3.3% | 3.3% | |
| Dependency ratio[(1)] | 44% | 54% | 64% | 71% | 76% | |
| **Scenario 3: Increasing age of retirement, replacement rate unchanged, slight adjustement of the tax rate** | | | | | | |
| GDP per capita growth rate | 1.2% | 1.2% | 0.9% | 1.2% | 1.4% | 1.2% |
| Tax rate of the PAYG pension regime balancing the regime | 19.2% | 19.8% | 21.1% | 20.0% | 18.2% | |
| Replacement rate for new retirees | 64% | 64% | 64% | 64% | 64% | |
| Average age of retirement *(years)* | 59.2 | 60.3 | 61.6 | 62.8 | 63.9 | |
| Interest rate (real, 1989=3.5%) | 3.8% | 3.8% | 3.9% | 4.2% | 4.3% | |
| Dependency ratio[(1)] | 43% | 48% | 53% | 55% | 55% | |
| **Scenario 4: Increasing age of retirement, tax rate unchanged, slight adjustement of the replacement rate** | | | | | | |
| GDP per capita growth rate | 1.2% | 1.2% | 1.0% | 1.2% | 1.3% | 1.2% |
| Tax rate of the PAYG pension regime | 19.1% | 19.1% | 19.1% | 19.1% | 19.1% | |
| Replacement rate for new retirees balancing the regime | 64% | 56% | 55% | 68% | 63% | |
| Average age of retirement *(years)* | 59.2 | 60.3 | 61.6 | 62.8 | 63.9 | |
| Interest rate (real, 1989=3.5%) | 3.8% | 3.8% | 3.9% | 4.1% | 4.2% | |
| Dependency ratio[(1)] | 43% | 48% | 53% | 55% | 55% | |

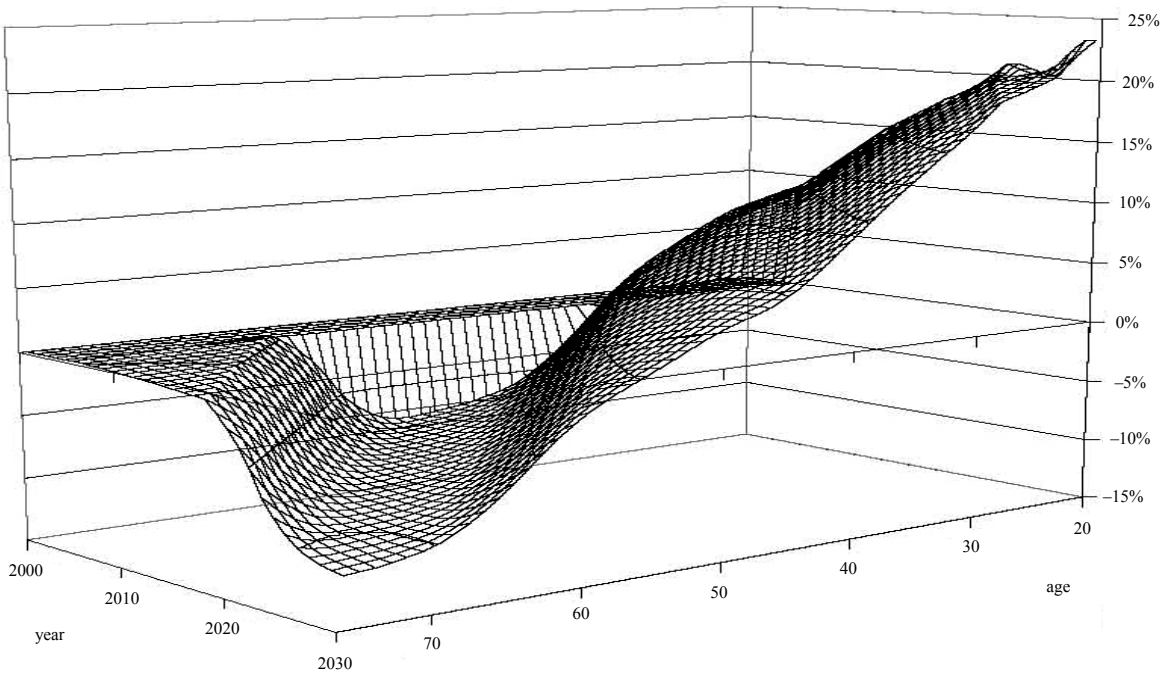
### Germany

| *(yearly average)* | 2001-10 | 2011-20 | 2021-30 | 2031-40 | 2041-50 | Average 2001-50 |
|---|---|---|---|---|---|---|
| **Scenario 1: Increasing tax rates, replacement rate and age of retirement unchanged** | | | | | | |
| GDP per capita growth rate | 1.0% | 1.0% | 0.9% | 1.0% | 1.2% | 1.0% |
| Tax rate of the PAYG pension regime balancing the regime | 16.5% | 17.8% | 20.5% | 22.5% | 22.0% | |
| Replacement rate for new retirees | 52% | 52% | 52% | 52% | 52% | |
| Average age of retirement *(years)* | 61.0 | 61.0 | 61.0 | 61.0 | 61.0 | |
| Interest rate (real, 1989=3.5%) | 3.6% | 3.6% | 3.5% | 3.6% | 3.7% | |
| Dependency ratio[(1)] | 48% | 55% | 65% | 72% | 76% | |
| **Scenario 2: Tax rates unchanged, diminishing replacement rate, age of retirement unchanged** | | | | | | |
| GDP per capita growth rate | 1.0% | 1.1% | 1.1% | 1.2% | 1.3% | 1.1% |
| Tax rate of the PAYG pension regime | 16.3% | 16.4% | 16.4% | 16.4% | 16.4% | |
| Replacement rate for new retirees balancing the regime | 49% | 44% | 37% | 39% | 39% | |
| Average age of retirement *(years)* | 61.0 | 61.0 | 61.0 | 61.0 | 61.0 | |
| Interest rate (real, 1989=3.5%) | 3.6% | 3.5% | 3.3% | 3.3% | 3.3% | |
| Dependency ratio[(1)] | 48% | 55% | 65% | 72% | 76% | |
| **Scenario 3: Increasing age of retirement, replacement rate unchanged, slight adjustement of the tax rate** | | | | | | |
| GDP per capita growth rate | 1.1% | 1.2% | 1.0% | 1.3% | 1.4% | 1.2% |
| Tax rate of the PAYG pension regime balancing the regime | 16.3% | 15.5% | 16.1% | 16.1% | 13.8% | |
| Replacement rate for new retirees | 52% | 52% | 52% | 52% | 52% | |
| Average age of retirement *(years)* | 61.2 | 62.3 | 63.6 | 64.8 | 65.9 | |
| Interest rate (real, 1989=3.5%) | 3.6% | 3.8% | 3.7% | 3.9% | 4.0% | |
| Dependency ratio[(1)] | 47% | 50% | 55% | 56% | 55% | |
| **Scenario 4: Increasing age of retirement, tax rate unchanged, slight adjustement of the replacement rate** | | | | | | |
| GDP per capita growth rate | 1.1% | 1.2% | 1.0% | 1.3% | 1.4% | 1.2% |
| Tax rate of the PAYG pension regime | 16.3% | 16.4% | 16.4% | 16.4% | 16.4% | |
| Replacement rate for new retirees balancing the regime | 53% | 57% | 48% | 59% | 61% | |
| Average age of retirement *(years)* | 61.2 | 62.3 | 63.6 | 64.8 | 65.9 | |
| Interest rate (real, 1989=3.5%) | 3.7% | 3.8% | 3.8% | 4.0% | 4.1% | |
| Dependency ratio[(1)] | 47% | 50% | 55% | 56% | 55% | |

[(1)] Population receiving a pension /labour force.

**Figure 1**

**Gain (or Loss) of Current Welfare of a Cohort in Scenario 2 (Lower Replacement Rate, Unchanged Age of Retirement) Compared to Scenario 1 (Higher Tax Rate, Unchanged Age of Retirement)**




compared to the baseline. For active cohorts, scenario 2 involves a lower tax rate and a lower replacement rate from 2005.[7] For active cohorts about to retire, the discounted, unfavourable effect of a replacement rate that is lower over the remaining lifetime than in scenario 1 dominates the discounted, favourable impact of a tax rate lower over only a few remaining working years before retiring. The associated loss of permanent income entails lower consumption for older active generations. For young active generations, the net effect of the reform on current welfare is reversed and thus favorable, bolstering consumption as well as leisure. For future generation, the favorable influence on welfare is still bigger;

- intergenerational redistributive effects are far more limited in scenario 3 where the age of retirement is increased by 1.25 year per decade from 2005 on and the tax rate is marginally adjusted to balance the pension system. This reform enhances current welfare for many cohorts and over most of the simulation period. Compared to scenario 1, the welfare cost of the reform is borne by the cohorts aged between 50 and 70 each year. Their future current welfare is indeed lower than in the baseline scenario 1, reflecting lower leisure for cohorts which would have been retired had scenario 3 not been implemented;
- in scenario 4 – which encapsulates a rising age of retirement as in scenario 3 and where the pension regime is balanced by adjusting the replacement rate and not the tax rate – the intergenerational redistributive effects are qualitatively similar to those observed in scenario 2 but quantitatively far more limited, in particular for future generations.

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[7] For individuals already retired in 2005, the reform has a small detrimental effect on welfare. Since capital deepening is stronger in scenario 2 than in the baseline, the interest rates are lower and the return on the capital accumulated by the retirees also declines.

**Figure 2**

**Gain (or Loss) of Current Welfare of a Cohort in Scenario 3 (Increasing Age of Retirement, Adjusted Tax Rate) Compared to Scenario 1 (Higher Tax Rate, Unchanged Age of Retirement)**

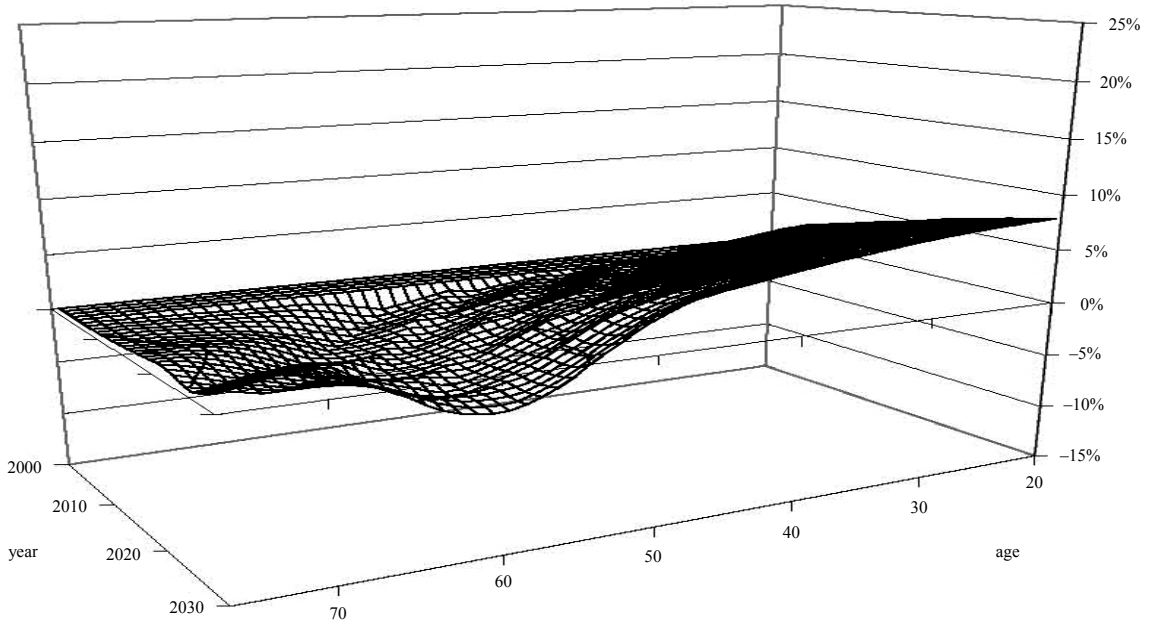
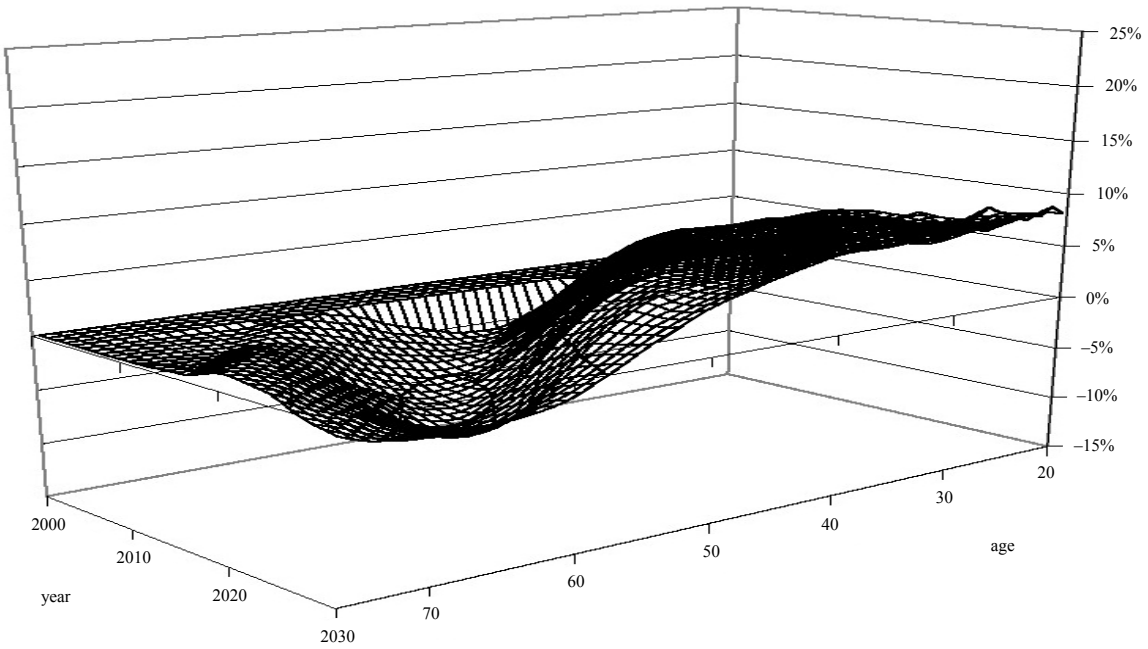



**Figure 3**

**Gain (or Loss) of Current Welfare of a Cohort in Scenario 4 (Increasing Age of Retirement, Adjusted Replacement Rate) Compared to Scenario 1 (Higher Tax Rate, Unchanged Age of Retirement)**



25 The Lexis surfaces for the United States, Japan and Germany –which are not shown here – display similar patterns but orders of magnitude differ:

- in the United States, the intergenerational redistributive effects in all scenarios are far more limited than in France. For instance, the welfare gain of the cohort aged 20 in 2030 compared to scenario 1 is 7 per cent in the US whereas it is above 20 per cent on French data. This difference illustrates divergent demographic dynamics between the two countries, with an ageing problem less acute in the US than in France and therefore smaller adjustments needed in the PAYG pension system;
- in Japan and Germany, welfare gains in scenarios 2, 3 and 4 are slightly more limited than in France. In Japan, welfare gains in case of a reform increasing the age of retirement are smaller than in France because the age of retirement in Japan is already high at the beginning of the simulation period (*i.e.*, 66 years) and because the GE-OLG model encapsulates a declining labor productivity of individuals above 60.

26 Overall, Lexis surfaces show that increasing the age of retirement allows for smoothing the intergenerational redistributive effects associated with pension reforms. However, from a normative point of view, they hardly help determining whether a Pareto-improving reform exists among the scenarios considered here. Comparing intertemporal utilities among different scenarios – and not current utility as in Lexis surfaces – proves to be more useful on this issue (see below).

27 In contrast with the Lexis surfaces, intertemporal utilities take account of all the influences on households' welfare over his/her entire lifespan. Let's $W_t^{intertemp}$ stand for the intertemporal utility of the representative individual of a cohort born in $t$ in the GE-OLG model. Figure 4 shows the levels of the intertemporal utility for the cohorts born between 1940 and 2000 in the United States, Japan, France and Germany respectively, and in the four scenarios of pension reform modeled here.

28 Figure 4 clearly shows that the level of the intertemporal utility of a representative individual tends to increase with its year of birth.[8] This trend comes from strictly positive gains of multifactor productivity (MFP) in the GE-OLG model. Technical progress indeed increases the level of the real wage over time and thus pushes up optimal consumption and leisure. Thus the intertemporal utility of a household is all the higher as this household is younger, *ceteris paribus*.

29 Many common features emerge from the profiles of intertemporal utilities in the four countries considered here, in particular as concerns the intergenerational redistributive effects of pension reforms:

- A reform bolstering private saving (as scenario 2 and, to a lesser extent, scenario 4) is always more favorable to younger cohorts and future generations than other scenarios, and weighs down relatively more on the intertemporal welfare of the baby-boomers.
- An increase in the age of retirement (as in scenarios 3 and 4) moderates the intergenerational redistributive effects of the reform as compared to scenario 2, because they are simultaneously less detrimental to the welfare of the baby-boomers and less favorable to younger and future cohorts.
- In all countries a group of cohorts exists for which the social choice for one reform or another is almost neutral as concerns their intertemporal welfare. This group encompasses cohorts born between 1970 and 1975.

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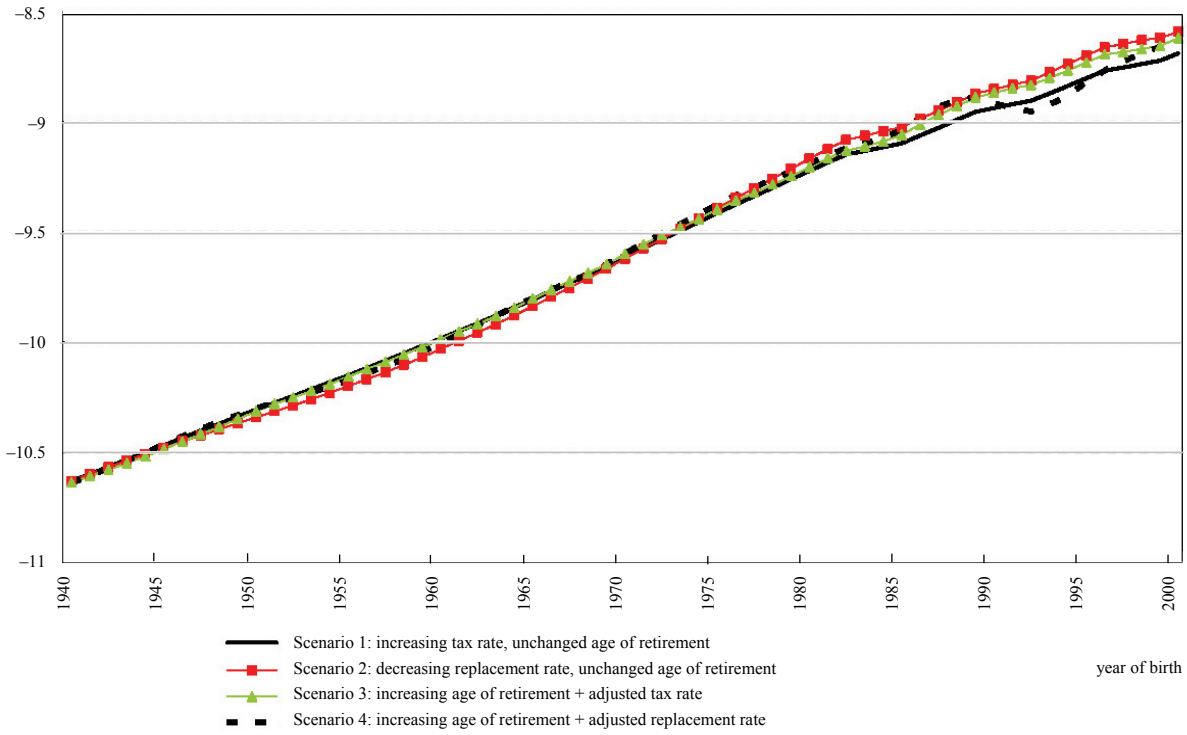
[8] In some exceptional cases, the intertemporal utility of a cohort is slightly lower than the one of the immediately preceding cohort, due to the influence on welfare of pension reforms which depends on age.

**Figure 4**

**Intertemporal Utilities of the Representative Individuals of the Cohorts Born Between 1940 and 2000**

**United States**




**Japan**

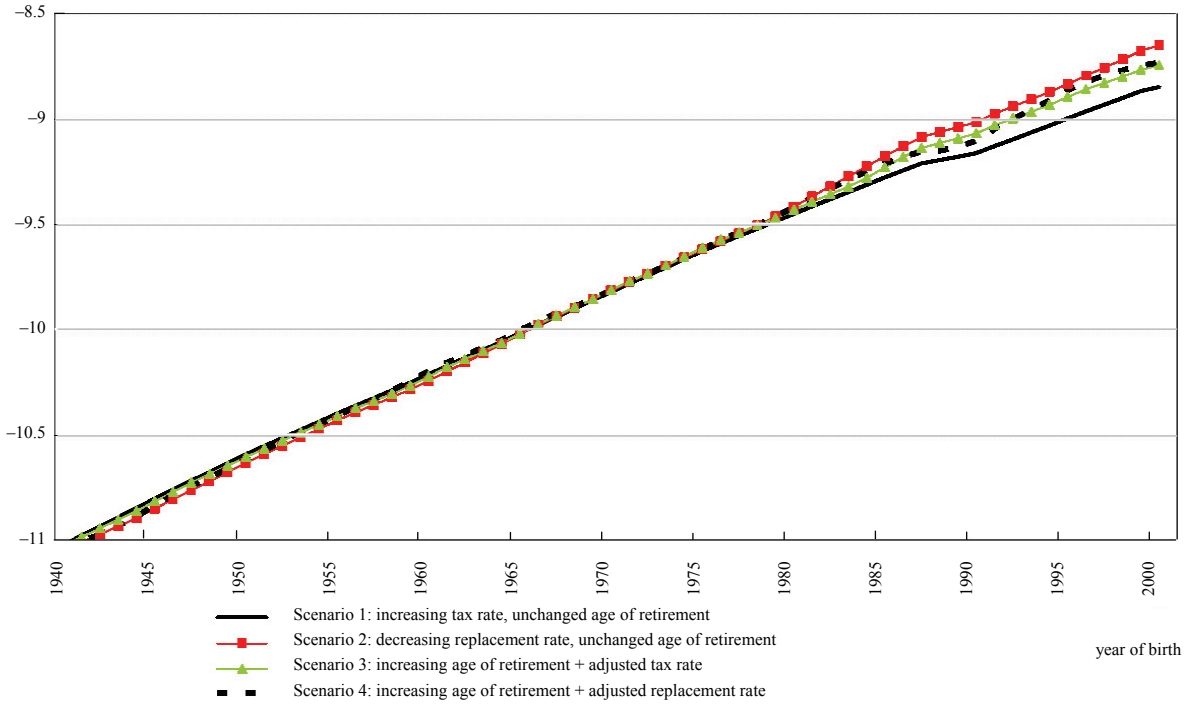
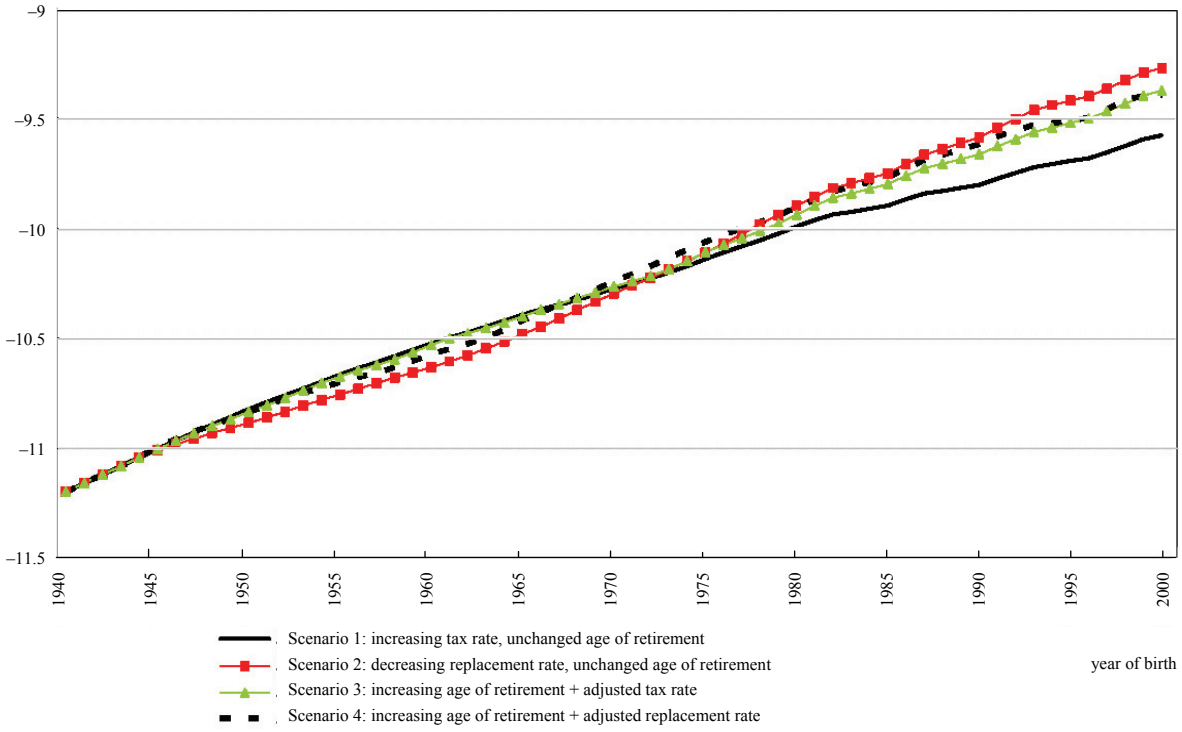


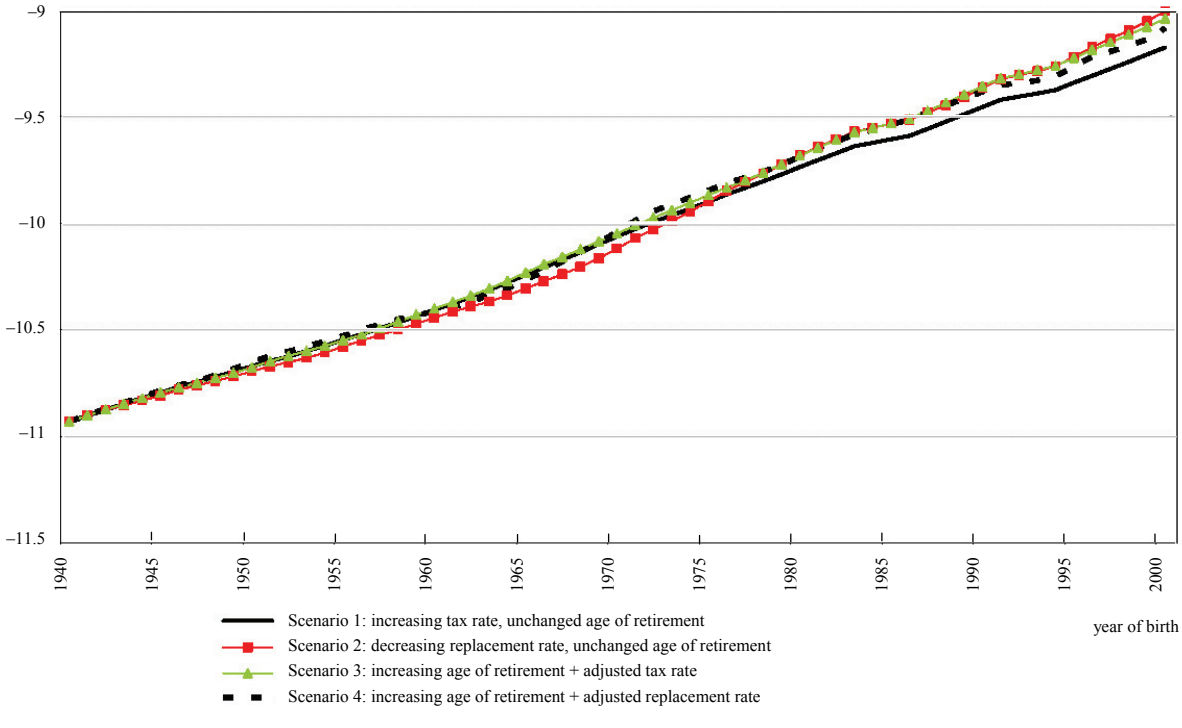
**Figure 4 (continued)**

**Intertemporal Utilities of the Representative Individuals of the Cohorts Born Between 1940 and 2000**

**France**




**Germany**



30 However, significant differences appear among the different scenarios in each country as concerns intertemporal utilities:

- in the United States, the differences between the scenarios are relatively limited, in line with a relatively slow ageing of the population;
- on Japanese data, the respective influences of the reforms on intertemporal utility are very limited for cohorts born before the mid-1980's. This reflects a demographic context characterized by an ageing process already advanced, in which the upward effect on savings of a declining replacement rate remains small and increasing the age of retirement is of little impact when the initial age of retiring is already high (66 years). For the intertemporal welfare of cohorts born after the 1980's, scenario 2 is relatively more favorable;
- in France and Germany, differences among intertemporal utilities are coherent with the results obtained with Lexis surfaces and reflect the same mechanisms.

31 Most importantly, *intertemporal utilities in Figure 4 shows that no reform scenario is Paret-improving* compared to any other scenario, and especially compared to the baseline, no-reform scenario 1. This result holds in the four countries considered here. PAYG pension reforms all tend to weight down more or less on the intertemporal welfare of the baby-boomers and to increase more or less the welfare of their children and of future generations. In this context, the social choice is not trivial and the use of a social welfare functional is required.

## 4 Modelling the social choice for a pension reform: an applied normative analysis

32 Among possible welfarist social choice functionals, the criterion of the maximin has brought about a large and controversial literature. In the modelling context of our GE model with overlapping generations which involves a strictly positive technical progress, the use of the maximin raises serious and interesting problems that were first formulated in Arrow's (1973) criticism of Rawls' (1971) *Theory of Justice*.

33 By definition, the maximin requires that the decision of a welfarist social planner among a set of possible choices should be the one which maximizes the welfare of the most detrimentally affected social unit (Rawls, 1971). However, Arrow (1973) shows that applying this maximin criterion in an intertemporal environment with strictly positive technological progress amounts to selecting the reform maximising the welfare of the oldest cohort alive, which corresponds in our model to the group of survivors dying in 2005 when the reform is announced. Figure 4 clearly illustrates Arrow's point. Reforming pensions on the exclusive basis of their impact on the intertemporal welfare of the oldest individual of a society seems hard enough to advocate for.

34 Arrow's criticism can be extended to social welfare functionals taking account of the welfare of future generations.[9] The issue of whether the welfare of future generations should be discounted in the social planner's function has been bringing about difficult issues in normative economics. Welfarism requires the social choice to depend only on information about well-being, disregarding all other information – such as, for instance, the year of birth of a cohort. This implies *not* discounting the welfare of future cohorts. Such a proposal usually appears problematic since, for instance, it can call for large sacrifices from current generations for the benefit of cohorts appearing far in the future.

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[9] In one paragraph, Arrow (1973) advocates for discounting the welfare of future cohorts mainly because it is common sense; however, when criticising the use of the maximin in an intertemporal environment, he implicitly assumes that the welfare of future generations is not discounted.

35 Discounting the well-being of future generations is not without drawbacks either. If the number of future generations whose well-being is discounted is *not* finite, applying the maximin in an intertemporal modelling environment does not allow for defining a solution to the social choice problem. Indeed, the further the cohorts in time, the lower their discounted intertemporal utility. Thus if the number of future cohorts taken into account is not finite, applying the maximin criterion does not yield a defined result. If the number of future generations whose well-being is discounted is finite, then applying the maximin in an intertemporal modelling environment amounts to selecting the reform maximizing the welfare of either the further cohort in time or the oldest living cohort (the latter case corresponding to Arrow's critique), depending on the values of the social discount rate and the number of future cohorts taken into account.

36 From a more empirical point of view, it seems reasonable to take account of the welfare of a finite number of future generations. Determining this number is unavoidably arbitrary but the implications are all the more limited as the value of the social discount rate is higher. In what follows, the analysis takes account of the welfare of the cohorts born before or in 2030. Thus, our applied normative economics analysis does not abide by strict welfarist standards which would have required not discounting the well-being of an infinite number of future generations – an empirically non-tractable requirement here.

37 Arrow's criticism of the maximin criterion in an intertemporal context with positive technical progress applies to any social welfare functional aggregating intertemporal utilities. The following paragraphs dig deeper into this issue.

38 Blackorby, Bossert and Donaldson (2005) distinguish two types of social welfare functionals which both encapsulate a variable parameter measuring the degree of aversion of the social planner to intergenerational inequality. A first category of functionals ranks intertemporal utilities by decreasing order and then weights the utility of a cohort the more as it is lower (Gini generalised function). A second category applies an increasing and concave transformation when aggregating the intertemporal utilities of the cohorts (Kolm Pollack function). Depending on the value of the parameter measuring the aversion of the social planner to intergenerational inequality, social preferences tend to the utilitarianism of the mean, the maximin or lie between these polar cases.

39 A few notations can be helpful. The Gini generalised social welfare functional in a given scenario and for a given country can be written as:

$$\Delta^{Gini}\left(\mathrm{W_t}^{\text{intertemp}}\right)_{t\in T}=\frac{\sum_t\left[N_t\,(1+\rho_s)^{-c(t)}\,\left(i^{\theta}-(i-1)^{\theta}\right)\left[\mathrm{W_t}^{\text{intertemp}}\right]_{[i]}\right]}{\left(\sum_t N_t\,(1+\rho_s)^{-c(t)}\right)^{\theta}}$$

where $\Delta^{Gini}$ stands for the Gini generalised social welfare functional. Its arguments are the intertemporal utilities $W_t^{intertemp}$ of the representative individuals of each cohort born in $t \in T$ where $T$ is the set of cohorts alive in 2005 when the reform is announced and/or born before or in 2030. $N_t$ stands for the number of individuals in a cohort in 2005.[10] The expression $(1+\rho_s)^{-c(t)}$ refers to the social rate discounting the welfare of future generations in the social welfare functional.[11] The parameter $\theta \geq 1$ stands for the degree of aversion of the social planner to intergenerational inequality. The parameter $i$ refers to the rank order of $W_t^{intertemp}$ – the intertemporal utility of the representative individual of the cohort born in $t$ – after applying a rank-ordered permutation such that:

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[10] If $t \in$ (2005;2030], then $N_t$ equals the initial number of individuals of the cohort.

[11] with $\rho_s \in$ [0;1] and $c(t)$ such that $\{[t \leq 2005\ ] \rightarrow [c(t) = 0]; [t \in (2005;2030\ ]] \rightarrow [c(t) = t - 2005\ ]\}$.

$$[W_t^{intertemp} \geq W_{t^*}^{intertemp}] \rightarrow [[W_t^{intertemp}]_{[i]} \geq [W_{t^*}^{intertemp}]_{[i+1]}] \ \forall t, \ \forall t^* \neq t, \ \forall i$$

40 These specification and notations rely on simple intuitions. The $\Delta^{Gini}$ function aggregates the intertemporal utilities of the cohorts weighting them all the more as their level is lower and associating them with increasing values of *i*. If $\theta = 1$, then $\Delta^{Gini}$ corresponds to the utilitarism of the mean. For $\theta \rightarrow \infty$, $\Delta^{Gini}$ tends to the maximin because the weight of the lowest intertemporal utility is increasingly higher that the other weights. Between these two polar cases, the degree of aversion of the social planner to intergenerational inequality can vary in a continuous fashion.

41 Such a specification assumes cardinal comparability of the preferences since the utilities are weighted by the number of individuals in each cohort (*i.e.*, by $N_t$). Incidentally, it avoids Parfit's (1982 and 1984) repugnant conclusion by taking account of the size of the total population – as it clearly appears, for instance, when $\theta = 1$.

42 This standard Gini-generalised social welfare functional is biased in favor of the well-being of the oldest cohorts alive, however. In our intertemporal context with positive technical progress, the intertemporal utility of the representative individual of a cohort ($W_t^{intertemp}$) increases with the year of birth. Accordingly, permuting the intertemporal utilities in the Gini function amounts basically to classifying these utilities by decreasing order of date of birth. For $\theta \rightarrow \infty$ which models Rawls' maximin criterion, Arrow's critique thus still fully applies because the social choice takes only account of the welfare of the oldest cohort alive.

43 The same problem arises with social welfare functionals applying an increasing and concave transformation when aggregating the utilities of the cohorts. Blackorby *et al.* (2005) present a so-called Kolm Pollack function in which the transformation is logarithmic, such as:

$$\Delta^{Kolm}\left(W_t^{\text{intertemp}}\right)_{t\in T} = -\frac{1}{\gamma}\ln\left[\frac{\sum_t\left[N_t\,(1+\rho_s)^{-c(t)}\,\exp\left[-\gamma\,W_t^{\text{intertemp}}\right]\right]}{\left(\sum_t N_t\,(1+\rho_s)^{-c(t)}\right)}\right]$$

where $\Delta^{Kolm}$ stands for the Kolm Pollack social welfare functional. Its arguments are the intertemporal utilities $W_t^{intertemp}$ of the representative individuals of each cohort born in $t \in T$ (see above). $N_t$ stands for the number of individuals in a cohort in 2005.[12] The expression $(1+\rho_s)^{-c(t)}$ refers to the social rate discounting the welfare of future generations in the social welfare functional (see above). The parameter $\gamma$ stands for the degree of aversion of the social planner to intergenerational inequality. For $\gamma \rightarrow 0$, social preferences tend to the utilitarism. For $\gamma \rightarrow \infty$, they tend to the maximin.

44 Given the intertemporal context of modelling with positive technological progress and the increasingness of the exponential function, applying the maximin criterion for the social choice in the Kolm Pollack function ($\gamma \rightarrow \infty$) still favors the well-being of the oldest cohort alive, which again is in line with Arrow's critique.

45 Non-biased results can nevertheless be obtained by slightly modifying the specification of the social welfare functionals and using, as arguments, the *differences* between the intertemporal utilities in a given scenario and the same utility in the baseline, no-reform scenario 1, such that:

$$\Delta^{Gini}\left(W_t^{\text{intertemp}}\right)_{t\in T} = \frac{\sum_t\left[N_t\,(1+\rho_s)^{-c(t)}\,\left(i^\theta-(i-1)^\theta\right)\left[W_{t,SCi}^{\text{intertemp}} - W_{t,SC1}^{\text{intertemp}}\right]_{[i]}\right]}{\left(\sum_t N_t\,(1+\rho_s)^{-c(t)}\right)^\theta}$$

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[12] If $t \in (2005;2030]$, then $N_t$ equals the initial number of individuals of the cohort.

for the Gini-generalised function where stands for the intertemporal utility of the $W_{t,SCi}^{intertemp}$ stands for the intertemporal utility of the representative individual of the cohort born in $t$ in scenario $i$ with $i \in \{1,2,3,4\}$), and

$$\Delta^{Kolm}\left(W_t^{\text{intertemp}}\right)_{t\in T} = -\frac{1}{\gamma}\ln\left[\frac{\sum_t\left[N_t\,(1+\rho_s)^{-c(t)}\,\exp\left[-\gamma\,W_{t,SCi}^{\text{intertemp}} - W_{t,SC1}^{\text{intertemp}}\right]\right]}{\left(\sum_t N_t\,(1+\rho_s)^{-c(t)}\right)}\right]$$

for the Kolm Pollack function. These specifications of the social welfare functionals model the social preferences of a government comparing the intertemporal utilities of the cohorts in different scenarios of pension reforms with the same utilities in the no-reform, baseline scenario 1.

46 These specifications avoid the problems stemming from associated with the positive correlation between the intertemporal utilities of the representative individual of a cohort and his/her year of birth. Computing the difference between $W_{t,SCi}^{intertemp}$ and $W_{t,SC1}^{intertemp}$ indeed mechanically cancels out the trend since it is common to both $W_{t,SCi}^{intertemp}$ and $W_{t,SC1}^{intertemp}$.

47 Interestingly, applying the maximin becomes meaningful with these modified specifications. The rawlsian social planner always prefers the *status quo* and chooses to implement scenario 1, in which the welfare of the most detrimentally affected cohort is maximised – indeed, it is nil by construction. Since no scenario is Pareto-improving, some cohort are loosing from the reform in all the other scenarios. Thus a rawlsian social planner chooses to increase taxes in our model.

48 Figures 5 to 8 depict the pay-as-you-go pension system reform which the social planner chooses given its degree of aversion to intergenerational inequality and its discount rate of the welfare of future generations, in the four countries analysed and with the two social welfare functionals used in this paper (Gini generalised and Kolm Pollack). These results provide with a synthetic policy recommendation which takes account of the impact of pension reforms on growth as well as the intergenerational redistributive effect.

49 Since results as concerns the impact of reforms on growth were especially indecisive on French data (see section 2), the case for France is examined first. For an infinite degree of aversion to intergenerational inequality (*i.e.*, $\theta \to \infty$ or $\gamma \to \infty$), the social planner always select scenario 1 (with tax hikes and unchanged age of retirement) (see above).[13] In the case of a purely utilitarist social planner with no aversion to intergenerational inequality (*i.e.*, $\theta = 1$ or $\gamma \to 0$), the selected reform depends on the value of the social discount rate. If it is low, the social planner implements scenario 2 (with cuts in the replacement rate and unchanged age of retirement). If it is higher than 24 per cent in the Gini function and 19 per cent in the Kolm Pollack case, the government chooses scenario 4 (which incorporates a rise in the age of retirement and slightly diminishes the replacement rate).

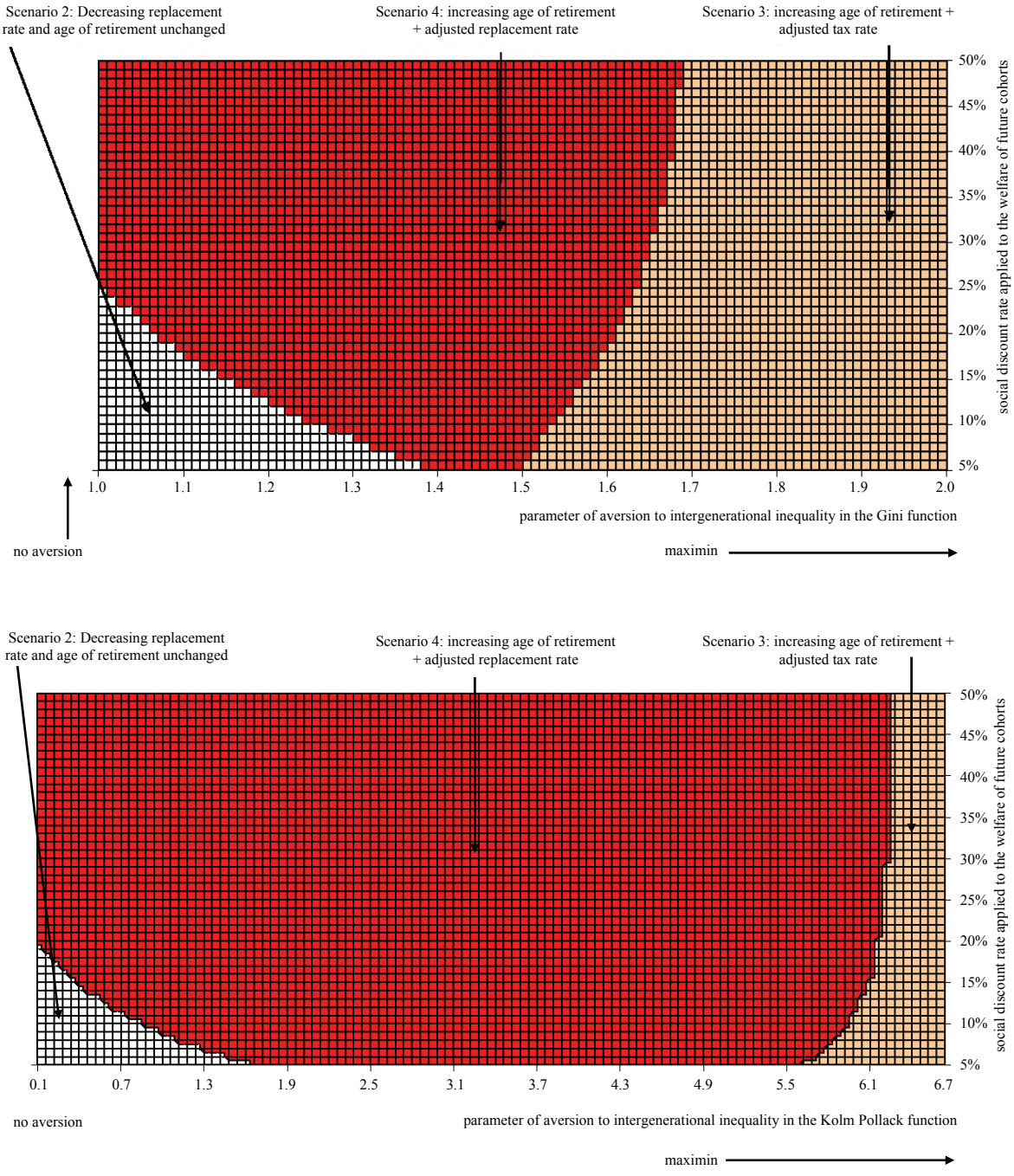
50 From an empirical point of view, the social planner can reasonably be thought of as being relatively averse to intergenerational inequality but not taking much care for the welfare of future cohorts. Different cases can be distinguished here. For increasing values of $\theta \geq 1$ (or $\gamma > 1$), the social planner in France selects firstly scenario 4, then – for still higher aversion to intergenerational inequality – scenario 3 and ends up, for Rawlsian preferences, selecting scenario 1 (see above).

51 In order to yield clear normative results, threshold levels for $\theta$ and $\gamma$ have to be determined. On French data, values of $\theta = 1.6$ or $\gamma = 2.6$ characterize a government weighting the welfare of a baby-boomer born in 1950 50 per cent more than the well-being of an individual born in 1985. Values of 2.0 and 4.4, respectively, correspond to a social planner taking account of the welfare of

[13] The values above which the social choice favors scenario 1 can be high and are not necessarily shown in the Figures 5 to 8.

**Figure 5**

**Pension Reform Implemented by the Social Planner (France)**




a baby-boomer born in 1950 twice as much as the well-being of someone born in 1985. We consider ($\theta = 1.6$, $\gamma = 2.6$) as characterizing a social planner moderately averse to intergenerational inequality, and ($\theta = 2.0$, $\gamma = 4.4$) as associated to a government with strong aversion to intergenerational inequality.

52 Four types of social preferences, each defined by a pair ($\theta$, $\rho_s$) (or ($\gamma$, $\rho_s$)), can be defined:

- a utilitarist social planner with moderate aversion to intergenerational inequality and *not* caring about future cohorts ($\theta$ = 1.6 or $\gamma$ = 2.6 and $\rho_s$ =100 per cent) implements, on French data, scenario 4 (rising age of retirement and slight decline in the replacement rate) in the Gini function as well as in the Kolm Pollack function;
- a utilitarist social planner with moderate aversion to intergenerational inequality and caring about future cohorts ($\theta$ = 1.6 or $\gamma$ = 2.6 and $\rho_s$ = 5 per cent) implements, on French data, scenario 3 (rising age of retirement and slight adjustment of the tax rate) in the Gini function and scenario 4 in the Kolm Pollack function;
- a utilitarist social planner with strong aversion to intergenerational inequality and not caring about future cohorts ($\theta$ = 2.0 or $\gamma$ = 4.4 and $\rho_s$ =100 per cent) implements, on French data, scenario 3 (rising age of retirement and slight adjustment of the tax rate) in the Gini function and scenario 4 in the Kolm Pollack function;
- a utilitarist social planner with strong aversion to intergenerational inequality and caring about future cohorts ($\theta$ = 2.0 or $\gamma$ = 4.4 and $\rho_s$ =100 per cent) implements, on French data, scenario 3 (rising age of retirement and slight decline in the replacement rate) in the Gini function and scenario 4 in the Kolm Pollack function.

53 In a democratic system, the social planner is most probably moderately averse to intergenerational inequality. Indeed, its aversion to inequality is not nil and is strictly positive (Tocqueville, 1840). However it can not be too high because favoring a limited number of cohorts in the social choice could end up alienating the vote of many cohorts in a one-man-one-vote system and lead to defeat in democratic elections. As regards the plausible value of the social discount rate, democratic government usually does not care much of the welfare of future generations.

54 In our model parameterized on French data, such a standard democratic social planner chooses to implement scenario 4 (rising age of retirement and slight decline in the replacement rate) in the Gini function as well as in the Kolm Pollack function.

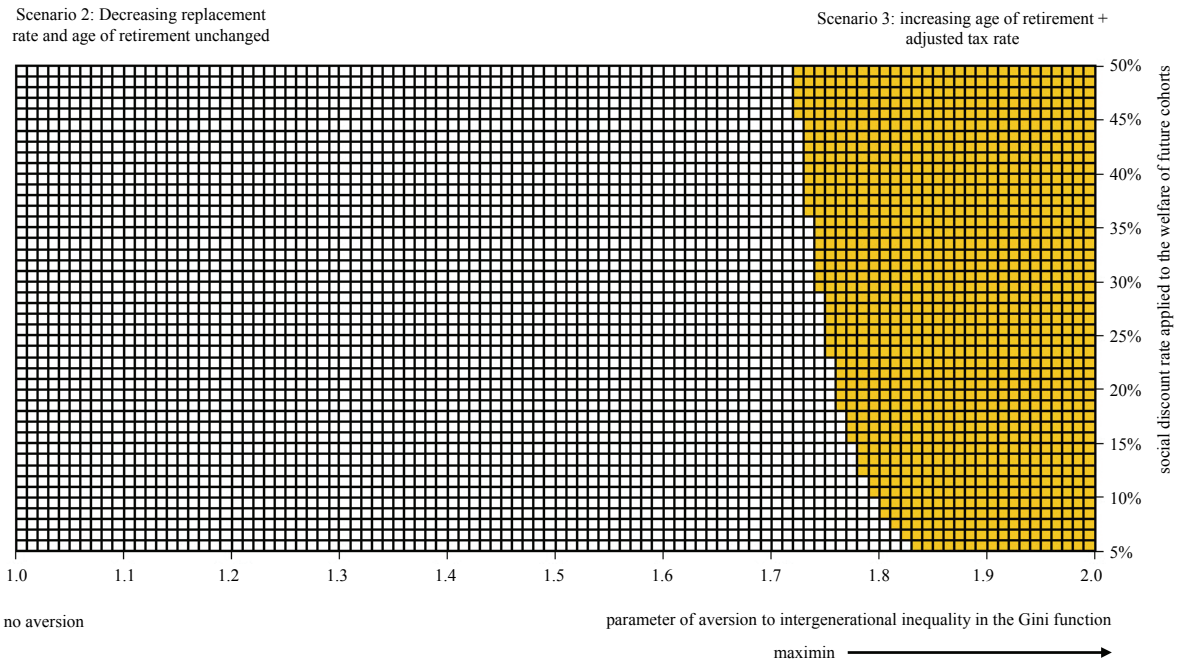
55 The normative results as concerns the United States, Japan and Germany confirm and complement the results obtained in Section 2 in a positive fashion:

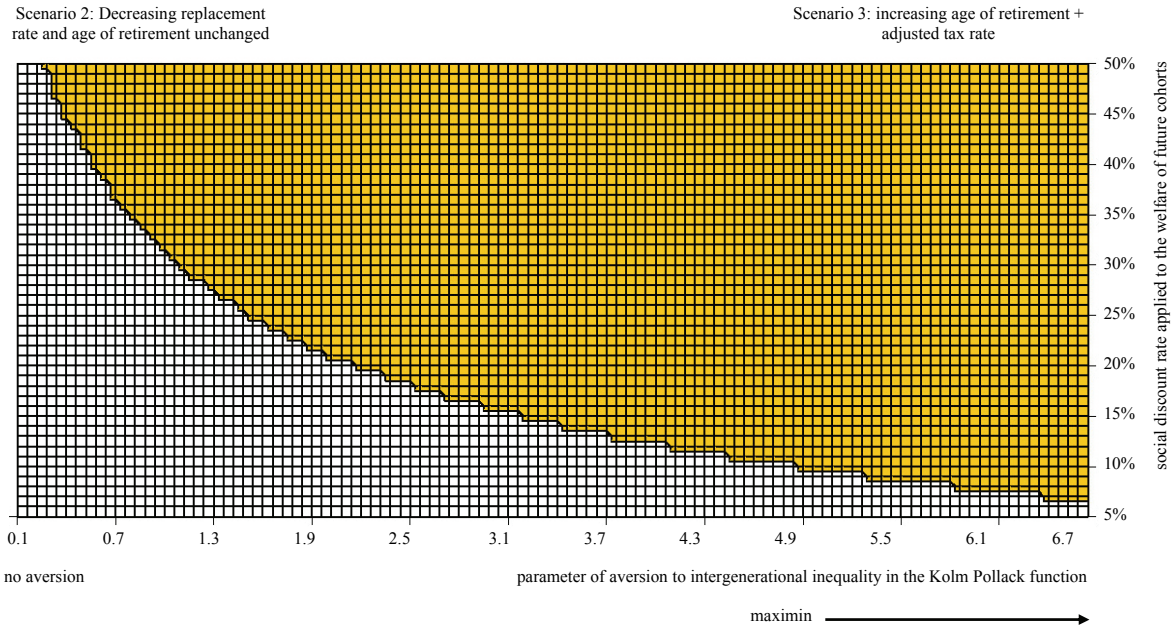
- in the United States and Japan, the social planner chooses to implement, in most cases, the reform scenario 2 where the replacement rate is diminished and the age of retirement unchanged. If its aversion to intergenerational inequality is strong, the social planner selects scenario 3 in the US and scenario 4 in Japan, which both incorporate a rise in the age of retirement. In the US, if the social planner does not care of the welfare of future generations (so if the value of the social discount rate is high), it may favor scenario 3 (rising age of retirement and slight decline in the tax rate);
- in Germany, the social planner almost always select scenario 3 (rise in the age of retirement and slight adjustment of the tax rate) in line with the demographic structure of this country characterized by relatively very large cohorts born in the 1950's. In this demographic context, the favourable effect on growth of increasing the age of retirement is sizeable and adjusting slightly the tax rate rather than the replacement rate weighs down less on the intertemporal welfare of older workers.

56 Overall, these results suggest that taking account of the intergenerational redistributive effects of the reform helps discriminating between scenario 2, 3 and 4 whereas this is not possible if only aggregate welfare is taken into account (see section 2).

**Figure 6**

**Pension Reform Implemented by the Social Planner (United States)**



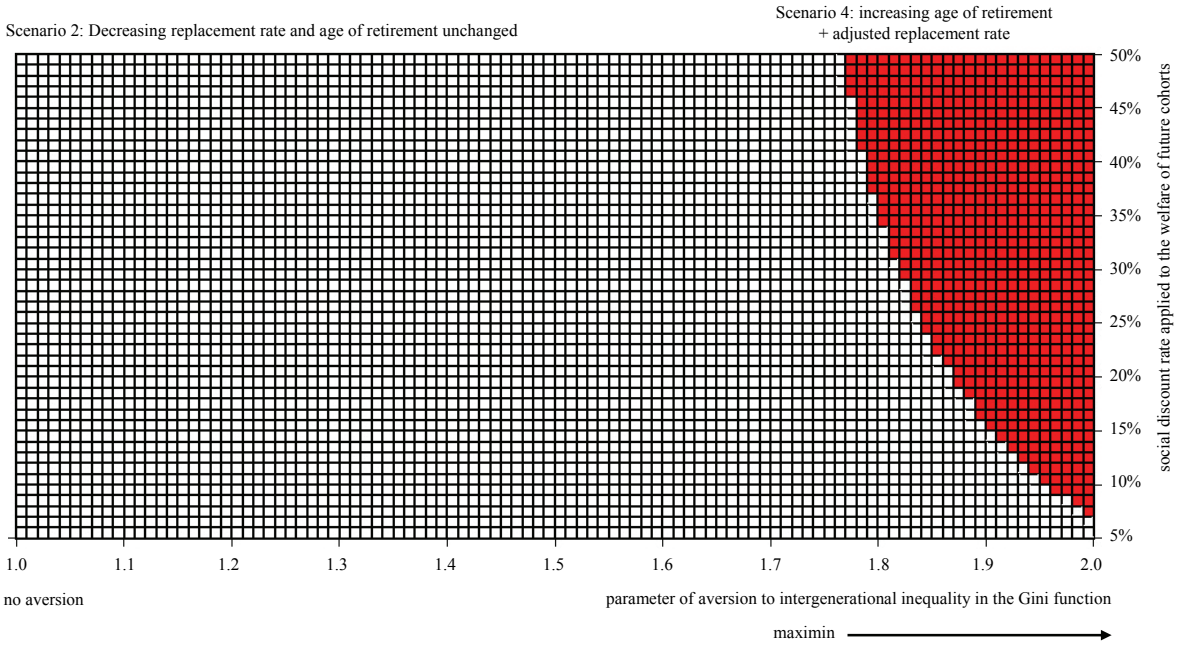



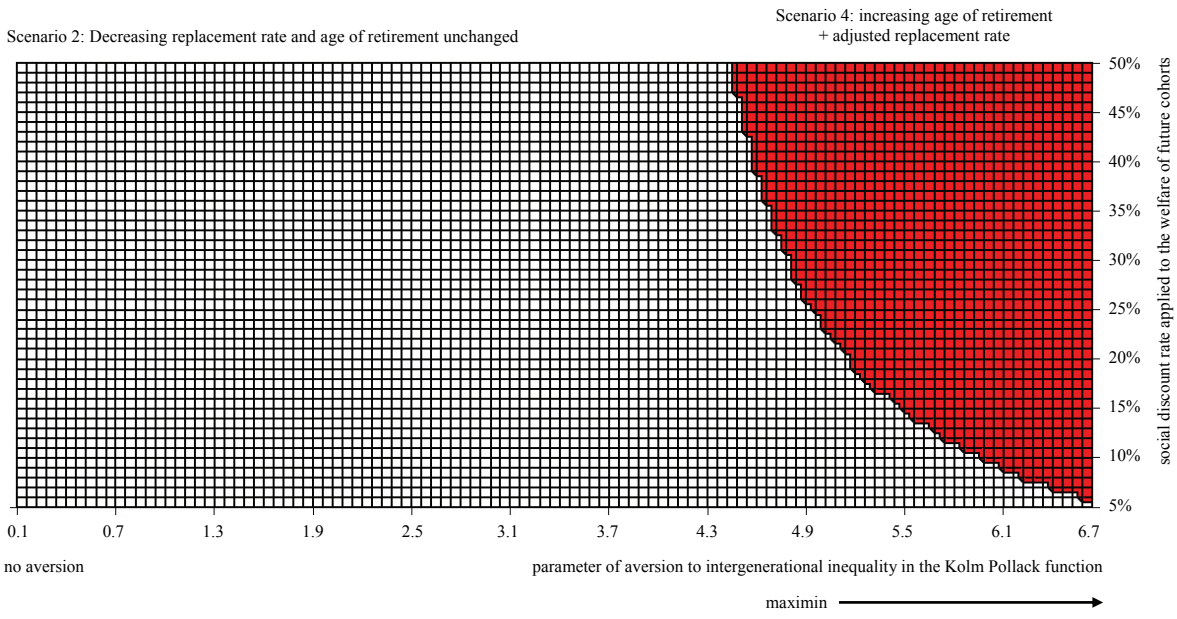

## 5 Conclusion

57 This paper has investigated the issue of which reform of the pay-as-you-go pension systems a social planner should choose given its aversion to intergenerational inequality and its discount rate of the welfare of future generations.

**Figure 7**

**Pension Reform Implemented by the Social Planner (Japan)**

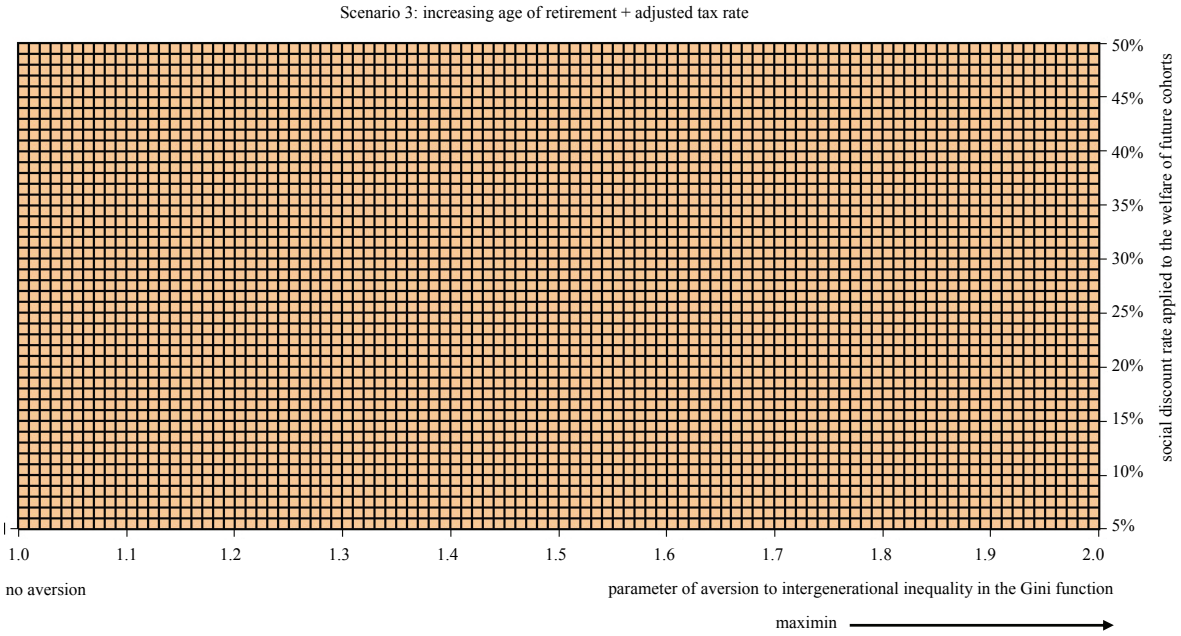


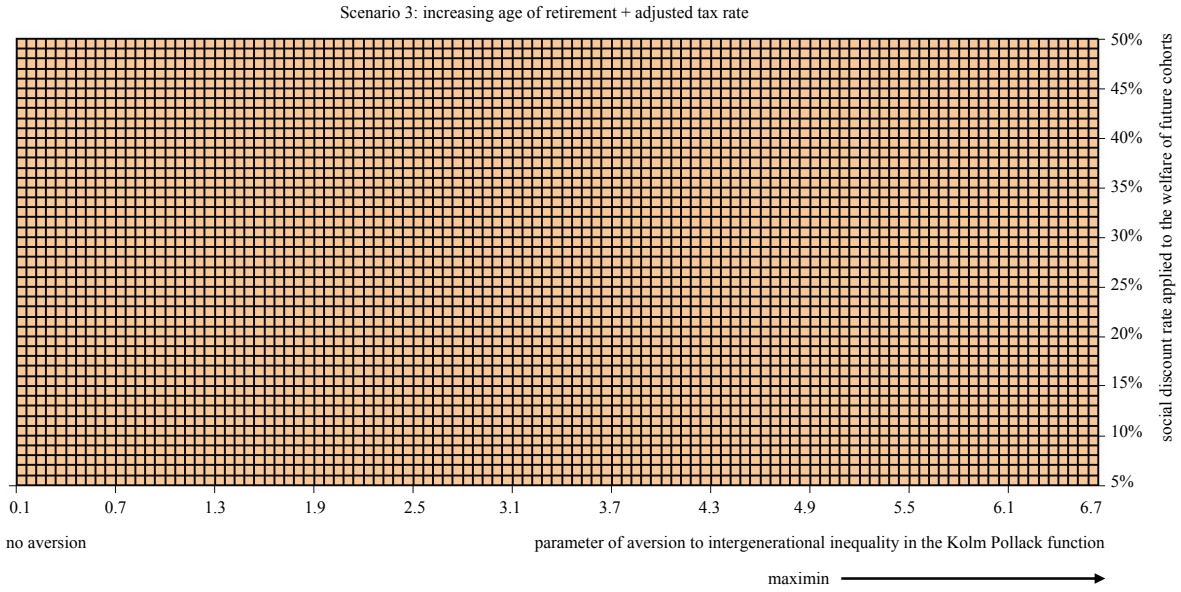




58 Four scenarios of PAYG pension reforms have been considered. The average retirement age is unchanged in a first pair of scenarios where the pension system remains balanced each year during the next decades thanks to either higher tax rates (scenario 1) or lower replacement rates for future retirees (scenario 2). A second pair of scenarios incorporates increases in the effective average age of retirement by one year and a quarter every ten years from 2005 until 2045 with

**Figure 8**

**Pension Reform Implemented by the Social Planner (Germany)**




age-specific participation rates of older workers assumed to increase in line with the changes in the retirement age. The small residual imbalances of the PAYG regime are covered either by adjusting the pension tax rate (scenario 3) or the replacement rate (scenario 4).

59 Using the results of a computable, dynamic general equilibrium model with overlapping generations (GE-OLG) parameterised on data for the United States, Japan, France and Germany, an

applied normative economics methodology has been developed yielding the following main results:

- the GDP growth rate is higher in scenarios 2, 3 or 4 than in scenario 1 by around +0.2 per cent per year on average in the next decades. Pension reforms indeed bolster labour supply and/or capital accumulation whereas raising taxes to balance the regime, as in scenario 1, fosters neither the former nor the latter;
- however, since the favourable impacts of reforms on growth are very comparable, a social planner can hardly decide for one pension reform or another on the exclusive basis of the GDP criterion. Taking account of the intergenerational redistributive effects of the reforms thus becomes crucial for determining the social choice;
- If the age of retirement is unchanged, as in scenario 2, the pension reform triggers strong intergenerational redistributive effects compared to the baseline, with many baby-boomers bearing most of the welfare cost of the reform while younger generations clearly benefit from it. Scenarios incorporating a rise in the average age of retirement (scenarios 3 and 4) strongly smooth the intergenerational redistributive effects associated with the pension reform;
- no pension reform is Pareto-improving in the four countries considered here. Compared to the baseline scenario 1, they all tend to weigh down more or less on the intertemporal welfare of the baby-boomers and to increase more or less the welfare of their children and of future generations;
- social welfare functionals aggregating the households' intertemporal utilities and encapsulating a variable degree of aversion of the social planner to intergenerational inequality and a variable discount rate of the welfare of future generations show that the social planner in the United States and Japan is likely to implement scenario 2. In Germany, the social choice favors scenario 3 in most cases. On French data, a social planner which does not care about the welfare of future generations but is reasonably averse to intergenerational inequality among living cohorts, chooses to implement scenario 4;
- in all countries, the scenario 1, which corresponds to tax hikes balancing the pension regime, characterizes a social planner with rawlsian preferences.

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# ECONOMIC AND BUDGETARY EFFECTS OF PENSION REFORMS IN EU MEMBER STATES

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## 1 Introduction

The key challenge for policy-makers in the EU over the medium-term will be to transform the European social models such that the implications arising from an ageing population will become manageable for the European societies. There are many examples in the recent past of successful reforms that deliver in terms of enhancing fiscal sustainability without any major sacrifice in terms of deteriorating standards of living or access to basic necessities provided for by the society. Notwithstanding these encouraging policy steps in the right direction in the EU, more remains to be done on the structural reform front.

On top of this, the financial and economic crisis taking hold since last year has drastically changes the economic and fiscal landscape in the EU – and, indeed, globally. At the current juncture characterized by very subdued economic activity and exceptional uncertainty as to the prospects, there is a strong need to put in place all necessary policies to avoid that the financial and economic crisis will have a lasting adverse impact on the supply side. It will be particularly important to firstly ensure that there is no backtrack of the recent progress on the structural reform front and secondly to not only maintain, but to intensify the reform agenda in view of the longer-term challenges so as to come out stronger from the current economic crisis, and get the European economies back on the path of decent and stable long-term growth. For this to materialize, a comprehensive exit strategy built on structural reforms across the board will be necessary to restore credibility and confidence in the public finances. This will provide the best possible chances for successfully resuming on the path towards more sustainable public finances.

The revision of the joint European Commission and Economic Policy Committee (Ageing Working Group) (henceforth EC-EPC) budgetary projection exercise carried out in 2009 provides the opportunity for assessing the economic and budgetary impact of recent pension reforms.[1] For these projections, national pension models have been used given their capacity to capture important institutional characteristics of national pension systems. In order to make sure that the degree of the challenge posed by population ageing is comparable across the EU Member States, a commonly agreed set of underlying macroeconomic assumptions is used.[2] Moreover, the different approaches to modelling pension spending have been scrutinized in a series of peer reviews, so as to ensure a high degree of comparability of the projection results.

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Finally, as customary, the views expressed in this paper are the responsibility of the authors alone and should not be attributed to the European Commission.

[1] The results reported in the paper are preliminary results. The final results are released in May 2009. See European Commission – Economic Policy Committee (2009), "2009 Ageing Report", *European Economy*.

[2] The core of the projection exercise is government expenditure on pensions for both the private and public sectors, as in the 2006 pension projection exercise. The EPC agreed to provide pension projections for the following items: gross pension expenditure, number of pensions/pensioners, number of contributors, contributions to public pension schemes, assets accumulated by public pension schemes. In addition, Member States covered, as in the 2006 exercise, on a voluntary basis: occupational and private (mandatory) pension expenditures. Moreover, the EPC decided that for the 2009 pension projection exercise Member States can provide projections on a voluntary basis on the following items: replacement rates and benefit ratios, taxes on pensions and net pension expenditures, private (non-mandatory) pension expenditures.

## 2 Pension systems in the EU: current setup and recent trends

Pension arrangements are very diverse in the EU Member States, due to both different traditions historically on how to provide retirement income, and Member States being in different phases of the reform process of pension systems.

However, all countries have a strong public sector involvement in the pension system through their social security systems, while the importance of occupational and private pension provisions varies. In most countries, the core of the social security pension system is a statutory earnings-related old-age pension scheme, either a common scheme for all employees or several parallel schemes in different sectors or occupational groups. In addition, the social security pension system often provides a minimum guaranteed pension to those who have not qualified for the earnings-related scheme or have accrued only a small earnings-related pension. Usually, such minimum guarantee pensions are means-tested and provided either by a specific minimum pension scheme or through a general social assistance scheme. In a few Member States, notably in Denmark, the Netherlands, Ireland and the United Kingdom, however, the social security pension system provides in the first instance a flat-rate pension, which is supplemented by earnings-related private occupational pension schemes (in the UK, also by a public earnings-related pension scheme (State Second Pension) and in Ireland by an earnings-related pension scheme for public sector employees). In these countries, the occupational pension provision is equivalent to the earnings-related social security pension schemes in most of the EU countries.

A number of Member States, including Sweden and some new Member States such as Estonia, Latvia, Lithuania, Hungary, Poland and Slovakia, have switched a part of their social security pension schemes into private funded schemes. Usually, this provision is statutory but the insurance policy is made between the individual and the pension fund. Participation in a funded scheme is conditional on participation in the public pension scheme and is mandatory for new entrants to the labour market (in Sweden for all employees), while it is voluntary for older workers (in Lithuania it is voluntary for all people).

Social security pension systems diverge from each other as regards the type of benefits provided by the pension system. Most pension schemes provide not only old-age pensions but also early retirement pensions, disability and survivors' pensions. Some countries, however, have specific schemes for some of these benefit types, in particular, some countries do not consider disability benefits as pensions, despite the fact that they are granted for long periods, and may be covered by the sickness insurance scheme.

Furthermore, pension systems differ across countries regarding the financing method of the schemes. Most social security schemes are financed on a pay-as-you-go (PAYG) basis, indicating that the contribution revenues are used for the payments of current pensions. In addition, there is a considerable variation between countries regarding the extent to which the contribution revenues cover all pension expenditure. In most countries, minimum guarantee pensions are covered by general taxes.

However, it is also common that earnings-related schemes are subsidised to varying degrees from general government funds or some specific schemes (notably public sector employees' pensions) do not constitute a clear scheme but, instead, pensions appear directly as expenditure in the government budget. On the other hand, some predominantly PAYG pension schemes have statutory requirements for partial pre-funding and, in view of the increasing pension expenditure, many governments have started to collect reserve funds for their public pension schemes. Occupational and private pension schemes are usually funded. However, the degree of funding relative to the pension promises may differ due to the fact that benefits can be defined either on the basis of benefit rights linked to the salary and career length (DC) or of paid contributions (DB).

**Table 1**

**Statutory Retirement Age and Average Exit Age in EU Member States**

| Country | Exit Age | | | | | | Statutory Retirement Age | |
|---|---|---|---|---|---|---|---|---|
| | Total | | Male | | Female | | Male | Female |
| | 2001 | 2007 | 2001 | 2007 | 2001 | 2007 | 2008 | 2008 |
| BE | 56.8 | 61.6 | 57.8 | 61.2 | 55.9 | 61.9 | 65 | 64 |
| BG | 58.4 | 61.2 | 62.5 | 64.1 | 56.8 | 59.7 | 63 | 59y 6m |
| CZ | 58.9 | 60.7 | 60.7 | 62 | 57.3 | 59.4 | 61y 10m | 56-60 |
| DK | 61.6 | 60.6 | 62.1 | 61.4 | 61 | 59.7 | 65 | 65 |
| DE | 60.6 | 62 | 60.9 | 62.6 | 60.4 | 61.5 | 65 | 65 |
| EE | 61.1 | 62.5 | | | | | 63 | 60y 6m |
| IE | 63.2 | 64.1* | 63.4 | 63.5* | 63 | 64.7* | 66 | 66 |
| EL | | 61 | | 61.6 | | 60.5 | 65 | 60 |
| ES | 60.3 | 62.1 | 60.6 | 61.8 | 60 | 62.4 | 65 | 65 |
| FR | 58.1 | 59.4 | 58.2 | 59.5 | 58 | 59.4 | 60 | 60 |
| IT | 59.8 | 60.4 | 59.9 | 61 | 59.8 | 59.8 | 65 | 60 |
| CY | 62.3 | 63.5 | | | | | 65 | 65 |
| LV | 62.4 | 63.3 | | | | | 62 | 62 |
| LT | 58.9 | 59.9* | | | | | 62y 6m | 60 |
| LU | 56.8 | | | | | | 65 | 65 |
| HU | 57.6 | 59.8** | 58.4 | 61.2** | 57 | 58.7** | 62 | 62 |
| MT | 57.6 | 58.5* | | | | | 61 | 60 |
| NL | 60.9 | 63.9 | 61.1 | 64.2 | 60.8 | 63.6 | 65 | 65 |
| AT | 59.2 | 60.9 | 59.9 | 62.6 | 58.5 | 59.4 | 65 | 60 |
| PL | 56.6 | 59.3 | 57.8 | 61.4 | 55.5 | 57.5 | 65 | 60 |
| PT | 61.9 | 62.6 | 62.3 | 62.9 | 61.6 | 62.3 | 65 | 65 |
| RO | 59.8 | 64.3* | 60.5 | 65.5* | 59.2 | 63.2* | 63 | 58 |
| SI | | 59.8* | | | | | 63 | 61 |
| SK | 57.5 | 58.7 | 59.3 | 59.7 | 56 | 57.8 | 62 | 55-59 |
| FI | 61.4 | 61.6 | 61.5 | 62 | 61.3 | 61.3 | 62-68 | 62-68 |
| SE | 62.1 | 63.9 | 62.3 | 64.2 | 61.9 | 63.6 | 61-67 | 61-67 |
| UK | 62 | 62.6 | 63 | 63.6 | 61 | 61.7 | 65 | 60 |
| NO | 63.3 | 64.4 | 63 | 64.1 | 63.6 | 64.7 | 62 | 62 |
| EU27 | 59.9 | 61.2 | 60.4 | 61.9 | 59.4 | 60.5 | : | : |
| EA | 59.9 | 61.3 | 60.2 | 61.6 | 59.6 | 60.9 | : | : |
| EA12 | 59.9 | 61.3 | 60.2 | 61.6 | 59.6 | 60.9 | : | : |
| EU15 | 60.3 | 61.5 | 60.7 | 62 | 59.9 | 61.1 | : | : |
| EU10 | 57.6 | 59.6 | 58.8 | 61.3 | 56.6 | 58.3 | : | : |
| EU25 | 59.9 | 61.2 | 60.4 | 61.9 | 59.4 | 60.6 | : | : |

Source: Average Exit age (Eurostat), information provided by AWG delegates.
Joint Commission-Council report on SPSI (2009).
Note: * represents 2006 and ** represents 2005.

**Figure 1**

**Average Wage and Average Pension Benefit in 2007**
*(thousands of euros)*

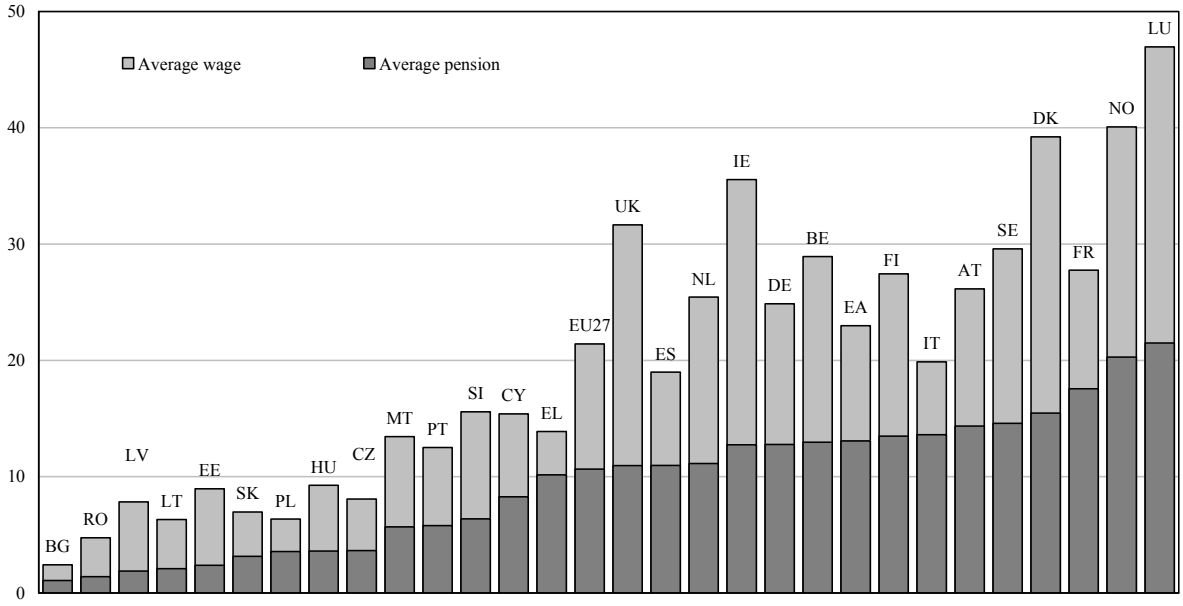



Table 1 shows the statutory retirement age in 2008 and the effective exit age from the labour market in 2001 and in 2007. In the large majority of countries, the average exit age is lower than the statutory retirement age. In many cases, this is due to the existence of early retirement schemes and/or other government programmes that provide income support to older people before they reach the official retirement age. Also, in a number of countries (like FI, SE) the retirement age is flexible, with built-in incentives to remain active in the labour market. For instance, retiring at say age 62 would lead to a reduction of a certain amount compared with a typical case of 65, while continuing working until say 68 would lead to an increase of a certain amount. The comparison between the average exit age in 2001 and 2007 already shows one of the main effects of recent pension reforms in many MSs: people retire relatively later than they used to do.

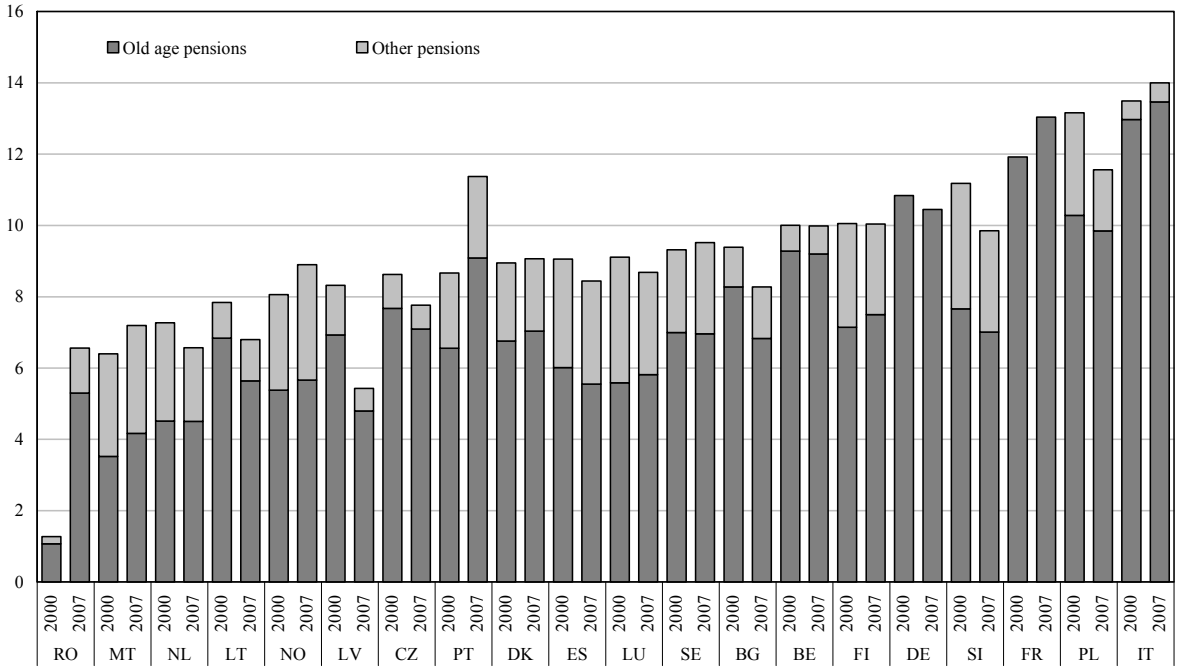
In 2007, there was a wide difference in the average public pension benefit, ranging from less than 3,000 euros or less per year (BG, RO, LV, LT and EE) to 14,000 euros or more per year (AT, SE, DK, FR, NO and LU). These wide differences reflect that average wage income levels are very different, ranging from less than 5,000 euros per year to more than 25,000 euros per year (see Figure 1).

Also at the aggregate level, a very large difference in the level of pension spending can be observed in 2007 among MSs. It ranges from 6 per cent of GDP or below in IE, LV and EE to 14 per cent in IT. In many MSs (DK, FR, HU, IT, MT, NO, PT, RO and SE), pension expenditure has increased faster than GDP, but in some others (BE, BG, CZ, DE, ES, FI, LT, LU, LV, NL, PL, SI) it has increased at a slower pace (see Figure 2).

Despite the generally higher effective retirement age in 2007 as compared with 2001, the public pension expenditure has continued to grow unabated during 2000 and 2007 in many countries (RO, NO, MT, PT, DK, SE, FR and IT) over this period, but there are also countries that have succeeded to keep it under control, or slightly reduce pension expenditure as percentage points of GDP (NL, LT, LV, CZ, ES, BG, DE, SL), as shown in Figure 2.

**Figure 2**

**Gross Social Security Pension Expenditure in 2000 and 2007**
*(percent of GDP)*




Note: The figure presents only the countries which provided information in both years.

A number of countries have implemented systemic pension reforms, shifting part of the previously public pillar to a mandatory funded private pillar (BG, EE, LV, LT, HU, PL, SK and SE). At present, these private pillars are making very small disbursements, but their importance will increase in the future. Private pensions are generally small today.

## 3 Assessing the economic impact of recent pension reforms

### *3.1 Recent pension reforms in some EU Member States*

An important feature of the EC-EPC (AWG) projections is that they take into account the potential effects of recently enacted pension reforms (in the 20 EU Member States that have implemented it since 2000), including measures to be phased in gradually, on the participation rates of older workers. Some countries have enacted legislation to increase the statutory retirement age for females or for both males and females. Others have changed some provisions of social security programmes (and sometimes of other transfer programmes used as alternative early retirement paths) that provided strong incentives to leave the labour force at an early age. The findings of a recent international research project based on micro-estimation results (based on a sample of individuals and the matching of individual retirement decisions and retirement incentives) are clear: changing pension plan provisions would have large effects on the labour force participation of older workers.[3]

[3] See Gruber and Wise (2005).

The following pension reforms[4] are incorporated in the baseline scenario:

**Box 1**
**Pension reforms enacted in the Member States**

**Belgium**

The standard retirement age for women will increase gradually from 63 in 2003 to 64 in 2006 and 65 in 2009. Retirement age remains flexible from the age of 60 for men and women, provided that a 35-year career condition is satisfied. The "older unemployment scheme", reformed in 2002, will keep having an impact on participation rates between 50 and 58.

The law concerning the "Solidarity Pact between Generations" has come into force in 2006. It provided a series of measures to increase participation in the labour market. The statutory age for the early retirement ("*prépension*") scheme embedded in the unemployment insurance has been raised from 58 to 60 and the eligibility conditions (career length) have been made more restrictive. Conditions for entering this scheme before the statutory age ("*prépensions*" for labour market reasons) have also become tighter. Staying at work after the age of 62 is now rewarded by a specific supplement in the pension formula ("pension bonus"). Finally, a structural mechanism for linking benefits to prosperity has been introduced.

**Czech Republic**

Before the pension reform in 2003, men retired at the age of 60 and women at 53-57, depending on the number of children (one year less per child). Since January 2004 with modification of the retirement age from August 2008, the age of retirement is increased constantly over time (2 months per year for men and 4 months per year for women) to reach 65 years for men and 62-65 for women (still depending on the number of children) born in 1968 and later. Bonus for later retirement is 1.5 per cent of person's calculation base for every additional completed 90 calendar days. Early retirements are subject to penalization, which is 0.9 per cent of person's calculation base for every period of 90 calendar days before the statutory retirement age up to 720 days and 1.5 per cent from the 721st day. But resulting earnings related component must not be lower than 770 CZK (approximately 28 euros).

**Denmark**

Denmark introduced in 2006 a major reform package known as the "Welfare Agreement". This reform package affects mainly younger than age 48 at the end of 2006. It reverses the 2004 decision to lower retirement age from 67 to 65. It also increases early retirement (VERB) from age 60 to age 62 between 2019 and 2022 with a minimum contribution period of 30 years instead of 25 for taking a VERB. The normal retirement age is increased from age 65 to 67 between 2024 and 2027. Finally it indexes the retirement ages to the average life expectancy of 60 years old from 2025.

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[4] The information was provided by the Members of the EPC and AWG. Detailed information on the national pension models are envisaged to be published in European Economy (2009), "2009 Ageing Report: Pension Models in EU Member States and Projection Results" (forthcoming).

**Germany**

Since the early nineties a series of major reforms have been passed, aiming at the financial and social sustainability of the public pension scheme. Highlighting the most important reform steps, the reform process began in the mid of the nineties with the increase of the statutory retirement age to the age of 65 years and the introduction of deductions on early retirement (3.6 per cent per year) accompanied with a bonus for deferred retirement (6.0 per cent per year). Secondly, at the beginning of this decade, a comprehensive promotion of second and third pillar pension schemes (Riester pension) by subsidising voluntary contributions was introduced. The aim of those reforms was to compensate the envisaged reduction of benefits in the statutory pension scheme by second and third pillar pensions. Thirdly, in 2005 the pension adjustment formula was augmented by a sustainability factor, which adjusts statutory pension payments to population dynamics, whereby the extent of the adjustment is determined by the change in the relation of the workforce to the number of retirees.

The most recent major reform took place in 2007. Though the transition process of increasing the retirement age to 65 years is not yet fully completed, a further increase of the statutory retirement age to the age of 67 was legislated (the age of retirement will be put back one month each year from 2012 on to 2024, then 2 months each year until the age of 67 years will be reached by 2029). The first aim of this reform was postponing the retirement age and thus decreasing the future financial burden. Secondly, the reform will partially compensate the expected decline of the workforce due to population ageing. Therefore, the increase of the retirement age is accompanied by the so-called "Initiative 50 plus" which aims to increase participation rates of older workers by a large range of different measures such as the extension of vocational training and the reduction of employment barriers for older workers.

**Estonia**

Changes in the PAYG system include raising the retirement age for females to 63 by 2016 and revising the benefit formula. Legislation passed in mid-September 2001 set up mandatory individual accounts in the second tier (starting operations in mid-2002), while voluntary accounts became the new third tier.

**Spain**

The latest reform of the pension system in 2002 (Law 35/2002) abolished mandatory retirement age (65) in the private sector. Workers remaining active after 65 will increase their pension benefit by 2 per cent per year, and both employers and employees' are exempted from paying most social security contributions. For workers age at least 60, social contributions are reduced by 50 per cent, and this amount is increased by 10 per cent to reach 100 per cent for those aged 65. Early retirement is possible from 61 year old, with at least 30 years of paid contributions and registered as unemployed for at least 6 months, but with a high penalty, from 6 to 8 per cent per year (8 per cent for those with only 30 years of contribution, 6 per cent for those with at least 40 years of contribution). Pensions became compatible with part-time work (but the pension benefit was reduced according to the length of the working day).

A new law on Social Security measures was enacted in 2007. This package of reforms contains as main measures: increase in the effective contribution period to be eligible for a

retirement pension; partial retirement from age 61 instead of 60 for people entering the system after 1967 (and a minimum of 30 years of contribution instead of 15); incentives for people working after age 65; more restrictive rules to get an invalidity pension.

**France**

The standard retirement age remains 60. Since 2004, gradual alignment of public sector with private sector by increasing the number of contribution years for entitlement to a full pension (from 37.5 to 40 years between 2004 and 2008). Since 2009, the numbers of contribution years will increase following the increase in life expectancy through a rule keeping constant the ratio of the number of contribution years and the number of years in pension to the level of 1.79 as in 2003. The number of contribution years will be increased to 41 in 2012 and 41.50 in 2020 due to the expected gains in life expectancy (by 1.5 years each 10 years). Introduction of a bonus (3 per cent per year) in case of postponement of retirement. The penalty for early retirement (before 40 years of contributions) will be changed. Since 2006, the amount of the penalty (la décote) will decrease gradually from 10 to 5 per cent of pension per year of anticipation in 2015 for the private sector and will increase from 0.5 to 5 per cent for civil servants).

**Italy**

Since 2006, the major changes to pension legislation concern the implementation of the 23rd July Agreement on welfare state between government and social partners (Law 127/2007 and Law 247/2007) and Law 133/2008) improving the possibility of accumulating pension and labour income.

*A. Law 127/2007*: increase of lower amount pensions through an additional lump sum of 420 euros per year from 2008 (327 euro in 2007) acknowledged to pensioners of 64 and over with an income lower than 1.5 times the minimum pension (8,504.73 euros per year in 2007). Such an increase is reduced or augmented by 20 per cent for contribution careers inferior to 15 years or superior to 25, respectively (18 and 28, for the self-employed). Additional increases are also foreseen for social assistance pensions, starting from 2008, by way of the so-called "social assistance additional lump sums" ("*maggiorazioni sociali"*).

*B. Law 247/2007* foresees the following:

- a slowdown of the process of elevating the minimum requirements for early retirement, keeping unchanged the phased-in values foreseen by Law 243/2004. In particular, in 2008 the age requirement, with 35 years of contribution, is 58 for the employees and 59 for the self-employed instead of 60 and 61. Starting from 2013 (it was 2014, according to Law 243/2004) the age requirement, with 35 years of contribution, is 62 for the employees and 63 for the self-employed. In addition, starting from July 2009, workers may access early retirement at an age lower by 1 year, provided that they possess at least 36 years of contributions. The age requirement may be reduced by at most 3 years (but never below the age of 57) for specific categories of workers involved in hard and stressful jobs ("*lavori usuranti*"), within a given amount of resources assigned to a specific fund;
- the application in 2010 of the transformation coefficients, revised on the basis of the procedure foreseen by Law 335/95. The subsequent revisions will be made every three years, instead of every ten years, through a simplified procedure falling entirely under the administrative sphere of competence;

- an increase of the contribution rate of the atypical workers by 3 percentage points (up to 26 per cent in 2010) in order to improve pension adequacy for this category of workers.

*C. Law 133/2008* states that old age and seniority pensions may be fully cumulated with labour income. The new legislation improves upon the previous one which foresaw some restrictions in the possibility of cumulating, especially in the case of employees.

**Latvia**

Under the new three-pillar system with a defined contribution PAYG based on notional accounts, set up in 1996, the standard age requirement for women (59.5 years in 2003) will increase by 6 months each year to reach 62 by 2008. Those for men reached 62 in 2003.

**Lithuania**

The standard minimum retirement age for women (55 years and 4 months in 1995, 58.5 years in 2003) will increase by 6 months each year to reach 60 years in 2006. The retirement age for men was gradually increased (2 months per year) from 60 years and 2 months (in 1995) up to 62.5 in 2003.

**Hungary**

The standard retirement age for women will increase to 60 by 2005, 61 by 2007 and 62 by 2009 (before the reform it was 57).

In 2006-07, the Hungarian Parliament adopted (by two regulations) a package of reforms which specifies that the early retirement is allowed only 2 years before normal retirement instead of 3 before. Thus from 2013 the early retirement is possible from age 60 both for women and men. From 2013 all early pensions will be subject to a reduction. The rate of reduction, depending on the time remaining until retirement age, would be 0.3 per cent per month for the 61-62 age group and 0.4 per cent per month below the age of 61. It introduces also changes in the calculation of the benefits, a minimum contribution from 40-41 for early retirement and some favourable retirement conditions for those working in potentially health-damaging occupations. Finally, it includes also: a new pension benefits system that will reduce the replacement rate; the retirement benefits will be available only for the difference between earnings of the year and minimum wage for the first year of an early retirement; the pension contribution increases for early retirees; some measures to increase employment of persons with reduced working capacity; pensions and earnings are no more cumulated in early retirement if earnings > minimum wage; changes in contribution levels payable by the employer and by the employee.

**Malta**

In December 2006, the Maltese Government completed the legislative process associated with the enactment of the pensions reform bill. Among the most important elements of the reform there is a staggered rise in pension age from 60 years for females and 61 years for males to 65 years for both by 2026 and the gradual lengthening of the contribution period for full entitlement to the two-thirds pension from 30 years to 40 years. Meanwhile, the calculation of pensionable income will reflect the yearly average income during the best 10 calendar years within the last forty years, as opposed to the previous

regime which consisted of the best 3 years of the last ten years for employed persons and the average of the best ten years for self-employed persons. In addition, prior to the reform, the maximum pensionable income was fixed by the law though in recent years it was revised in line with the cost of living adjustment. Following the reform, maximum pensionable income will evolve in a more dynamic fashion and will be increased annually by 70 per cent of the national average wage and 30 per cent of the inflation rate as from 1 January 2014 for persons born after 1 January 1962.

**Austria**

The minimum retirement age for men will increase from 61.5 years to 65 years; for women the age will rise from 56.5 to 60 years. The increase will be phased in gradually beginning in July 2004 and by 2017 early retirement will be eliminated. Meanwhile, larger penalties are imposed on early retirement (4.2 per cent of reduction per year instead of the former 3.75 per cent, up to a maximum of 15 per cent), within the age of 62-65. The statutory retirement age for women will be increased gradually between 2019 and 2034 to reach the retirement age for men at 65. A bonus for later retirement up to the age of 68 years (4.2 per cent per year, up to a maximum of 10 per cent) is introduced. From January 2005, harmonised guaranteed pension accounts is established (Act on the harmonisation of pension system, approved in November 2004). In the new system of individual, transparent pension accounts (with a clear reporting of benefits accrued from contributions paid in and other credits acquired, such as from active child and elderly care) the key rule will be: 45-65-80 (45 contribution years, retirement age of 65 and a gross replacement rate of 80 per cent of average life earnings). Pension benefits will be adjusted to consumer price index, starting in 2006.

**Poland**

All insured persons born after 1948 are covered by the new defined contribution PAYG with notional accounts and three-pillar pension system. The standard retirement age remains 65 for male and 60 for female. There will be no early pension for those born after 1948 and retiring after 2006, with the exception of those who worked long enough (20 years) in special conditions.

**Portugal**

Portugal introduced in 2007 a “sustainability factor” linking initial benefits to average life expectancy when the worker retires (at 65, which is the legal retirement age). Individuals have the option of postponing retirement beyond legal retirement age to compensate (at least partially) the financial penalty given by the sustainability factor. They introduced also a “national strategy for the promotion of active ageing” which is a package of measures that encourages older workers to remain in the labour force (trainings, improvement of older workers employment, higher penalty in case of early retirement and benefits granted in case of long contributive careers).

**Slovenia**

Under the new Pension and Disability Insurance Act entered into force on 1 January 2000 (a three-pillar modernised defined benefit PAYG system plus compulsory and voluntary supplementary funded schemes), the standard retirement age has been increased. It

is now possible to retire between 58 and 63 for men and 61 for women (the minimum retirement age was 53 for women and 58 for men before the reform). Women that worked before the age of 18 can retire earlier (but not before the age of 55). Special regulations reduce the age of retirement to 55 in certain cases (before the reform it was possible even below 50). The minimum retirement age is raised from 53 to 58 for women (the same level for men). The accrual rate was reduced by 2 to 1.5 per cent since 2000. Later retirement has been encouraged: a person who fulfils the requirement for pension but continues to work beyond the age 63/61 will receive an additional pension increase (3.6 per cent the first additional year, 2.4 per cent the second year and 1.2 per cent in the third, plus the normal rate of accrual, 1.5 per cent per year).

**Slovakia**

Under the reformed (from 2004) three-pillar pension system, the standard retirement age will increase from 60 to 62 for men (9 month per year) by 2007 and from the former 57 (reduced by 1 year per child, to reach age 53) to 62 for women by 2016. A worker can still retire earlier if the combined benefit from the first and the newly introduced second pillar equal at least 60 per cent of the minimum living standard determined by the government. In this case, the pension is reduced by 6 per cent per year, while a bonus of 6 per cent is introduced for those postponing their retirement. It is also possible to get pension benefit while working.

**Finland**

Since 2005, flexible old-age retirement (63 to 68 years) with an increase of the accrual rate to 4.5 per cent for those continuing to work beyond the age of 63. The ceiling on the maximum pension is abolished. A new early retirement scheme is introduced with a minimum age of 62 and an actuarial reduction of 0.6 per cent per month prior to 63. Those borne after 1949 are not eligible for the unemployment pension scheme, which is replaced by an extended period of unemployment benefit (the so-called "unemployment pipeline to retirement" (currently 57-65).

**Sweden**

The pension reform was approved by Parliament in 1999. Under the new notional defined contribution system is possible to retire from age 61 onwards, with an actuarially fair compensation for those who stay on in the labour force. Every year of contributions is important for the pension benefit. A person with an average wage will increase his yearly pension benefit by nearly 60 per cent if he postpones his retirement decision till age 67 compared to leaving at age 61. Yearly "statement of account" informs the individual of costs and benefits of retirement. The new system is phased in gradually for generations born between 1938 and 1953, and will affect generations born after 1953 fully.

**United Kingdom**

Between 2010 and 2020, women's pensionable age will gradually rise from 60 to 65, as for men. The Pension Act 2007 adds also several measures in which we have the gradual increase of the state pension age between 2024 and 2046 to 68 for men and women (instead of 65 before).

### 3.2 Impact of pension reforms in the baseline labour force projection

Pension reforms are modelled by considering the likely impact of reforms on the probability of withdrawing from the labour market when ageing due to changes in the statutory "normal" age of retirement, or "early-retirement age" (that is the age at which benefits are first available), or in the rules governing pension rights. This likely impact is incorporated in the baseline labour force projection by means of the probabilistic model already used by the European Commission for the calculation of the *average exit age* from the labour force, using estimated cumulative probabilities of exit from the labour market.[5]

More specifically, the analysis of the distribution of the probability of retiring at different ages (from age 50 to 71, separately for males and females) is done for the period 1998 to 2007 for the 20 EU Member States concerned. Then, the relationship between changes in the parameters of the pension systems and the retiring behaviour of older workers is examined. Existing empirical evidence is also taken into account, such as econometric estimates of the impact of changes in the implicit tax rate on continuing to work and retirement behaviour.[6]

As a starting point, the probability of retirement and the cumulative distribution function (the cumulated distribution of probability of retirement) observed in 2007 are analysed, along with the calculated average exit age, see Figure 4. While the age profiles of the probability of retirement vary across countries, because of differences in the pension system, a common feature is that the distribution is clearly skewed towards the earliest possible retirement age. The distribution of the retirement age presents evidence of spikes at both the minimum age for an early retirement and the normal/ average retirement age, which is either 60 (especially for women) or 65.

### 3.3 Simulating the impact of the pension reforms on the participation rate of older workers

The impact of pension reforms on the participation rate of older workers is simulated by calculating the impact of reforms that have either increased the statutory retirement age or removed early retirement schemes on the participation rates. This is made as follows:

- first, by changing the probability of retiring according to our considered judgement about the factors that affect the retirement decision.[7] More specifically, the distribution of the frequency (density function and cumulative distribution function) observed in 2007 is shifted. For example, let us assume that in a given country a concentration of the probability of retiring is observed at age 58 over the last 5 to 6 years, while a reform removes early retirement schemes or increases the minimum years of contribution. To calculate the impact of this reform, we shift the peak of the retirement probability away from the previously observed peak at 58 years and closer to the statutory average age (usually 65 for men and 60 for women).[8] Within the same

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[5] For details on the methodology used, see Carone (2005).

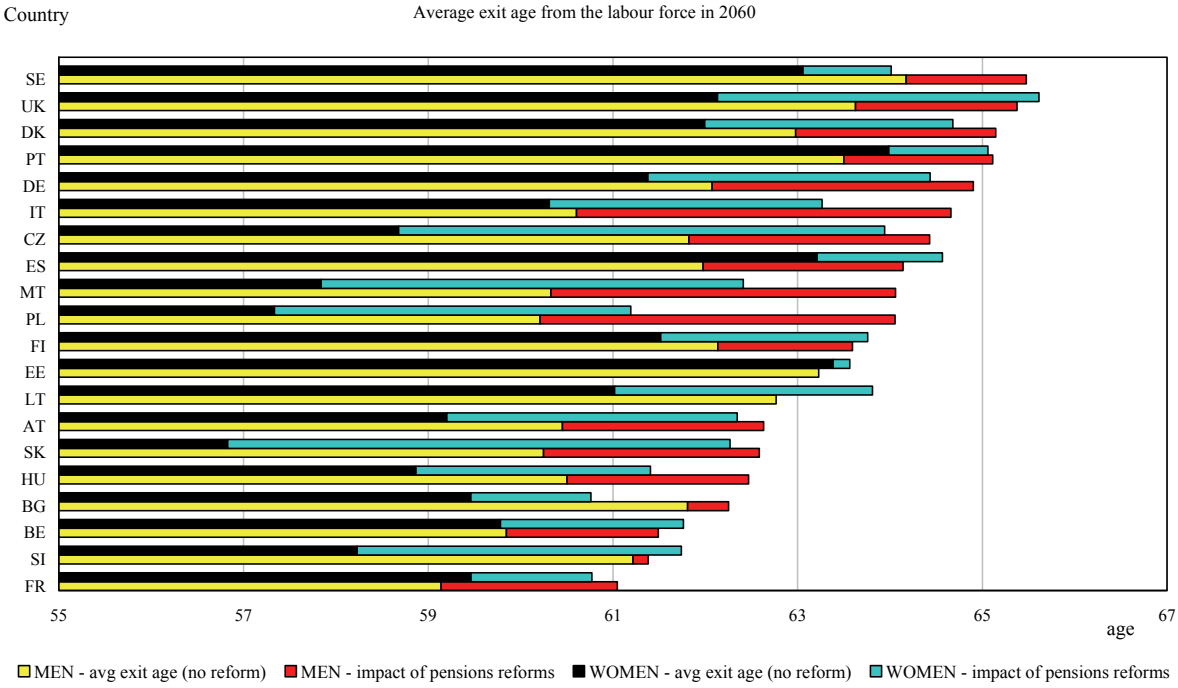
[6] See Börsch-Supan (2003), Duval (2003), Gruber and Wise (2005).

[7] As regards the impact of delay in eligibility ages, recent estimates by Gruber and Wise (2002) for France, Belgium and the Netherlands suggest for example that in these three countries a three-year delay in eligibility ages to old-age and early retirement schemes could raise the labour force participation of the 55-64 age group by about 20 percentage points. According to Duval (2003), "past experience suggests a more moderate outcome". For instance, the five-year increase in eligibility ages in New Zealand throughout the 1990s led to a 15 percentage point increase in labour force participation".

[8] Technically speaking, the shift in the distribution function of retirement probability can be done rather mechanically in this way. The retirement probability for a generic cohort of people is given by a density function $f(x)$. The cumulated probability is given by a cumulative distribution function $F(x)$. Any time a reform of the pension system (such as changes in the statutory retirement age) has an effect on the age of retirement, it has an effect on the density function. Thus, for example, if the possibility of retirement at age 57 ($x = 57$) is no longer possible and the new age of statutory retirement become $n = 60$ than $f(x) = 0$ for $x < n$. To calculate the new density function $d(x)$ one can use a shift in the cumulative distribution function of $f(x)$. The new density function $d(x)$ is $s*f(x)$, where $s = 1/(1–F(n))$. For a similar approach, see Baldacci and Tuzi (2003) and Carone (2005).

**Figure 3**

**Impact of Pension Reforms on the Average Exit Age from the Labour Force**




Source: Commission services, EPC.

methodological framework, another simulation is done, by applying a progressive shift of the probability distribution of retiring for females. This is done for Member States that have recently legislated a progressive increase of the statutory retirement age of females to that of males (usually from 60 to 65), such as Belgium, the United Kingdom and some others, especially among the new Member States;

- secondly, the new probabilities of retirement resulting from the simulation are converted into a change in exit rates (following the algorithm presented in Annex 2.1);
- finally, the observed exit rates (the average over the period 1998-2007) are replaced (at a different time for each country, in line with the timing of reform implementation) with the new estimated exit rates in the cohort-based projection model. Consequently, the participation rates initially estimated, without taking into account the impact of pension reforms, have changed. The magnitude of the expected impact of pension reforms can be inferred by comparing the participation rates calculated with and without the effect of reforms.

### *3.4 Estimates of the impact of pension reforms*

The expected postponement of retirement is summarised by the difference in the *average exit age* from the labour force in 2060. As a result of recently enacted pension reforms, the effective retirement age for males is expected to increase by as much as three years or more in Germany, Italy, Malta and Poland and by between two and three years in Denmark, Spain, Austria, and Slovakia. The expected postponement of retirement for females is similar, or even higher than for males, reflecting in several cases a progressive alignment of the retirement age of females to that of males.

Given that changes in overall participation rates are mainly driven by changes in the labour force attachment of prime-age workers, as this group accounts for more than 70 per cent of the total labour force, even such high projected increases in the participation rates of older workers will only have a rather limited impact on the overall participation rate. For example, the 18 percentage point increase in the participation rate of workers aged 55 to 64 years projected in Germany will lead to an increase in the overall participation rate (workers aged 15 to 64 years) of about 4 percentage points by 2060.

Table 7 shows the estimated impact of pension reforms on participation rates. Pension reforms are projected to have a sizeable impact on the labour market participation of older workers (aged 55 to 64) in most of the EU Member States in which future implementation of already enacted pension reforms is planned. A stronger impact is expected from changes in the parameters affecting the statutory age of retirement. For example, the labour participation in the group aged 55 to 64 in Italy is projected to record an additional increase of 14 percentage points by 2030. This is the estimated impact of the recent reform postponing the statutory age of retirement and the gradual move towards a notional defined contribution pension system.[9] In Germany, Finland, Hungary, Slovenia the impact is estimated to be more than 10 per cent by 2020. In the Czech Republic and Slovakia, the impact is estimated to be higher than 15 per cent by 2020. Overall, in the EU, the participation rate of older people (55-64) is estimated to be about 8 percentage points higher in 2020 and 13 percentage points higher in 2060 due to the estimated impact of pension reforms. In the euro area, the impact is estimated to be slightly larger, at about 9 percentage points in 2020 and 13.5 percentage points 2060, respectively.

## 4 Pension expenditure projections: 2009 results

The updated projections suggest that considerable challenges will come from a higher share of the total population in older age cohorts and a decline in the share of the population that is economically active. The fiscal impact of ageing is projected to be substantial in almost all Member States, with the effects becoming apparent already during the next decade in the EU (see Figure 4). Overall, on the basis of current policies, pension expenditures are projected to increase on average by about 2¾ percentage points of GDP by 2060 in the EU and by about 2¾ percentage points in the euro area.[10]

There is a very large diversity across Member States as regards the projected change in public pension expenditure, ranging from a decline of –3.5 per cent of GDP (PL) to an increase of 15.2 per cent of GDP (LU):

- The projected increase in public pension spending is very significant in seven EU Member States (IE, EL, ES, CY, LU, MT, RO and SI) with a projected increase of 5 per cent of GDP or more (and of more than 10 per cent of GDP in EL, CY and LU). These countries have so far made only limited progress in reforming their pension systems or are experiencing maturing pension systems. For them there is an urgent need for a modernisation of pension to start to bend the curve of long-term costs.
- For a second group of countries – BE, BG, CZ, DE, LT, HU, NL, PT, SK, FI and the UK – the cost of ageing is more limited, but still high, ranging from 2 to 5 per cent of GDP. Several of

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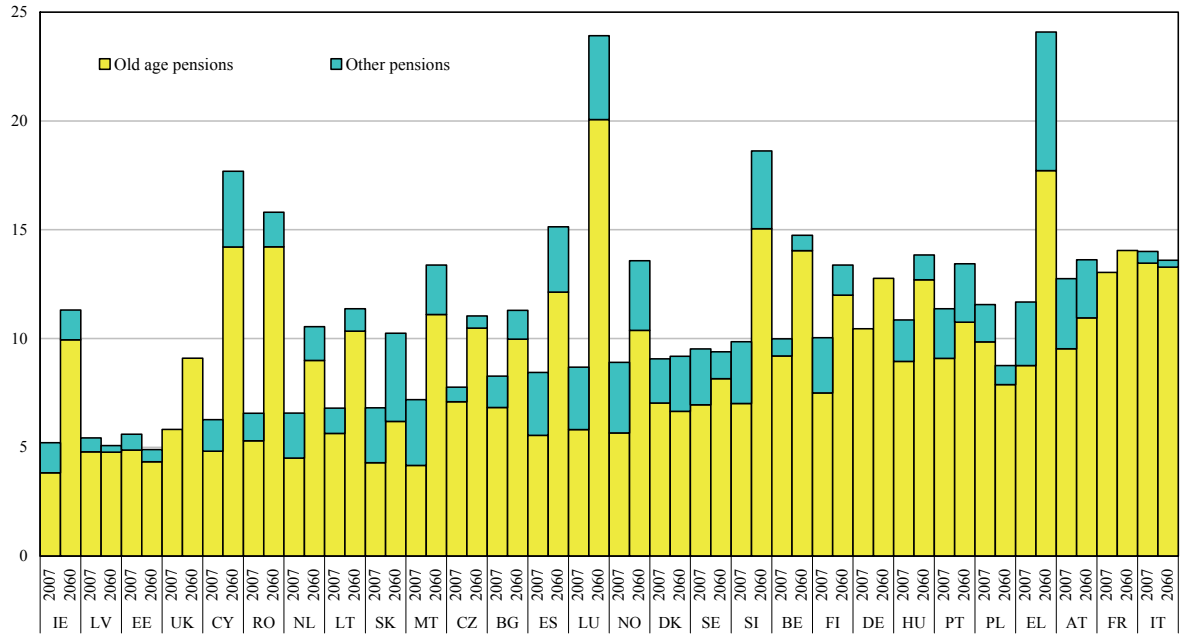
[9] For an empirical analysis on the retirement decision of Italian employees see Brugiavini and Peracchi (2003). According to their prediction of retirement probabilities under alternative policies that change social security wealth and derived incentive measures, the male employment rate at age 55 are projected to be 84.3 under the Dini/Prodi pension regime (1995 and 1997 reforms) as compared to 65.6 under the pre-1992 reform regime, see also Brugiavini and Peracchi (2005).

[10] See European Commission DG ECFIN (2009), "2009 Ageing Report", *European Economy*, No. 1.

**Figure 4**

**Old-age and Other Public Pension Expenditure in 2007 and 2060**
*(percent of GDP)*




Note: HU: the projection of old-age and early pensions include an estimation of the old-age allowance (a minimum pension in HU), which is not a part of Hungarian authorities pension model at this stage. This projection contributes with 0.4 per cent of GDP to the increase in old-age and early pensions ratio over the period 2007-60.

these countries have taken some steps in reforming pensions that contribute to limit the increase in public expenditure, but much more needs to be done.

- Finally, the increase is more moderate, 2 per cent of GDP or less, in DK, EE, FR, IT, LV, AT, PL and SE. Most of these countries have implemented substantial pension reforms, in several cases also involving a partial switch to private pension schemes (BG, EE, LV, HU, PL, SK and SE).

Old-age and early pensions are projected to increase by 2.4 per cent of GDP between 2007 and 2060 in the EU. In the euro area, the increase is projected to be slightly higher at 2.6 per cent of GDP. A smaller increase is projected for other pension expenditure, mainly disability and survivor pensions, increasing only slightly by 0.1. per cent of GDP in the euro area.

It should be stressed that the ratio has been pushed downwards due to a shift from public scheme towards private mandatory scheme in BG, EE, LV, LT, HU, PL, SK and SE.[11]

As regards spending on disability and survivor pensions, they are projected to decrease in the majority of countries. Only in 8 Member States (PT, RO, SI, SK, FI, SE, UK and NO) is it projected to increase, although only slightly.

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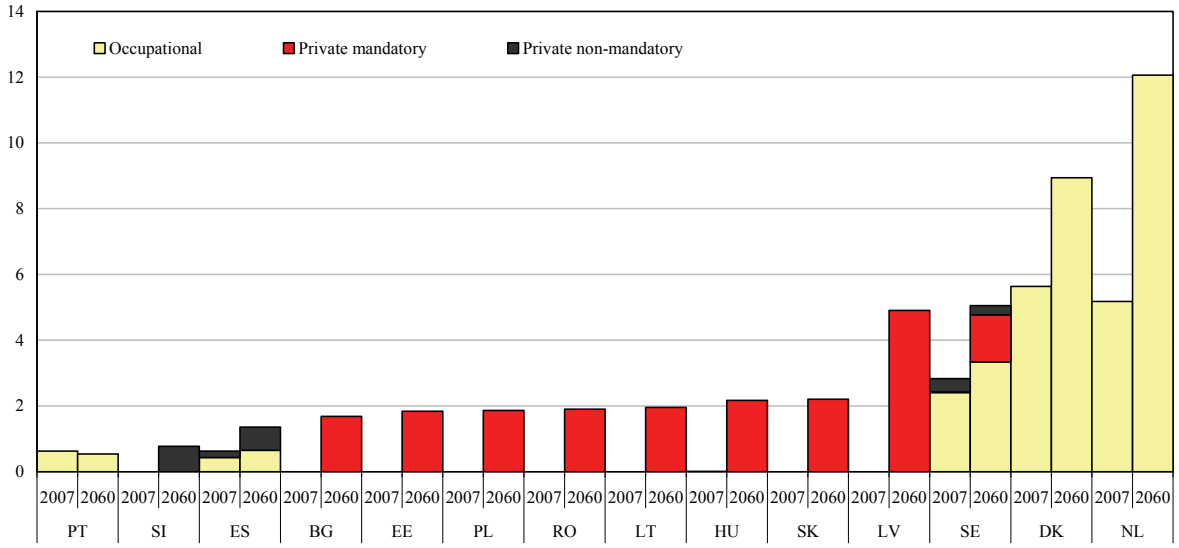
[11] In the case of LU, the pension projection is affected by the considerable number of cross border workers who will in the future years receive a pension from the LU social security scheme, but at the same time will not be registered as LU inhabitants. Due to this peculiar circumstance, LU can not be, in same cases, strictly compared with other MS. Thus, in some of our analysis LU is treated as an outlier.

**Figure 5**

**Occupational, Private Mandatory and Non-mandatory Pension Expenditure**
*(percent of GDP)*




Note: The figure presents only the countries which provided data for other pension schemes and its value is non-zero.

In brief, a majority of EU Member States have: (i) reduced the generosity of public pension schemes so as to make these programmes financially more sustainable in view of the demographic trends; (ii) pushed up the statutory retirement age in a gradually phased way over the long-term for old-age pensions; (iii) restricted the access to early retirement schemes by strengthening the incentives to prolong working lives, which leads to a containment of the increase in old-age and early pensions spending. Also, the projections show no increase in disability and survivor pensions, embodying an assumption of lower take-up rates of these transfers over the projection period.

### *4.1 Private pensions*

A number of countries have implemented systemic pension reforms, shifting part of the previously public pillar to a mandatory funded private pillar (BG, EE, LV, LT, HU, PL, SK and SE). At present, these private pillars are making very small disbursements, but their importance will increase in the future. Some countries have provided projections of 2nd pillar occupational pension expenditure and 3rd pillar non-mandatory pensions.

Figure 5 shows the private pension projections by pillar (provided only by very few member States).[12] It should be pointed out that the figure is not comprehensive; private pensions may exist in a country, but it was not possible to provide a projection (see the note to the figure for detailed information). Indeed, for occupational pension expenditure, only 6 MSs (DK, IE, ES, NL, PT and SE) provided projections, while 13 MSs (DK, GR, IE, CZ, EE, HU, LT, LV, MT, PL, SK, BG and RO) have indicated that occupational pension does not exist. For private mandatory pension expenditure, 8 MSs (BG, EE, LV, LT, HU, PL, SK and SE ) have provided projections and 9 MSs

[12] Annex: "Assets in All Pension Schemes as a Share of GDP" presents the current and projected value of assets in all public, occupational, private mandatory and voluntary pension schemes.

(BE, DK, GR, ES, IE, NL, PT, CZ and MT) report that such pension do not exist, while for private non-mandatory pension expenditure, only 3 MS (ES, SI and SE) have provided projections and 7 MSs (DK, DE, IE, LV, MT, PL and BG ) report that they do not exist.

For only a few countries (LV, SK, HU, LT, PL, EE, BG and SE), the mandatory private pensions are projected to provide a considerable top-up of the public pensions. Also, the presence of a high coverage of 2nd pillar pensions since a long time (e.g., SE, DK, NL and IE) also provides for a sizable topping-up of the public pillar.

## 5 Drivers of pension expenditure trends over the period 2007-60

### *5.1 Main drivers of projected pension expenditure*

In order to shed light on the main drivers behind these dynamics, a decomposition of pension expenditure to GDP into its main our components can be very helpful:[13]

- *a dependency effect (or a population ageing effect)*, which measures the changes in the dependency ratio over the projection period as the ratio of persons aged 65 and over to the population aged 15 to 64;
- *an employment effect* which measures changes in the share of the population of working age (15 to 64) relative to the number of the employed, *i.e.* an inverse employment rate;
- *a coverage effect of pensions*,[14] which measures changes in the share of pensioners relative to the population aged 65 and over. In effect, it measures the take-up of pensions relative to the number of old people;
- *a benefit effect*, which captures changes in the average pension relative to income; output per employed person.[15]

The decomposition of the overall change (see Figure 6) in the social security pension spending to GDP ratio over period 2007-60 is provided in Table 2. In particular, the table demonstrates the contribution of each of the four main factors to the change in the pension/GDP

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[13] In order to analyse dynamics and the factors of the pension spending to GDP ratio the following decomposition is used:

$$\frac{Pension\ Expenditure}{GDP} = \frac{\overbrace{Population\ 65+}^{Dependency\ Ratio\ Effect}}{Population\ 15-64} \times \frac{\overbrace{Number\ of\ Pensioners}^{Coverage\ Ratio\ Effect}}{Population\ 65+} \times \frac{\overbrace{Population\ 15-64}^{Employment\ Rate\ Effect}}{Working\ People\ 15-64} \times \frac{\overbrace{\frac{Average\ Pension}{GDP}}^{Benefit\ Ratio\ Effect}}{Hours\ Worked\ 15-71} \times \underbrace{\frac{Working\ People\ 15-64}{Hours\ Worked\ 15-71} \times Interaction\ Effect}_{residual}$$

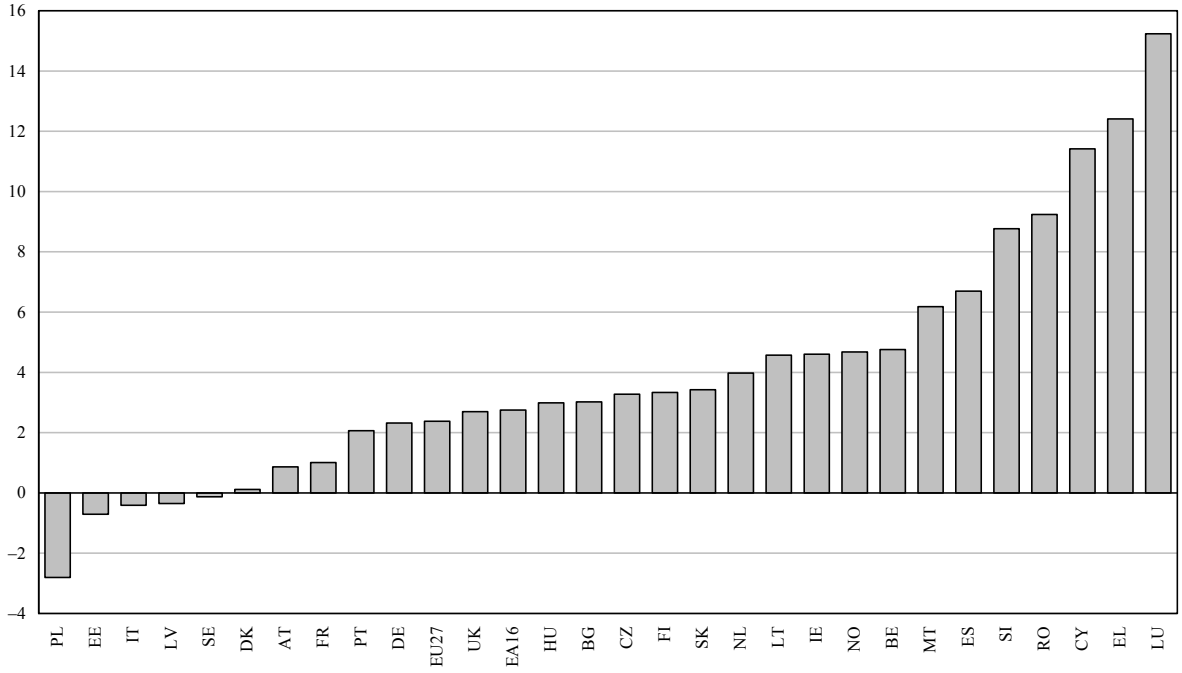
In particular, we analyse the percentage change in the public pension expenditure-to-GDP ratio. The overall percentage change can be expressed as a sum of the contribution of the four main factors, *i.e.* the dependency ratio contribution, the coverage ratio contribution, the employment rate contribution and the benefit ratio contribution.

[14] This effect is also commonly referred to as the *"eligibility effect"* in the literature.

[15] Average pension and output per worker, approximating the average wage, are measured each year of the projection exercise for the total population of pensioners and employees. Thus, the benefit ratio also captures changes in the structure of the respective population groups, in addition to the assumed increases in pensions due to the indexation rules, the maturation of the pension system and longer contribution periods as well as in wages due to the assumptions of labour productivity growth rates. In particular, it should be noted that the benefit ratio does not measure the level of the pension for any individual relative to his/her own wage and, hence, is not equivalent to a replacement rate indicator.

**Figure 6**

**Change in Public Pension Expenditure over the Period 2007-60**
*(percent of GDP)*




ratio. As already stressed, the main contributor to the increasing in the ratio of pension to GDP is represented by demographic factors (captured by the old age dependency ratio), ranging from +4.2 to +13.7 per cent in the case of UK and SI respectively. It is worthwhile stressing that for many MS, a significant worsening of demographic factors is only partly offset by higher employment, lower coverage rate and lower benefit rate. Indeed, the increase in the old age dependency ratio is the only factor pushing upward the pension to GDP ratio, while the evolution of the other three factors are expected to contribute to dampening, but only to a limited degree in the majority of MSs, the evolution in the pension/GDP ratio.

In general, the downward pressure on pension spending of the projected increase in the employment rate is very small in the majority of MSs,[16] being less that 1 per cent in absolute terms over the projection period (0.6 per cent for the EU27).

On the contrary, the contributions of the fall in both the coverage rate and the benefit rate are more pronounced, although generally not large enough to stabilise the pension to GDP ratio in the long run at the initial level. The overall EU27 effect of these two factors seems to be comparable, reaching about –2.5 per cent. But variation among countries tends to be noticeable. An increase in the coverage ratio will contribute to increase the pension/GDP ratio in LU (+5.2 per cent) and CY (+1.6 per cent). On the contrary, large falls are projected to contribute to put downward pressure on pension in PL (–6.2 per cent) and RO (–5.9 per cent).

Concerning the contribution of changes in the benefit ratio, one can observe both negative as well as positive values. Only in 5 MS (UK, IE, GR, LU and RO), the change in the benefit ratio is

[16] This is mainly due to the assumptions behind the macroeconomic projection and a development of aggregate employment, in particular in the long run.

**Table 2**

**Decomposition of the Public Pension Expenditure over the Period 2007-60**

*(percent of GDP)*

| Country | 2007 Level | Dependency Ratio Contribution | Coverage Ratio Contribution | Employment Effect Contribution | Benefit Ratio Contribution | Interaction Effect | 2060 Level |
|---|---|---|---|---|---|---|---|
| BE | 10.0 | 7.4 | –0.9 | –0.5 | –1.0 | –0.3 | 14.7 |
| BG | 8.3 | 9.1 | –3.0 | –0.5 | –1.8 | –0.8 | 11.3 |
| CZ | 7.8 | 9.5 | –3.5 | –0.5 | –1.2 | –1.1 | 11.0 |
| DK | 9.1 | 6.5 | –4.9 | –0.1 | –0.5 | –0.7 | 9.2 |
| DE | 10.4 | 7.9 | –1.9 | –0.8 | –2.2 | –0.8 | 12.8 |
| EE | 5.6 | 4.6 | –1.6 | –0.2 | –3.1 | –0.4 | 4.9 |
| IE | 4.0 | 5.9 | –1.5 | –0.2 | 0.7 | –0.3 | 8.6 |
| EL | 11.7 | 12.7 | –0.4 | –0.6 | 0.8 | –0.1 | 24.1 |
| ES | 8.4 | 10.7 | –0.9 | –0.9 | –1.7 | –0.5 | 15.1 |
| FR | 13.0 | 8.4 | –2.2 | –0.5 | –4.0 | –0.7 | 14.0 |
| IT | 14.0 | 10.4 | –3.2 | –1.1 | –5.5 | –1.0 | 13.6 |
| CY | 6.3 | 10.8 | 1.6 | –0.5 | –0.3 | –0.2 | 17.7 |
| LV | 5.4 | 5.7 | –1.6 | –0.2 | –3.9 | –0.4 | 5.1 |
| LT | 6.8 | 9.6 | –2.4 | –0.0 | –1.8 | –0.8 | 11.4 |
| LU | 8.7 | 8.4 | 5.2 | 0.0 | 1.2 | 0.3 | 23.9 |
| HU | 10.9 | 11.3 | –5.4 | –0.7 | –1.1 | –1.0 | 13.8 |
| MT | 7.2 | 11.3 | –3.1 | –0.7 | –0.5 | –0.8 | 13.4 |
| NL | 6.6 | 6.6 | –1.5 | –0.2 | –0.6 | –0.4 | 10.5 |
| AT | 12.8 | 9.9 | –2.6 | –0.5 | –5.0 | –1.0 | 13.6 |
| PL | 11.6 | 13.4 | –6.3 | –1.0 | –7.1 | –1.8 | 8.8 |
| PT | 11.4 | 9.8 | –1.7 | –0.6 | –4.5 | –0.9 | 13.4 |
| RO | 6.6 | 13.6 | –4.9 | 0.3 | 1.7 | –1.5 | 15.8 |
| SI | 9.9 | 13.7 | –3.5 | –0.1 | –0.7 | –0.7 | 18.6 |
| SK | 6.8 | 11.7 | –3.9 | –0.6 | –2.4 | –1.4 | 10.2 |
| FI | 10.0 | 8.7 | –3.1 | –0.6 | –0.9 | –0.7 | 13.4 |
| SE | 9.5 | 5.6 | –0.4 | –0.4 | –4.3 | –0.6 | 9.4 |
| UK | 6.6 | 4.2 | –1.4 | –0.3 | 0.5 | –0.3 | 9.3 |
| NO | 8.8 | 8.2 | –1.2 | 0.3 | –2.3 | –0.2 | 13.6 |
| EU27 | 10.1 | 8.7 | –2.6 | –0.7 | –2.5 | –0.6 | 12.5 |
| EA16 | 11.0 | 9.0 | –2.0 | –0.7 | –2.9 | –0.7 | 13.8 |
| EA12 | 11.1 | 8.8 | –1.9 | –0.7 | –2.9 | –0.7 | 13.8 |
| EU15 | 10.2 | 7.7 | –1.8 | –0.6 | –2.3 | –0.6 | 12.6 |
| EU10 | 9.7 | 11.8 | –4.9 | –0.7 | –3.9 | –1.3 | 10.7 |
| EU25 | 10.2 | 8.5 | –2.4 | –0.7 | –2.5 | –0.6 | 12.5 |

envisaged to be positive, thus contributing to push up pension spending. In the rest of the countries, a reduction in the relative value of social security benefits (compared to the gross average wage) is projected. In the following 8 MS (PL, IT, AT, PT, SE, FR, LV and EE) the contribution of a decreasing benefit ratio is in absolute terms quite significant (above 3 per cent). The mentioned differences among countries are mainly due to different degree of reforms affecting both access to pensions and generosity of future pension benefits.

To sum up, in the upcoming decades, demographic factors are projected to be the main driver of the future pension expenditure. For all countries, except CY and LU, the contribution of the old-age dependency ratio is bigger that the total change in the social security pension to GDP. It is evident that envisaged demographic transition will affect future pensions to a remarkable extent. Hopefully, recent pension reforms have strengthened the counterbalancing impact of other factors (increase in employment rate, especially of older workers, decline in the coverage ratio, through postponement of retirement age, less generous public pension transfers). However, since the effect of population ageing is expected to be really a substantial one, additional appropriate reforms are needed in order for the other main determinants of pension spending to fully countervail its effect.

Contrary to the labour market reforms, changes of the pension schemes tend to have an impact on economic variables rather in the long run. Usually, the impact of the reforms affecting the value of pension benefits will become visible only in future years, as currently working individuals will retire under different conditions in the future. This circumstance is clearly visible in Table 3 where the contribution of falling benefit ratios at the EU27 level is the strongest from 2020 to 2050.

Focusing on development at the EU27 level, the first sub period 2007-20 is characterised by a relatively low contribution of a change in the benefit ratio (–0.1 per cent). Still, a large divergence is observed across countries, ranging from the largest positive contribution in RO (+3.3 per cent) and the largest negative contribution registered in SE (–1.5 per cent), LU and CZ (–1.4 per cent for both). As already noted, the effect of the pension system reforms is expected to materialise over longer horizon. Thus, not surprisingly, the EU27 average benefit contribution to keep pension spending under control increases over time, starting from 2020-30. The largest positive contribution falls down reaching 1.3 per cent in case of EL. The largest negative benefit contribution remains unchanged at –1.4 per cent this time registered by PT. As the current pension reforms adjusting adequacy of individual pension benefits will affect primarily individuals retiring in thirty to forty years, the largest contribution of the fall in benefit ratios is projected to show up over the period 2030-40 (–0.7 per cent in the EU27).

### *5.2 Is there a risk of pensions becoming "too small"?*

We have seen that sizable decreases in benefit ratios are projected over coming decades. It is very difficult to assess to what extent future pension benefits will be "adequate" in the future. Comprehensive pension reforms have aimed at strengthening fiscal sustainability by generally including measures aimed at both tightening of eligibility for pension benefits and reducing the growth of the pension benefits in relation to income growth in the economy.

Table 4 shows the benefit ratio (the ratio between the average pension benefit and the economy-wide average wage) and the replacement rate (the average first pension as a share of the economy-wide average wage).

The decline in the public pension benefit ratio over the period 2008-60 is substantial, 20 per cent or more in 11 MSs (FR, IT, AT, PT, SE, EE, LV, LT, PL, SK, BG). However, taking into consideration also the projected support from pension benefits from the 2$^{nd}$ and 3$^{rd}$ pillars, the decline in the pension benefit ratio including also these private pensions is smaller in several of

**Table 3**

**Contribution of the Benefit Ratio to the Change in the Ratio of Social Security Pension Expenditure**
*(percent of GDP)*

| Country | 2007-20 | 2020-30 | 2030-40 | 2040-50 | 2050-60 | 2007-60 |
|---|---|---|---|---|---|---|
| BE | 0.5 | –0.1 | –0.5 | –0.5 | –0.5 | –1.0 |
| BG | 0.1 | –0.8 | –0.7 | –0.4 | 0.0 | –1.8 |
| CZ | –1.4 | –0.3 | 0.2 | 0.3 | 0.0 | –1.2 |
| DK | –0.4 | 0.0 | –0.2 | –0.1 | 0.1 | –0.5 |
| DE | –0.5 | –0.9 | –0.8 | –0.1 | 0.0 | –2.2 |
| EE | 0.1 | –0.9 | –0.7 | –0.9 | –0.8 | –3.1 |
| IE | 0.3 | 0.1 | 0.1 | 0.1 | 0.0 | 0.7 |
| EL | 1.0 | 1.3 | 0.2 | –0.8 | –0.9 | 0.8 |
| ES | 1.0 | –0.7 | –0.7 | –0.7 | –0.7 | –1.7 |
| FR | –1.4 | –1.1 | –0.7 | –0.5 | –0.2 | –4.0 |
| IT | 0.3 | –1.3 | –1.6 | –1.5 | –1.3 | –5.5 |
| CY | 0.5 | –0.4 | 0.3 | –0.2 | –0.5 | –0.3 |
| LV | –0.1 | –0.4 | –0.6 | –1.6 | –1.3 | –3.9 |
| LT | –0.3 | –0.3 | –0.4 | –0.4 | –0.5 | –1.8 |
| LU | –1.4 | 0.6 | 0.7 | 0.8 | 0.6 | 1.2 |
| HU | 0.5 | –0.7 | –0.3 | –0.3 | –0.3 | –1.1 |
| MT | –0.6 | –0.6 | 0.6 | 0.3 | –0.3 | –0.5 |
| NL | –0.5 | –0.1 | 0.0 | 0.1 | –0.0 | –0.6 |
| AT | –0.9 | –0.6 | –0.9 | –1.1 | –1.4 | –5.0 |
| PL | –0.8 | –1.3 | –1.6 | –1.9 | –1.5 | –7.1 |
| PT | 0.0 | –1.4 | –1.7 | –0.7 | –0.7 | –4.5 |
| RO | 2.8 | 0.1 | –0.3 | –0.5 | –0.3 | 1.7 |
| SI | –0.6 | –0.3 | 0.1 | 0.1 | 0.1 | –0.7 |
| SK | –0.3 | –0.4 | –0.6 | –0.7 | –0.5 | –2.4 |
| FI | 0.6 | –0.1 | –0.4 | –0.5 | –0.4 | –0.9 |
| SE | –1.5 | –1.1 | –0.8 | –0.6 | –0.4 | –4.3 |
| UK | 0.0 | –0.1 | –0.0 | 0.4 | 0.3 | 0.5 |
| NO | –0.1 | –0.5 | –0.7 | –0.5 | –0.5 | –2.3 |
| EU27 | –0.1 | –0.6 | –0.7 | –0.6 | –0.4 | –2.5 |
| EA16 | –0.2 | –0.8 | –0.8 | –0.6 | –0.5 | –2.9 |
| EA12 | –0.2 | –0.8 | –0.8 | –0.6 | –0.5 | –2.9 |
| EU15 | –0.2 | –0.7 | –0.7 | –0.4 | –0.3 | –2.3 |
| EU10 | –0.6 | –0.8 | –0.8 | –1.0 | –0.8 | –3.9 |
| EU25 | –0.2 | –0.7 | –0.7 | –0.6 | –0.4 | –2.5 |

**Table 4**

## Benefit Ratios and Replacement Rates

*(percent)*

| Country | Benefit Ratio | | | | | | Gross Average Replacement Rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Public Pensions | | | Public and Private Pensions | | | Public Pensions | | | Public and Private Pensions | | |
| | 2007 | 2060 | % Change | 2007 | 2060 | % Change | 2007 | 2060 | % Change | 2007 | 2060 | % Change |
| BE | 45 | 43 | –4 | | | | 45 | 42 | –7 | | | |
| BG | 44 | 36 | –20 | 44 | 41 | –8 | | 36 | | | 49 | |
| CZ | 45 | 38 | –17 | | | | 33 | 27 | –17 | 33 | 27 | –17 |
| DK | 39 | 38 | –4 | 64 | 75 | 17 | 33 | 33 | 0 | 71 | 84 | 18 |
| DE | 51 | 42 | –17 | 51 | 42 | –17 | | | | | | |
| EE | 26 | 16 | –40 | 26 | 22 | –18 | 28 | 16 | –41 | 28 | 31 | 9 |
| IE | 27 | 32 | 16 | | | | | | | | | |
| EL | 73 | 80 | 10 | | | | 61 | 67 | 10 | | | |
| ES | 58 | 52 | –10 | 62 | 57 | –8 | | | | | | |
| FR | 63 | 48 | –25 | | | | | | | | | |
| IT | 68 | 47 | –31 | | | | 67 | 49 | –26 | | | |
| CY | 54 | 57 | 5 | | | | | | | | | |
| LV | 24 | 13 | –47 | 24 | 25 | 4 | 33 | 22 | –33 | 33 | 33 | 2 |
| LT | 33 | 28 | –16 | 33 | 32 | –2 | 32 | 29 | –10 | 32 | 37 | 15 |
| LU | 46 | 44 | –4 | 46 | 44 | –4 | 53 | 62 | 17 | | | |
| HU | 39 | 36 | –8 | 39 | 38 | –3 | 49 | 38 | –23 | 49 | 43 | –13 |
| MT | 42 | 40 | –6 | | | | | | | | | |
| NL | 44 | 41 | –7 | 74 | 81 | 10 | | | | | | |
| AT | 55 | 39 | –30 | | | | 49 | 38 | –22 | | | |
| PL | 56 | 26 | –54 | 56 | 31 | –44 | | | | | | |
| PT | 46 | 33 | –29 | 47 | 33 | –31 | 58 | 56 | –3 | | | |
| RO | 29 | 37 | 26 | 29 | 41 | 41 | 36 | 44 | 20 | 36 | 49 | 34 |
| SI | 41 | 39 | –6 | 41 | 40 | –2 | | | | | | |
| SK | 45 | 33 | –27 | 45 | 40 | –11 | | | | | | |
| FI | 49 | 47 | –5 | | | | | | | | | |
| SE | 49 | 30 | –39 | 64 | 46 | –27 | 49 | 31 | –36 | | | |
| UK | 35 | 37 | 7 | | | | | | | | | |
| NO | 51 | 47 | –8 | | | | | | | | | |

Note: The "Benefit ratio" is the average pension benefit for social security and total, respectively, as a share of the economy-wide average wage, as calculated by the Commission. The "Gross Average Replacement Rate" as the average first pension as a share of the economy-wide average wage, as reported by the MSs in the pension questionnaire. Public pensions used to calculate the Benefit Ratio includes old-age and early pensions and other pensions, while public pensions used to calculate the Gross Average Replacement Rate only includes old-age and early pensions. In general, the old-age and early pensions are the major part of pension expenditure, so this difference is unlikely to affect the results substantially.

**Table 5**

**Decomposition of Public and Other Pension Spending over the Period 2007-60**

| Country | 2007 Level | Dependency Ratio Contribution | Coverage Ratio Contribution | Employment Effect Contribution | Benefit Ratio Contribution | Interaction Effect | 2060 Level |
|---|---|---|---|---|---|---|---|
| BG | 8.3 | 9.1 | –3.2 | –0.5 | –1.8 | 1.2 | 13.0 |
| DK | 14.7 | 6.5 | –8.0 | –0.2 | –0.8 | 6.0 | 18.1 |
| EE | 5.6 | 4.6 | –1.8 | –0.2 | –3.6 | 2.1 | 6.7 |
| IE | 5.2 | 5.9 | –2.1 | –0.3 | 0.9 | 1.6 | 11.3 |
| ES | 9.0 | 10.7 | –0.9 | –1.0 | –1.9 | 0.5 | 16.4 |
| LV | 5.4 | 5.7 | –2.0 | –0.2 | –5.2 | 6.3 | 10.0 |
| LT | 6.8 | 9.6 | –2.7 | –0.0 | –2.0 | 1.7 | 13.3 |
| HU | 10.9 | 11.3 | –4.5 | –0.7 | –2.4 | 1.5 | 16.0 |
| NL | 11.7 | 6.6 | –2.7 | –0.3 | –1.2 | 8.4 | 22.6 |
| PL | 11.6 | 13.4 | –6.5 | –1.0 | –7.6 | 0.7 | 10.6 |
| PT | 12.0 | 9.8 | –1.6 | –0.6 | –4.9 | -0.7 | 14.0 |
| RO | 6.6 | 13.6 | –5.1 | 0.3 | 1.7 | 0.7 | 17.7 |
| SI | 9.9 | 13.7 | –3.5 | –0.1 | –0.7 | 0.0 | 19.3 |
| SK | 6.8 | 11.7 | –4.2 | –0.6 | –2.7 | 1.4 | 12.4 |
| SE | 12.2 | 5.6 | –0.5 | –0.5 | –6.2 | 3.7 | 14.4 |

these countries (SE, EE, HU, LV, LT, PL, SK, BG), see also Table 5.[17] Notwithstanding this boost, it still declines by 20 per cent or more in FR, IT, AT, PT, SE, EE, PL.

In the case of a declining benefit ratio over time, the replacement rates at retirement provides information on whether the reduction in average pension benefit over time is due to a decline over time in newly awarded pensions (as reflected in the replacement rate at retirement), or due to a decline in previously awarded "old" pensions, the latter being influenced by the pension indexation rule employed.

Only about half of the EU MSs have reported replacement rates, which hampers a mapping of the situation across the EU. Nonetheless, in a number of countries, the decline in the public pension replacement rate between 2007 and 2060 is substantial, being 15 per cent or more in IT, AT, SE, EE, HU, LV, and PL. This suggests that the valorisation of the average first pension is lagging behind the average wage growth quite significantly (in some cases partly reflecting the impact of increases in life expectancy in the calculation of the pension benefit – through some kind of "adjustment coefficient" or "sustainability factor"). In a number of countries the decline in the

[17] It should be noted that not all MSs were in a position to provide projection for 2nd and 3rd pillars even if they exist, indicating that the total benefit ratio is not fully comparable.

gross average replacement rate including the contribution from 2nd and 3rd pillar pensions is smaller than concerning public pensions.

A decline in the replacement rate over time may be an explicit policy target in some cases, where the initial replacement is very high and might act as a deterrent on the individual's attitude towards continuing working. Hence, it is informative to look not only at the change in the replacement rate over time, but also at the level, see Table 5. If the replacement rate at a future point in time is "low", there is a case for putting in place other sources of income in order to avoid potential future issues as regards adequacy of pensions. In countries where the public pension replacement rate is low in the future, the potential inadequacy of pensions from public sources may therefore be relatively larger and call for proper intervention by governments so as to realign contemporary income across different age groups.

However, as pointed out above, it must be borne in mind that other sources of income for older people can make up for the lower initial pension from social security. First, retirement income from other pillars can support purchasing power of pensioners (for instance, this is the case in SE, EE, HU, LT, LV, PL, SK, BG, who have provided projection of these privatized funded pillars). Second, other income sources can contribute to retirement income, like drawing down on accumulated assets and savings. Third, behavioural change among the population, beyond what is already assumed in the baseline projections, to further extend working lives and/or to increase their savings to enhance the future pension benefit and/or retirement incomes may occur on the assumption that individuals are well-informed of their future prospects and take a (long) forward-looking perspective. Clearly, structural reforms that fosters (or forces) the expansion of life spent working can affect this change.

In addition to issues regarding the level of the first pension awarded, as captured by the average replacement rate, indexation rules governing the evolution of the pension after retirement is an important determinant of the pension income after retirement. As noted above, pinpointing a level below which a pension may be "too low", is a difficult task. Nonetheless, the lower the first pension benefit, the higher the reliance of price indexation (as opposed to wage indexation) after retirement is, the higher is the probability that the pension benefit for an individual risks becoming inadequate over time. This applies in particular to individuals with the lowest, or minimum, pension benefits.

## 6 Assessing the potential impact of future changes in some of the main drivers of pension spending

In order to verify how sensitive are the different national pension models to changes in key variables, and thus to possible future changes in the parameters of the pension schemes, a series of sensitivity tests were carried out. Specifically, changes to the demographic (assumptions on life expectancy and migration flows) and macroeconomic (productivity growth, employment rates and the interest rate) variables were applied in the projection exercise of the EC-EPC.[18]

In particular, given the high uncertainty surrounding assumptions regarding demographic and economic outlook over the long-term, it is important to know the impact of changes in these factor on pension spending. In order to take such uncertainties into account, a set of projections under alternative assumptions is carried out in addition to the baseline scenario (labour productivity growth, employment rate, interest rate and life expectancy).

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[18] For details on the specification of the sensitivity tests, please see European Commission – Economic Policy Committee (2008), "2009 Ageing Report: Underlying Assumptions and Projection Methodologies (2007-2060)", *European Economy*, No. 7.

### 6.1 Pension spending is especially sensitive to life expectancy and assumptions on migration

Sensitivity tests show that public spending on pensions appears to be particularly sensitive to changes in life expectancy and in some countries to the labour productivity growth rate. The projected change in public spending on pensions are relatively robust regarding the changes in employment rates and the changes in interest rates affect only funded schemes. More specifically:

#### 6.1.1 Life expectancy

Higher life expectancy leads to increased public spending in countries with defined-benefit schemes, whereas defined-contribution schemes inherently takes into account the length of retirement. As part of recent pension reforms, some Member States have introduced a link between life expectancy at retirement and pension benefits: the projection results indicate that these measures appear to achieve a better sharing of demographic risk. A higher life expectancy (of 1 year at birth by 2060) would lead to an increase of the pension to GDP ratio in the EU27 of about +0.2 per cent. The impact is however not uniform across countries, ranging from +0.1 per cent by LV to +0.8 per cent by PL.

The extent to which the pension schemes react to a change in life expectancy depends on the design of the schemes. The impact of longer life expectancy appears to be smaller in countries where the annuity explicitly depends on life expectancy at retirement or in countries where automatic stabilizers of spending are built into the system to compensate for some fiscal imbalances (e.g., the sustainability factors in DE, SI, FI, PT and SE). This type of features increases the resilience of pension schemes to longevity risk. By contrast, the impact is larger in countries with a large level of pension expenditure in 2050 and where no such automatic stabilizer of the pension spending has been put in place (e.g., BE and FR).

#### 6.1.2 Higher labour productivity growth

A permanent increase of 0.25 per cent in the productivity growth rate would reduce the increase in the pension to GDP ratio in the EU27 by –0.5 per cent up to 2060. A larger reduction would be the case in GR (–2.0 per cent), AT (–1.1 per cent) and ES (–1.0 per cent), while an increase is projected in SI (+0.2 per cent), NO (+0.2 per cent) and PL (+0.3 per cent) thanks to indexation of pensions to wages or larger accumulation of pension rights.

Higher productivity growth increases income, also in per capita terms, and leads to improved living standards (also for pensioners) at the aggregate level. However, the main mechanism behind the lower increase in pension expenditure as a share of GDP is that higher productivity growth leads to a faster growth of GDP and hence a faster increase in income than in pensions (a fall in benefit ratio). As discussed in above, this change in relative income position between the working-age population and the retired may put pressure on governments to adjust retirement income policies to avoid potential risks related to relatively inadequate pensions.

Higher labour productivity growth has a different impact on pension expenditure across countries. It will have virtually no impact in countries where the public pension scheme provides a flat rate pension whose level is indexed to wage growth. By contrast, it will lead to lower increases where pension expenditure trail GDP growth. This will be the case if pensions are not fully indexed to wages after retirement. The higher the productivity growth, the higher the gap between the average pension and the average wage. If pensions are earnings-related and are calculated over a long period of the career, a more dynamic productivity growth will lead to higher wages and therefore accumulate higher pension rights.

### 6.1.3 Higher employment of older workers

An increase of the total employment rates by 1 percentage point or an increase of the employment rates of older workers by 5 percentage points compared to the baseline would reduce the upward dynamic in pension expenditure as a share of GDP by 0.2 per cent over 2007-60. This would materialize through higher employment growth raising GDP growth in a first phase. However, in a second phase it would enable workers to accumulate further pension rights, having a moderating upward impact on the pension-to-GDP ratio in the longer term. The employment effect is slightly stronger in reducing the increase in the pension ratio if it results from higher employment of older workers, since it will mechanically reduce the number of retirees. The impact of a higher total employment will depend on the extent to which extending working lives will translate into higher pension entitlements.

### 6.1.4 Higher total employment

The impact of a higher employment for the entire workforce (assuming a reduction of the unemployment rate) leads to a reduction of –0.2 per cent in the EU. A stronger impact would occur in BG, NO, AT all reaching (–0.3 per cent). On the other hand, in IT, HU, LV, LU, EE with zero impact on pension to GDP ratio and PL (+0.6 per cent), the effect is smaller, reflecting in some cases the flat-rate character of the public pension scheme. The effect is limited as higher/longer employment results in the accumulation of greater pension entitlements. Notwithstanding the apparently small impact on public spending, raising the employment rate is welfare enhancing. It leads to an improved economic performance, and on the budgetary side it delays somewhat the onset of increased public spending on pensions. Moreover, higher employment generates increased contributions to pension schemes, and if it is the result of lower unemployment, additional budgetary savings may emerge. Finally, longer working lives enable workers to acquire greater pension entitlements offsetting some of the impact of less generous public pensions.

### 6.1.5 Interest rates

Interest rates affect the pension spending only in countries where funding is important. Moreover, Changing the assumption on the interest rate has an impact on public expenditure only in a few countries with funded components in the public pension schemes such as SE (–0.02 per cent) and FI (+0.14 per cent). The effect comes through a higher rate of return and its impact will depend on the extent to which assets have been accumulated. The effect of this test is generally stronger for private pension and in particular for countries that have large pensions scheme funds, such as NL, DK, FI and SE.

Changes in interest rates affects the contribution rate and asset accumulation of funded schemes, albeit in opposite directions in defined-benefit and defined-contribution schemes. In defined-benefit schemes, with a higher interest rate, the contribution rate can be lowered to cover the targeted benefit, whereas in a defined-contribution scheme, the contribution rate remains unchanged but results in a higher accumulation of assets.

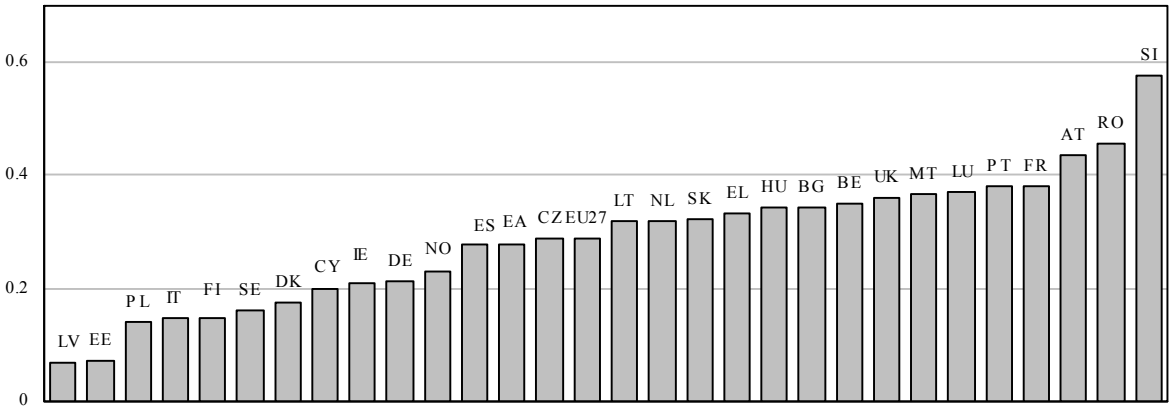
### 6.1.6 Zero migration

The zero migration scenario assumes the absence of both immigration and emigration between domestic economy and the rest of the world. The assumptions of this scenario seem to be very strong and even unrealistic for some of the countries. As a result, the outcomes of this scenario have to be interpreted only as indication of the potentially very different role that migration is expected to play in MSs. Indeed the difference between the baseline and the zero

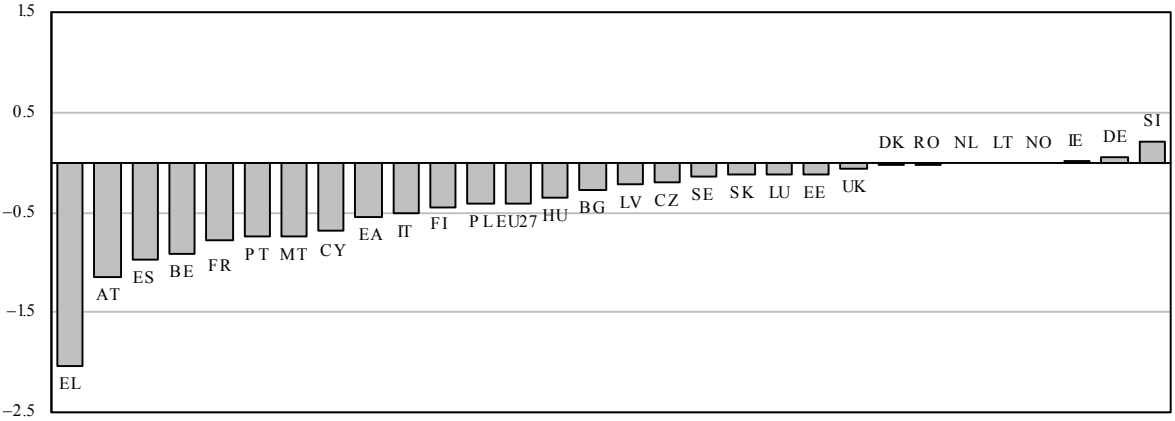
**Figure 7**

**Sensitivity Tests:**
**Difference between Pension Spending in the Alternative and the Baseline Scenarios**
*(percent of GDP)*

**Higher Life Expectancy**




**Higher Labour Productivity**




**Higher Employment of Older Workers**

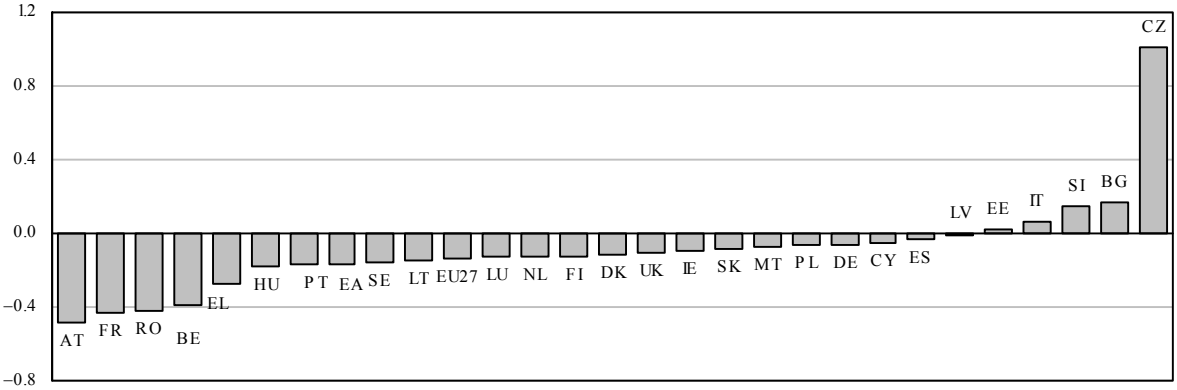
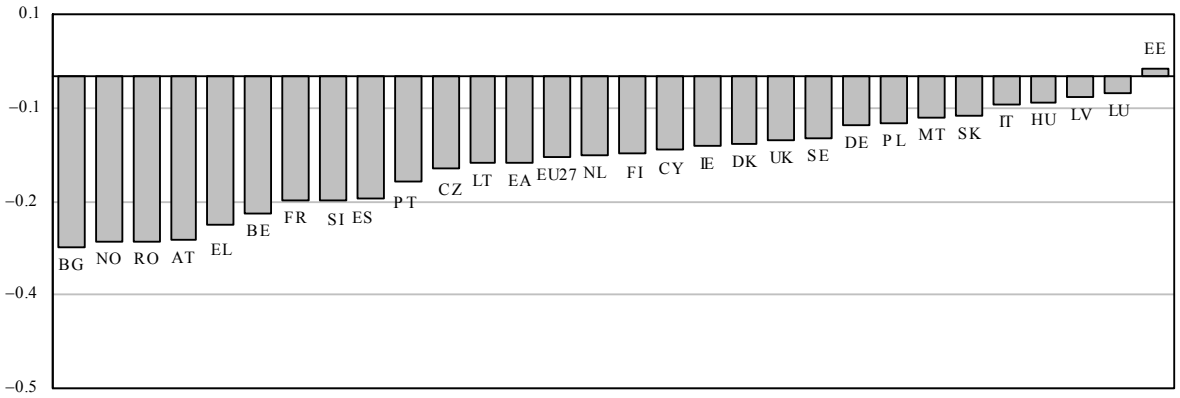


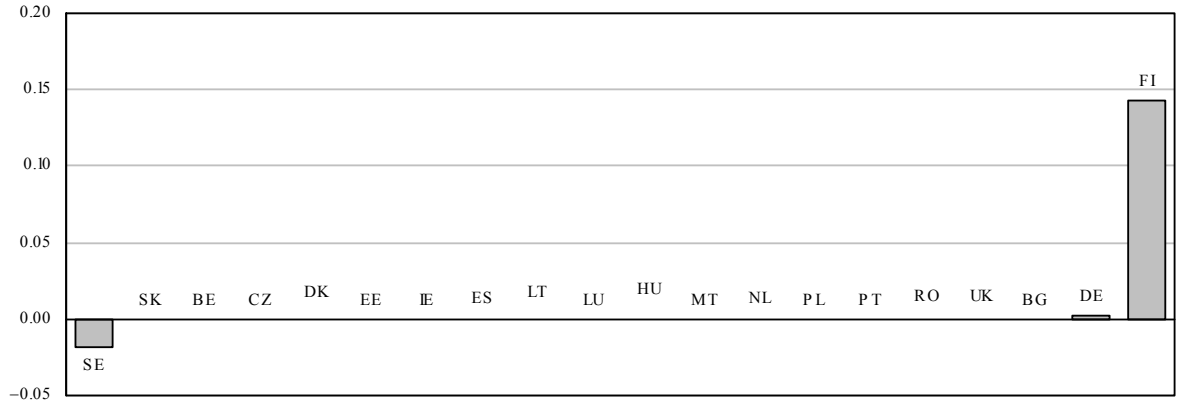
**Figure 7 (continued)**

**Sensitivity Tests:**
**Difference between Pension Spending in the Alternative and the Baseline Scenarios**
*(percent of GDP)*

**Higher Employment**




**Higher Interest Rate**




**Zero Migration**

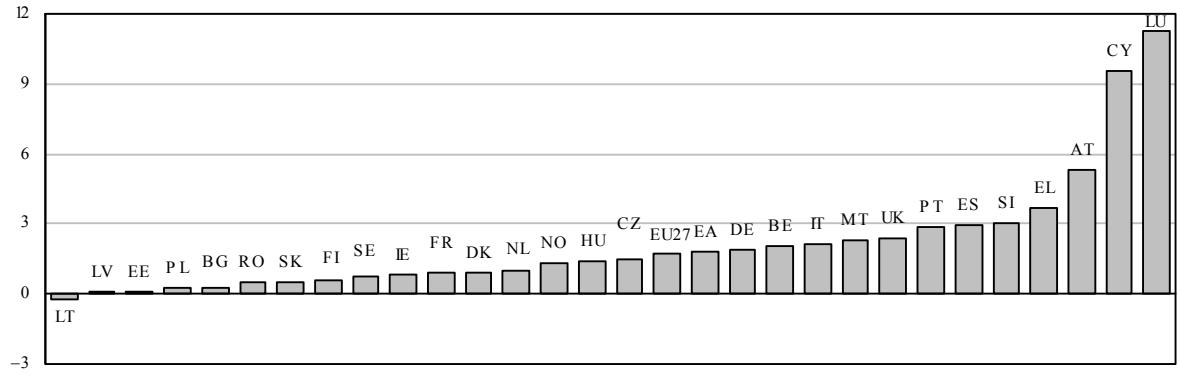
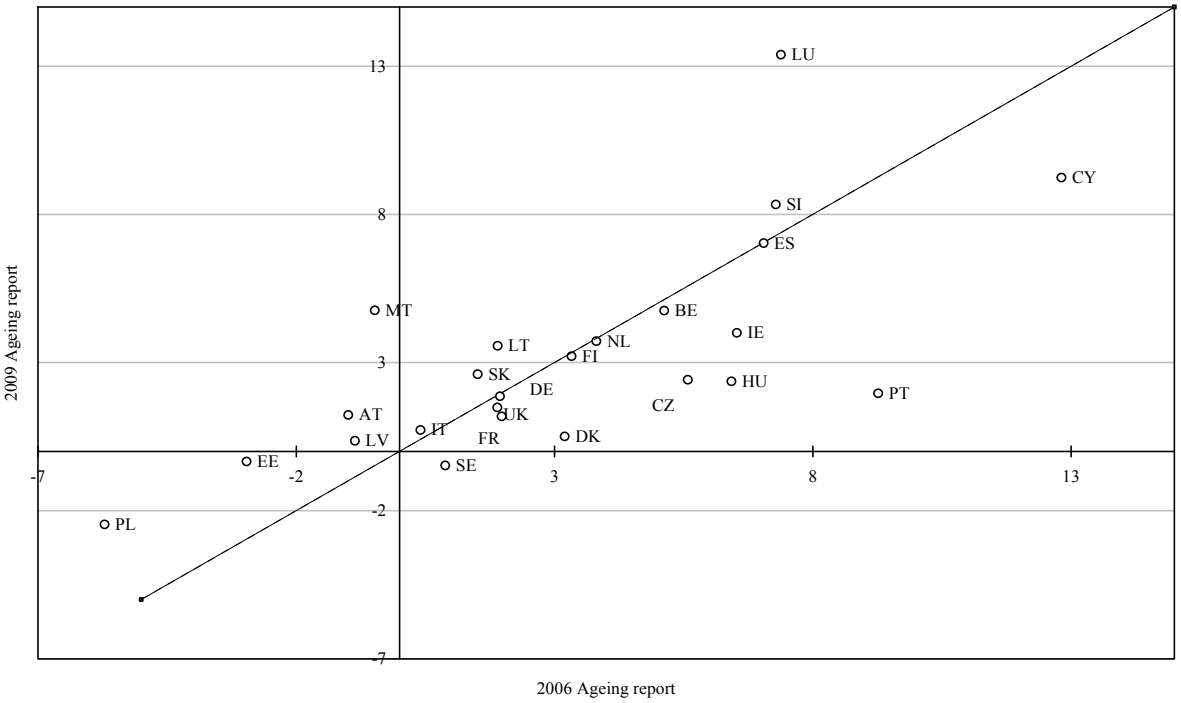


**Figure 8**

**Change in the Public Pension to GDP up to 2050 Compared: 2006 Ageing Report and Latest Projection**




migration scenarios is the largest one among all of the sensitivity tests for majority of the Member States. In general, due to the net zero migration assumption, the pension to GDP ratio increases. This is the case in all of the MSs except a very limited negative change in case of LT. The EU27 average increase in pension to GDP ratio is projected to be +1.7 per cent above the baseline change over the projection horizon. An increase in the pension to GDP ratio mainly results from an impact of the smaller labour force and lower GDP over the projection period. At the same time, the number of pensioners is generally less affected by the net zero migration assumption over the projection horizon, *i.e.* 2007-60.[19]

## 7 Assessing the budgetary impact of pension reforms: comparison with the previous pension projection exercise

An additional way to assess the budgetary impact of recent pension reforms is to compare the changes in public pension expenditure as a share of GDP up to 2050 in the current projection exercises with those projected in 2006 (see Figure 8). For most countries, the change in pension expenditure as a share of GDP has been revised over time, sometimes significantly (as reflected by the distance from the 45 degree line in Figure 8). Compared with the 2006 pension projection

[19] Beyond 2060, the number of pensioners will be affected by the assumptions of the net zero migration scenario. As the current and future (up to 2060) level of employment is lower due to lower inflow of immigrants, the number of pensioner is expected to fall in the long horizon (beyond 2060) as well.

exercise, pension expenditure is now projected to be fairly similar for the EU25 (rising by 2.3 per cent of GDP, compared with 2.2 per cent of GDP in the 2006 Ageing Report).[20]

Pension expenditure is now projected to increase more (or decrease less) in EE, IT, LV, LT, LU, MT, AT, PL, SI, SK, with large upward revisions of 1.5 per cent of GDP or more in EE, LV, LT, LU, MT, AT, PL. By contrast, a lower increase (or higher decrease) is now projected in BE, CZ, DK, IE, FR, CY, HU, NL, PT, FI, SE, UK, with significant downward revisions of 1.5 per cent of GDP or more in CZ, DK, IE, CY, HU, PT, SE.

The revisions of projected changes in pension expenditure over the long-term are due to several factors, notably but not exclusively due to reforms of pension systems. Also other factors are playing a role, such as changes in the demographic and macroeconomic assumptions, changes in modelling pension expenditure over the long-term and changes in the coverage of the projection (data on pension schemes covered in the projection).

In order to shed light on the reasons behind these revisions, a comparison of a decomposition of the change in public pension expenditure between the 2006 Ageing Report and the current projection exercise into four factors is conducted. This decomposition comparison was also used in the country fiches on the pension projections when analyzing the reasons behind the change in the projection results.

Table 6 presents a decomposition of the public pension to GDP ratio in 2006 and 2009 projections.[21] An in-depth analysis of the reasons behind the revisions for each country is provided in the country fiches on the pension projection and results envisaged for release in the latter half of 2009.

The main points may be summarized as follows:

- the main factor behind the projected increase in pension expenditure is the demographic transition to an older population. The dependency effect has decreased in a majority of countries PT, IE, CY, CZ, AT, ES, UK, IT, HU, DK, BE, FI, FR, SI, DE and SE, and it has increase only in few NL, LU, SK, EE, PL, LV, LT and MT;
- the other factors are in general offsetting the increase that follows from the larger number and share of older people. In the 2009 projection exercise, the fall in coverage is more accentuated, thus offsetting the dependency effect to a greater extent in a majority of countries. These reflect changes in pension policies that have aimed at increasing the effective retirement age either through increases in the statutory retirement age and/or through tightening access to early and disability pension schemes. Compared with the 2006 projection exercise, the largest reductions in the coverage ratio are projected in PT, IE and CY. By contrast, it slightly increases in ES, LU and AT. An increase in the coverage effect may be due to a higher take-up of pensions by women thanks to their increasing participation in the labour market even if there is a lower take-up of pensions by men due to reforms undertaken;
- the employment effect contributes to offset the dependency effect too. As already seen before, the effect is rather small in most countries and it generally offsets less in the current exercise compared with the 2006 projection. This partly follows from the fact that employment rates have generally risen in the period since the previous projection was carried out and that the structural unemployment rates have not been reduced to the same extent. This leads to lower

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[20] It should be noted that the projection for Greece is included in the current projection exercise, which was not the case in the 2006 Ageing Report. Excluding Greece from the EU25, the aggregate would lead to a lower increase in the current projection, of 1.9 percentage points of GDP.

[21] A small discrepancy between the changes in the consecutive projection exercises may be due to different starting year used; for the 2006 projection, the change is calculated over the period 2004-50 and in the current projection it is calculated over the period 2007-50.

**Table 6**

## Decomposition of the Public Pension in 2006 and 2009 Projections

*(percent of GDP)*

| Country | Projection Year | Dependency Ratio | Coverage Ratio | Employment Rate | Benefit Ratio | Change 2007-50 *(percent)* |
|---|---|---|---|---|---|---|
| BE | 2006 | 7.7 | –0.4 | –0.9 | –1.2 | 5.1 |
| | 2009 | 6.7 | –0.7 | –0.5 | –0.6 | 4.8 |
| BG | 2006 | | | | | |
| | 2009 | 7.5 | –2.2 | –0.3 | –1.8 | 2.5 |
| CZ | 2006 | 10.5 | –3.5 | –0.3 | –0.6 | 5.6 |
| | 2009 | 8.3 | –3.2 | –0.5 | –1.2 | 2.4 |
| DK | 2006 | 7.2 | –2.8 | –0.4 | –0.5 | 3.2 |
| | 2009 | 6.2 | –4.2 | –0.2 | –0.6 | 0.5 |
| DE | 2006 | 7.5 | –0.6 | –1.1 | –3.5 | 1.9 |
| | 2009 | 7.3 | –1.8 | –0.7 | –2.2 | 1.9 |
| EE | 2006 | 3.1 | –1.5 | –0.6 | –3.8 | –3.0 |
| | 2009 | 3.7 | –1.3 | –0.1 | –2.3 | –0.3 |
| IE | 2006 | 7.9 | –1.4 | –0.5 | 0.8 | 6.5 |
| | 2009 | 5.3 | –1.4 | –0.2 | 0.6 | 4.0 |
| EL | 2006 | | | | | |
| | 2009 | 12.7 | –1.2 | –0.7 | 1.8 | 12.3 |
| ES | 2006 | 12.4 | –2.3 | –1.8 | –0.8 | 7.0 |
| | 2009 | 10.6 | –1.0 | –0.9 | –1.1 | 7.0 |
| FR | 2006 | 8.7 | –1.8 | –0.9 | –3.5 | 2.0 |
| | 2009 | 8.2 | –2.1 | –0.5 | –3.8 | 1.2 |
| IT | 2006 | 11.5 | –3.2 | –2.0 | –5.3 | 0.4 |
| | 2009 | 10.4 | –3.3 | –1.2 | –4.2 | 0.7 |
| CY | 2006 | 10.2 | 1.2 | –1.2 | 2.5 | 12.8 |
| | 2009 | 8.0 | 1.6 | –0.5 | 0.2 | 9.2 |
| LV | 2006 | 3.4 | –1.3 | –0.7 | –2.3 | –0.9 |
| | 2009 | 4.3 | –1.1 | 0.0 | –2.6 | 0.4 |
| LT | 2006 | 5.4 | –2.1 | –1.0 | –0.2 | 1.9 |
| | 2009 | 6.8 | –1.4 | 0.1 | –1.3 | 3.6 |
| LU | 2006 | 7.2 | 2.5 | –4.4 | 2.1 | 7.4 |
| | 2009 | 7.6 | 4.9 | –0.0 | 0.6 | 13.4 |
| HU | 2006 | 10.5 | –4.5 | –1.1 | 2.0 | 6.4 |
| | 2009 | 9.5 | –4.7 | –0.7 | –0.8 | 2.4 |
| MT | 2006 | 7.3 | –1.0 | –1.2 | –5.0 | –0.5 |
| | 2009 | 9.1 | –2.8 | –0.7 | –0.2 | 4.8 |
| NL | 2006 | 6.3 | –1.6 | –0.2 | –0.4 | 3.8 |
| | 2009 | 6.3 | –1.5 | –0.2 | –0.5 | 3.7 |
| AT | 2006 | 11.3 | –5.8 | –1.3 | –4.3 | –1.0 |
| | 2009 | 9.3 | –3.1 | –0.5 | –3.6 | 1.2 |
| PL | 2006 | 10.4 | –5.7 | –3.2 | –6.3 | –5.7 |
| | 2009 | 11.3 | –5.7 | –0.9 | –5.6 | –2.5 |
| PT | 2006 | 13.7 | –0.9 | –0.2 | –3.0 | 9.3 |
| | 2009 | 9.4 | –1.9 | –0.7 | –3.8 | 2.0 |
| RO | 2006 | | | | | |
| | 2009 | 10.6 | –3.5 | 0.5 | 2.0 | 8.3 |
| SI | 2006 | 13.3 | –3.6 | –1.0 | –0.9 | 7.3 |
| | 2009 | 12.9 | –3.0 | –0.1 | –0.7 | 8.3 |
| SK | 2006 | 9.0 | –2.5 | –1.3 | –3.1 | 1.5 |
| | 2009 | 9.6 | –3.3 | –0.4 | –1.9 | 2.6 |
| FI | 2006 | 8.8 | –3.1 | –0.9 | –0.8 | 3.3 |
| | 2009 | 7.9 | –2.9 | –0.6 | –0.5 | 3.2 |
| SE | 2006 | 4.8 | –0.2 | –0.6 | –2.8 | 0.9 |
| | 2009 | 4.6 | –0.2 | –0.4 | –4.0 | –0.5 |
| UK | 2006 | 4.7 | 0.0 | –0.1 | 0.0 | 1.9 |
| | 2009 | 3.4 | –1.5 | –0.3 | 0.2 | 1.5 |
| NO | 2006 | | | | | |
| | 2009 | 7.4 | –1.3 | 0.2 | –1.7 | 4.5 |

- gains in employment rates over the projection period compared with the situation at the time of the previous projection;
- the benefit effect shows the extent to which average pensions increase at a different pace than average income (proxied by output per worker). The benefit effect can offset the dependency effect if: (i) the determination of the value of (future) accrued pension rights – eventually becoming pension benefits – is changed; (ii) the evolution of the pension after retirement is slower than average income (pension indexation below wage growth). It helps to offset the dependency effect in almost all countries, reflecting in many cases reforms that have been introduced so as to make the public pension systems more robust to demographic changes. In CZ, DK, IE, ES, FR, CY, LV, LT, LU, HU, NL, PT, SE, the offsetting impact of the relative benefit reduction has increased compared with the previous 2006 projection and in particular for HU, CY, LU, SE, LT, PT and CZ. A common feature for some of these latter set of countries (HU, PT, CZ) is that they have introduced strong pension reforms since the completion of the 2006 Ageing Report. As a result, the overall increase in the public pension ratio is now projected to be considerably smaller.

This decomposition comparison was also used in the country fiches on the pension projections when analyzing the reasons behind the change in the projection results. For countries where pension reforms have been implemented since the completion of the 2006 projections (e.g., DK, CZ, HU and PT), the effect of these reforms primarily comes via the coverage effect and the benefit effect, as shown above.[22]

## 8 Conclusions

The analysis of reforms in the Member States shows that the role of public pension benefits in overall pension provision is being reduced. This will happen gradually and through many mechanisms, including changes in the indexation of benefits which in some countries cause benefits to rise slower than wages.

The EC-EPC2009 projections show that, while the main driver behind the expected increase in pension spending to GDP ratio is the *transition to an older population*. This effect alone would push up expenditures very significantly in all Member States. However, there are several mitigating factors counteracting these daunting developments owing to important reforms steps taken by EU Member States.

*A tightening of the eligibility to receiving a public pension* (higher retirement age, reduced access to early retirement) is expected to act as a constraint on public pension expenditure in nearly every MS. This reflects implemented pension reforms, often phased-in over a long period, that lead to higher participation rates of older workers during the projection period. Pension reforms as well as trend increases in female labour force participation are assumed to lead to an increase in the effective retirement age in a large majority of countries. For instance, pension reforms that have strengthened the link between pension benefits and pension contributions (or raised the threshold for qualifying for a "full" pension) will also contribute to raising the retirement age. Achieving the necessary extension in working lives will prove challenging as adjustment will also be needed in the expectations and behaviour of citizens.

There are currently many hard and soft barriers that limit the extent to which the older generations can participate in society, and notably so in working life. Despite considerable

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[22] See European Economy (2009), "2009 Ageing Report: Pension Models and Projection Results in EU Member States" (forthcoming).

progress, e.g., pension reforms implemented in recent years in some Member States (most recently in CZ, HU, DK and PT), more policy action is necessary. In some countries, the scale of reforms to public pension systems has been insufficient and there is a critical need for ensuring that retirement behaviour takes due account of future increases in life expectancy, otherwise the pension bill will simply become unbearable.

*Higher participation and employment rates* are projected to occur as structural unemployment rates in a number of countries are projected to fall, brought about by reforms, including the flexicurity approach, that provide stronger work incentives. High unemployment rates are an enormous waste of potential resources, acting as a drag on the prosperity for society as a whole and especially for the individuals concerned as it adds to social exclusion. Also, high unemployment clearly constitutes a burden on public budgets. There is therefore a need to not only achieve the Lisbon targets, but also to surpass them and to work in a longer time horizon. The employment rate for women still lags behind that of men, despite recent progress. This represents a huge untapped resource for the European economy, and reflects an unacceptable level of inequality in terms of participation. Higher employment rates can lead to very large welfare gains. Higher employment does not, *per se*, lead to lower public spending on pensions as a share of GDP over the long run as higher/longer employment can result in the accumulation of greater and more adequate pension entitlements, thus contributing to social sustainability. However, measures which raise employment do strengthen the financial sustainability of pension systems by delaying the onset of expenditure rises and through increased contributions.

Increasing the employment rate of older workers is another area where progress has been made, but where much more can and needs be done. Employment of older workers has increased considerably in recent years. Yet, only around 50 per cent of people are still in employment by the age of 60. This represents a huge untapped potential and raising the employment rates of older workers, including those aged over 65 in the future, will remain a key policy objective for EU Member States.

Achieving the necessary extension in working lives will not be easy. It not only requires that tax/benefit and wage systems provide financial incentives for people to remain economically active and invest in building their own human capital, but it also means that there must be job opportunities for older people with appropriate skill sets. Policies to tackle age-discrimination and to promote life-long learning, flexible retirement pathways and healthy work conditions also need to be considered. Perhaps the most challenging aspect of efforts to rise effective retirement ages is the need to change the expectations and behaviour of employers and employees alike. Moreover, the concept of ageing is evolving, and with life expectancy projected to continue rising, retirement behaviour may also need to adjust continuously.

*Reduced generosity of public pensions is also expected to contribute to keeping pension spending under control*. The analysis shows that in the EU public pension benefits are rising slower than wages, implying that on average pensioners will experience a relative deterioration in living standards *vis-à-vis* workers in the future. The recent EC-EPC projections along with analysis carried out within the framework of Open Method of Coordination in Social Protection and Social Inclusion suggests that future relative pensioners' income will decline substantially in the number of Member States.[23] The 2006 report on sustainability of public finances considers the risk of inadequate pensions which may result in unforeseen pressure for ad hoc increases of pensions or higher demand for other benefits.[24] Thus the issues of pension adequacy, sustainability and modernisation need to be considered jointly.

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[23] COM (2009) 58 final.

[24] COM (2006) 574 final.

**Table 7**

## Estimated Impact of Pension Reform on Participation Rates (2020, 2060)
## Comparison of Projections with and without Incorporating Recent Pension Reforms
*(percent)*

| Age | BE | | CZ | | DK | | DE | | EE | | ES | | FR | | IT | | LT | | HU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Males** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 2.3 | 2.1 | 2.0 | 3.3 | 0.1 | 2.0 | 3.7 | 3.8 | 0.0 | 0.0 | 1.4 | 3.1 | 2.0 | 2.7 | 3.9 | 6.8 | 0.0 | 0.0 | 2.1 | 2.7 |
| 15-71 | 2.5 | 2.5 | 2.7 | 4.7 | –0.2 | 3.4 | 3.9 | 5.3 | 0.0 | 0.0 | 1.6 | 3.5 | 2.2 | 2.9 | 3.7 | 6.8 | 0.0 | 0.0 | 2.2 | 3.0 |
| 55-64 | 9.1 | 9.1 | 10.3 | 15.3 | 0.7 | 9.3 | 14.7 | 16.1 | 0.0 | 0.0 | 6.1 | 13.9 | 10.9 | 14.8 | 17.1 | 29.0 | 0.0 | 0.0 | 10.8 | 11.0 |
| **Females** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 2.6 | 2.7 | 3.6 | 7.2 | 0.3 | 2.5 | 2.5 | 4.4 | 1.3 | 1.8 | 1.1 | 2.1 | 1.3 | 1.5 | 2.0 | 2.7 | 3.8 | 3.5 | 3.9 | 3.9 |
| 15-71 | 2.5 | 2.7 | 4.8 | 8.9 | 0.2 | 4.3 | 2.8 | 5.6 | –1.4 | –1.1 | 1.1 | 2.0 | 1.6 | 2.0 | 2.0 | 2.9 | 4.5 | 5.1 | 3.7 | 3.7 |
| 55-64 | 10.4 | 11.6 | 16.9 | 32.5 | 1.5 | 12.2 | 10.5 | 19.3 | 5.7 | 8.8 | 4.9 | 9.0 | 6.1 | 7.6 | 10.2 | 15.2 | 15.5 | 14.6 | 17.4 | 17.4 |
| **Total** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 2.4 | 2.4 | 2.8 | 5.2 | 0.2 | 2.3 | 3.1 | 4.1 | 0.7 | 0.9 | 1.2 | 2.6 | 1.6 | 2.1 | 2.9 | 4.8 | 1.9 | 1.8 | 3.3 | 3.3 |
| 15-71 | 2.5 | 2.6 | 3.8 | 6.8 | –0.0 | 3.8 | 3.4 | 5.4 | –0.7 | –0.6 | 1.4 | 2.8 | 1.9 | 2.5 | 2.8 | 4.9 | 2.3 | 2.6 | 3.3 | 3.3 |
| 55-64 | 9.8 | 10.4 | 13.6 | 23.9 | 1.1 | 10.8 | 12.6 | 17.7 | 3.2 | 4.5 | 5.5 | 11.5 | 8.4 | 11.2 | 13.6 | 22.2 | 8.7 | 7.5 | 14.3 | 14.3 |

| | MT | | AT | | PL | | PT | | SI | | SK | | FI | | SE | | UK | | EU27 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Males** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 2.6 | 6.5 | 1.6 | 3.3 | 2.0 | 5.3 | 0.9 | 1.9 | 0.1 | 0.2 | 2.1 | 2.6 | 2.0 | 2.1 | 1.1 | 1.2 | 0.0 | 1.4 | 1.8 | 2.9 |
| 15-71 | 2.2 | 6.8 | 1.7 | 3.5 | 1.8 | 5.7 | 1.2 | 3.0 | –0.5 | –0.2 | 3.4 | 4.7 | 1.9 | 2.1 | 1.9 | 2.2 | 0.0 | 2.6 | 1.9 | 3.5 |
| 55-64 | 11.9 | 28.3 | 8.1 | 16.1 | 8.0 | 21.6 | 3.7 | 7.7 | 2.7 | 3.3 | 10.6 | 11.0 | 9.1 | 10.4 | 5.6 | 5.9 | 0.0 | 7.0 | 8.5 | 13.5 |
| **Females** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 3.8 | 3.8 | 4.0 | 4.0 | 4.7 | 4.7 | 1.4 | 1.4 | 5.2 | 5.2 | 7.6 | 7.6 | 2.9 | 2.9 | 0.7 | 0.7 | 1.8 | 3.4 | 1.8 | 2.7 |
| 15-71 | 3.5 | 3.5 | 5.5 | 5.5 | 5.6 | 5.6 | 1.8 | 1.8 | 4.9 | 4.9 | 10.1 | 10.1 | 3.7 | 3.7 | 1.6 | 1.8 | 1.7 | 5.2 | 1.9 | 3.5 |
| 55-64 | 14.0 | 14.0 | 18.2 | 18.2 | 16.9 | 16.9 | 5.0 | 5.0 | 22.9 | 22.9 | 31.4 | 31.4 | 13.8 | 13.8 | 3.1 | 2.9 | 8.1 | 16.9 | 7.9 | 12.8 |
| **Total** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 5.2 | 5.2 | 3.6 | 3.6 | 5.0 | 5.0 | 1.6 | 1.6 | 2.7 | 2.7 | 5.1 | 5.1 | 2.5 | 2.5 | 0.9 | 0.9 | 0.9 | 2.4 | 1.8 | 2.8 |
| 15-71 | 5.2 | 5.2 | 4.5 | 4.5 | 5.6 | 5.6 | 2.4 | 2.4 | 2.3 | 2.3 | 7.4 | 7.4 | 2.9 | 2.9 | 1.8 | 2.0 | 0.9 | 3.9 | 1.9 | 3.5 |
| 55-64 | 21.2 | 21.2 | 17.1 | 17.1 | 19.2 | 19.2 | 6.4 | 6.4 | 12.9 | 12.9 | 21.2 | 21.2 | 12.1 | 12.1 | 4.3 | 4.5 | 4.2 | 12.0 | 8.2 | 13.1 |

| | EA | | EA12 | | EU15 | | EU10 | | EU25 | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Males** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 2.4 | 3.4 | 2.4 | 3.4 | 2.0 | 2.9 | 1.8 | 3.7 | 2.0 | 3.0 |
| 15-71 | 2.5 | 3.9 | 2.5 | 3.9 | 2.1 | 3.6 | 1.8 | 4.3 | 2.1 | 3.7 |
| 55-64 | 10.7 | 15.5 | 10.7 | 15.6 | 9.0 | 13.8 | 8.0 | 15.8 | 8.8 | 14.1 |
| **Females** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 1.7 | 2.4 | 1.6 | 2.4 | 1.6 | 2.5 | 2.9 | 4.9 | 1.8 | 2.8 |
| 15-71 | 1.8 | 2.9 | 1.8 | 2.9 | 1.7 | 3.3 | 3.1 | 5.7 | 2.0 | 3.6 |
| 55-64 | 7.5 | 11.6 | 7.5 | 11.6 | 7.4 | 12.3 | 12.0 | 19.8 | 8.1 | 13.3 |
| **Total** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** | **2020** | **2060** |
| 15-64 | 2.0 | 2.9 | 2.0 | 2.9 | 1.8 | 2.7 | 2.4 | 4.3 | 1.9 | 2.9 |
| 15-71 | 2.2 | 3.4 | 2.2 | 3.4 | 1.9 | 3.5 | 2.5 | 5.0 | 2.0 | 3.7 |
| 55-64 | 9.1 | 13.5 | 9.1 | 13.6 | 8.2 | 13.1 | 10.1 | 17.8 | 8.4 | 13.7 |

Source: Commission services, EPC.

Trends differ widely across the EU. In a few Member Sates (DK, IE, EL, CY, RO, UK), average pensions relative to wages remain unchanged or even increase over the projection period, while in most others (especially in BG, EE, FR, IT, LV, AT, PL, PT, SK, SE) it is projected to decrease up to 2060. The decrease in the generosity of public pensions is due to necessary pension reforms introduced in the majority of Member Sates in order to contribute to the sustainability of public finances over the long-term. In order to secure that retirement income is also adequate, many countries have introduced supplementary (private) pension schemes.

*Additional pensions from private pillars, to compensate for the relatively lower pension income from public sources, are expected in a number of Member States*. A number of countries have implemented systemic pension reforms, shifting part of the previously public pillar to a mandatory funded private pillar (BG, EE, LV, LT, HU, PL, SK and SE). At present, these private pillars are making very small disbursements since they have been set up mainly during the previous decade, but their importance will increase in the future. Some countries (e.g., SE, DK, and NL) also rely on 2nd pillar occupational pensions to a certain extent. Also, 3rd pillar non-mandatory pension schemes are increasingly being introduced, but their importance is generally small.

*"Privatizing pensions" also entail important policy issues*, as exemplified by the current financial crisis where assets invested in stock markets worldwide have tumbled. While moving towards more private sector pension provision can help reduce explicit public finance liabilities and improve (potentially) the sustainability of public finances, it also creates new challenges and forms of risks for policy makers. In particular, the importance of appropriate regulation of private pension funds and of careful surveillance of their performance for securing adequate retirement income need to be addressed, as the current financial and economic crisis have made adamantly clear.

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# SOCIAL SECURITY REFORMS IN COLOMBIA: STRIKING DEMOGRAPHIC AND FISCAL BALANCES

*Sergio Clavijo*[*]

*This paper analyzes the economic rationale for adopting parametric pension reforms and reforms broadening the coverage of public health care in Colombia during 1993-2008. Parametric pension reforms have focused on increasing the retirement age and moderating replacement rates. The health system reforms aimed at reaching universal coverage by 2012, while providing a more homogenous level of services. Our results indicate that the Net Present Value of the debt of the social security system in Colombia is roughly 160 per cent of GDP for pensions and about 97 per cent of GDP for the health system.*

## 1 Introduction

The literature on labor economics identifies three salient stages regarding social security developments at the global level. The first era was born in Germany in 1883, when Chancellor Bismarck had the visionary idea that initiated a compulsory savings system allowing the State to guarantee universal pension benefits.

In the second stage, this system expanded throughout Europe with minor idiosyncratic differences and even reached across the Atlantic to the United States, where several labor compensation packages were developed over the years 1901-28. With the arrival of the Great Depression in 1929-31, the desire to enlarge and secure these labor benefits grew substantially, leading to the well-known New Deal initiated in 1935-36. For enterprises, the expansion of the formal system was beneficial, as it allowed workers to receive a pension benefits package (not subject to taxes) that would help attract highly sought-after skilled labor. This was deemed preferable to an open "wage war", especially in an environment in which union affiliations had increased from 10 to nearly 30 per cent between 1930 and 1947 (Krugman, 2007, p. 35). With contribution rates initially set at low levels, the benefits of the system, for the enterprise sector, outweighed its costs.

However, with global competition reaching new heights in the 1980s and 1990s, the balance sheets of US firms were hamstrung by massive social security costs (Bernanke, 2008). This change in the competitive landscape compelled the rise of a third stage in social security development, which could well be termed the era of outsourcing and off-shoring. This stage has resulted in increasing labor informality and the loss of prized social security protection in both developed economies and the so-called emerging markets, which had attempted to replicate the successful path followed by the US in the golden period of 1935-50.

The social security path followed by many Latin America countries resembled many features of the social security history of the United States. In the specific case of Colombia, compulsory wage increases came first with the movement toward unionization (1940-50), as related by Urrutia (1969) and Bushnell (1993). Later came the establishment of pension benefits in 1967, through the

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creation of the public *Pay-as-You-Go* System (Paygo), administered by the *Instituto de los Seguros Sociales* (ISS).

However, this system quickly dissolved into a crisis as a result of low participation rates – only 23-25 per cent of the labor market contributed. In response, the government carried out Law 100 of 1993, creating a dual public-private competitive system in which new generations were given the opportunity to migrate to a "defined contribution" scheme run by the *Administradoras de Fondos de Pensiones* (AFPs). This private system mimicked several elements of the Chilean reform of the early 1980s (Clavijo, 1995).

The aforementioned Law 100 of 1993 also ambitiously set the goal of attaining universal health coverage in Colombia, based on a very complex system of cross subsidies. Paradoxically, what has taken the advanced countries more than a century to accomplish is now being pursued by Colombia in just four decades, albeit at a much higher fiscal cost.

In what follows, we analyze the economic rationale for adopting parametric pension reforms and reforms broadening the coverage of public health care in Colombia during 1993-2008. Parametric pension reforms have focused on increasing retirement age (with disappointing results) and moderating replacement rates (with a fairly good balance between acquired rights of the old-age cohorts and new demographic challenges stemming from young cohorts with longer life expectancies). The health system reforms aimed at reaching universal coverage by 2012 (currently at 86 per cent), while providing a more homogenous level of services across different social strata. The latter reflected the effects of increased "judicial activism," with potentially substantial fiscal consequences.

We use official simulations regarding the public sector financial gap stemming from current pensions arrangements and run our own simulations regarding the health system financial gap. Based on these results, we compute the Net Present Value (NPV) of the debt of the social security system in Colombia, which currently hovers around 160 per cent of GDP for pensions and about 97 per cent of GDP for the health system (over the period 2007-50).[1]

After this introduction, we focus in Section 2 on the parametric pension reforms carried out in Colombia over 1993-2008 and its fiscal effects. Section 3 is devoted to analyzing health care reforms, which have been pursued in tandem with the pension reforms. Conclusions are provided in Section 4.

## 2 Pension reforms in Colombia

We analyze pensions reforms in Colombia according to parameters related to: a) retirement age and b) replacement rates (equivalent to the ratio of pension to the wage upon which contributions were made). The first generation of such pension reforms took place during the Gaviria Administration (1990-94), as reflected in Law 100 of 1993, and the second generation reforms occurred under the first Uribe Administration (2002-06), as instituted by Laws 797 and 860 of 2003 and the Constitutional Reform of 2005.

### *2.1 Retirement age*

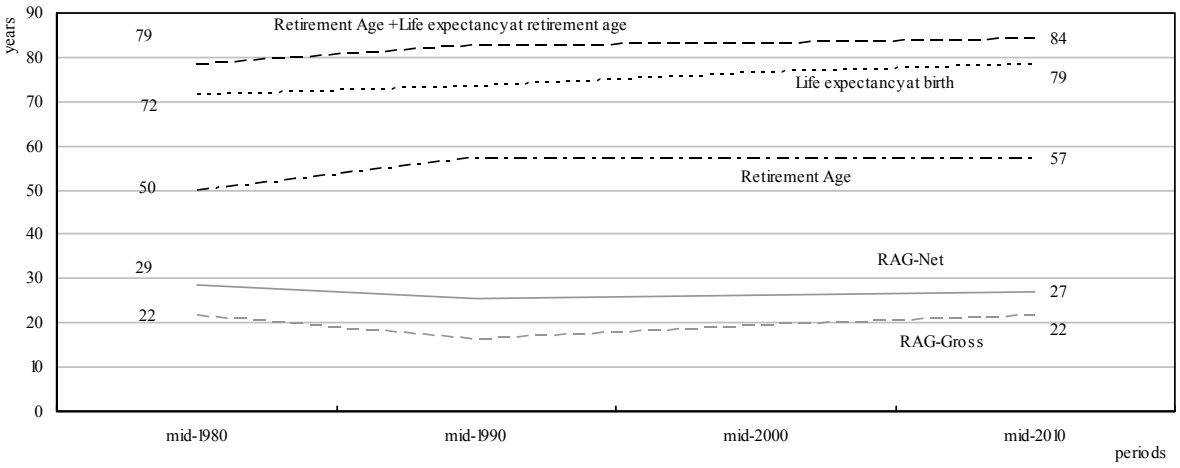
Before Law 100 of 1993, the bulk of public sector workers were covered by Law 33 of 1985

[1] All ratios to GDP used in this document are based on GDP estimates of the Colombian National Statistical Institute (DANE) before the historical revision undertaken in 2008, which resulted in upward revisions to GDP. For example, 2007 GDP is approximately 18 per cent higher under the new estimates.

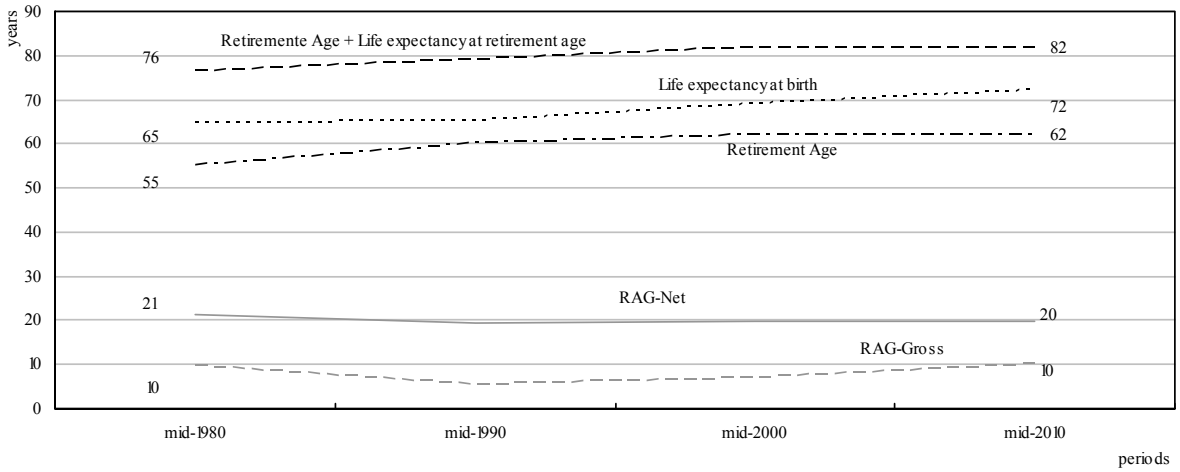
**Figure 1**

**Retirement Age Gap**

**Gross and Net (Females)**




**Gross and Net (Males)**




Source: author's computations based on data from DANE.

regarding retirement conditions in terms of time of service and age. The age of retirement was as low as 50/55 (female/male) after only 20 years of service. Private sector retirement ages were five years higher at 55/60 (female/male).

The retirement age requirements of the mid-1980s in Colombia were rather low when compared to life expectancy figures of 66 at birth or 70 when computed at the age of retirement. In this regard, it is possible to establish what we could term the Retirement Age Gap (RAG). The RAG can be computed in *gross* terms, such that RAG-Gross = Life expectancy *at birth* minus the official retirement age; and also in *net* terms, such that RAG-Net = Life expectancy *at retirement age* minus the official retirement age. The relevant concept for measuring the fiscal impact of pension subsidies is given by the RAG-Net, since it provides the time span during which pensions will be paid. The magnitude of such pension subsidies will be given by the rate of return on pensions in excess of contributions at reasonable rates of return, as discussed below.

Figure 1 depicts the path followed by the RAG-Net during the mid-1980s through the mid-1990s for females, beginning at 29 years of age and declining to 26 as retirement age increased from 50 to 57. But this reduction in the net burden of pensions evaporated as life expectancy, measured at retirement age, continued to rise while maintaining constant the retirement age at 57. Hence, the age of retirement plus life expectancy at retirement age increased from 79 to 84 over the last four decades.

In the case of males, the level of RAG-Net is lower at 21 years, although its trajectory is similar to that of females, declining later to 19 as retirement age increased from 55 to 60. But again, such fiscal relief has narrowed as the retirement age has been fixed at 62 (instead of 65, as initially proposed to Congress in 1993) and life expectancy at the age of retirement, plus the age of retirement, has continued to rise from 76 to 82.

Unless the parameter of retirement age is increased to 60/65 (female/male) in the near future, the RAG-Net will continue to expand to 29/21 (female/male), leading to the need for additional financing of pension expenditures from general tax revenues by 2015. By then, these figures on the RAG-Net would be above the levels prevalent when adopting the 1993 reform.

Given the political difficulties in adjusting these parameters of retirement age (as life expectancy increases), it would be useful to link them through a formula that aims at maintaining the RAG-Net constant and (preferably) below the historical mark of 26/19 (female/male), which is equivalent to using an approach that indexes retirement age to life expectancy, as being discussed in Hungary. In the case of Colombia, this would imply retirement ages be increased to 64/67 (female/male). This would still be below the 69 benchmark envisioned for the United States in the coming decades (see Advisory Council on Social Security, 1997; Jousten, 2007).

These parametric reforms need to be tackled decades before they become effective in order to better prepare the population for such changes and also to avoid judicial set-backs. It is worth noting, for example, that the Colombian Constitutional Court ruled unlawful article 4 of Law 860 of 2003, which sought to bring forward (to 2008) the retirement age increase (from 60 to 62) approved for 2014 under Law 100 of 1993. In this case, the Court argued that pension plan participants had "acquired rights" regarding expected retirement ages, which could not be negated.

In practice, changing key pension parameters in Colombia has required Constitutional amendments, as occurred in 2005, while fixing the date at which old-age pension parameters would cease to apply (July 31st of 2010), except for the military and teachers. For these reasons, the "transitional pension period," in which exaggerated pension benefits prevail, has extended for more than 20 years (1993-2014), instead of adopting reforms on a *pari-passu* basis from the early 1990s, as was implemented in Spain under the so-called *Pacto de Toledo*.

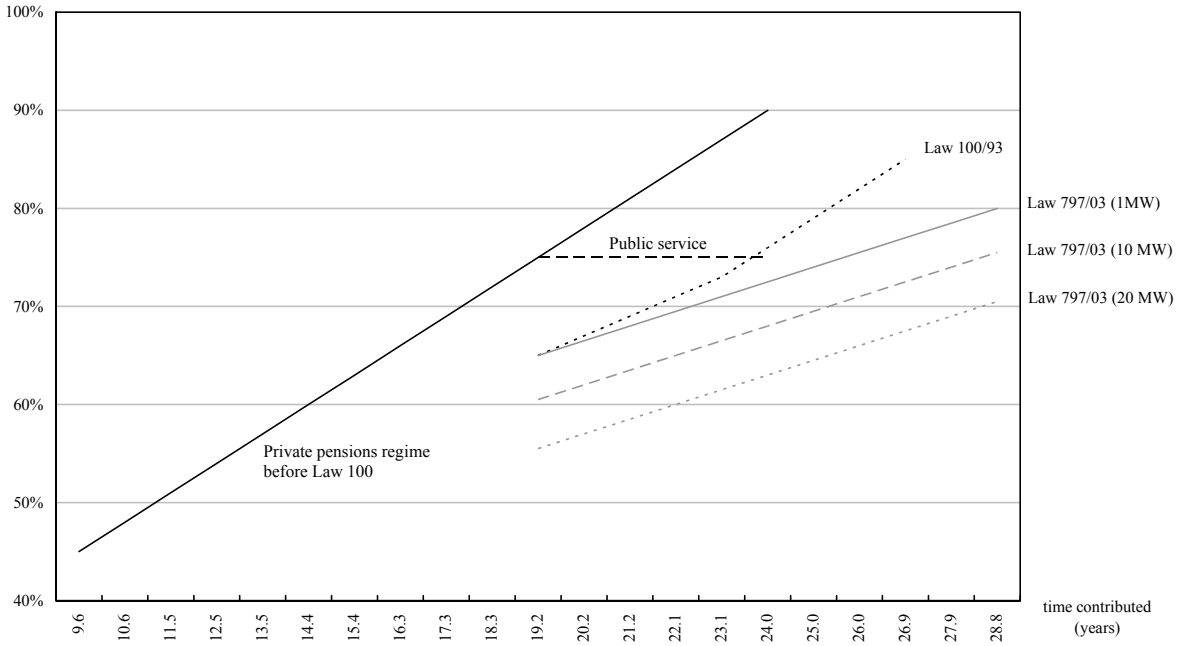
### *2.2 Replacement rates*

Replacement rates are defined as the ratio of the pension to wage earnings (upon which pension contributions were made). As it is well known, this variable is crucial for determining financial equilibrium in the paygo-system. If contributions plus (imputed) interest are enough to fund annuity payments over a determined horizon, the system will be in equilibrium. For instance, contributions of about 10 per cent of payroll over 30 years could assure a replacement rate of about 60 per cent over 20 years of pension benefits, if such savings yield a compound real rate of 6 per cent per annum.

In general, paygo-systems in Latin America have promised replacement rates above those that maintain the system's equilibrium, implying that additional taxes and/or public debt would be used to finance these outlays (Arenas and Llanes, 2006). In the case of Colombia, replacement rates

**Figure 2**

**Evolution of Replacement Rates**
*(according to Laws 100 of 1993 and 797 of 2003)*




hovered around 75-90 per cent during the 1980s and early 1990s (see Figure 2). These rates were clearly above the equilibrium for a paygo-system that allowed for easy access (with eligibility for pensions after only 10 years of contribution) and a low level of contributions (6-8 per cent of wages). Furthermore, in several cases, public employees had access to replacement rates of 100 per cent (e.g., for workers in the petroleum sector, education, or legislative branch).

By contrast, Severinson (2008) reports that average replacement rates in the OECD are close to 68 per cent, while contributions are in the range of 10-15 per cent. In the United States, the mode value of replacement rates under the paygo-system has been around 45 per cent (Advisory Council on Social Security, 1997).

Given easy conditions to qualify for a pension, the Colombian paygo-system quickly moved from a position of surplus (close to 1-2 per cent of GDP) over the 1970s-1980s into a position of deficit in the mid-2000s. Since then, the central government has been forced to use incremental tax support (from 2 per cent of GDP in 1998 up to 4.6 per cent of 2008, equivalent to one-third of tax collections) in order to comply with public pension obligations.

Aiming to contain these fiscal pressures in Colombia, Law 100 of 1993 and Law 797 of 2003 moderated replacement rates by means of increasing contributions: a) in terms of years of service (from a minimum of 10 years up to 20 years) and b) in amount (from 6-8 up to 10-12 per cent of wage earnings). Additionally, the constitutional amendment of 2005 dismantled, for newcomers, the extra-payment of about 8 per cent resulting from the so-called "Mesada 14", generalized by the constitutional court rulings over the years 1994-2004 (Clavijo, 2007).[2]

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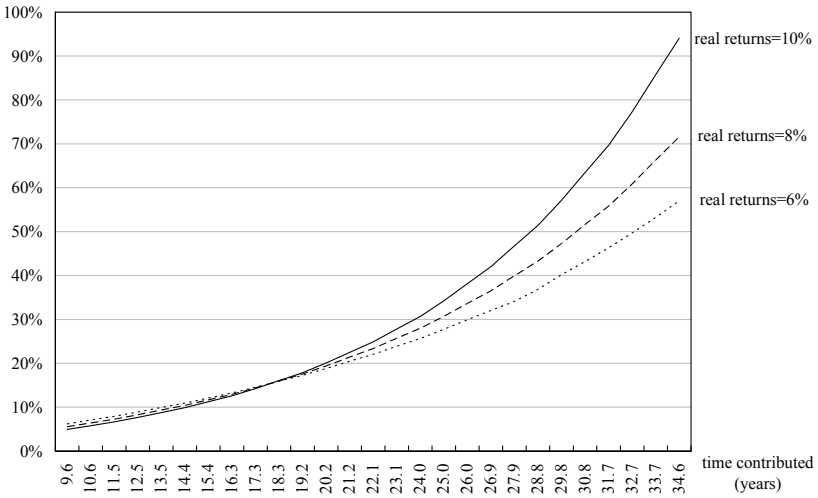
[2] Legal wages in Colombia amount to 13 monthly payments, including a one-month obligatory bonus payment. An additional monthly payment (called "Mesada 14") had been ordered by Art. 142 of Law 100 of 1993, seeking to level off wages and pensions among public workers. However, the "Mesada 14" continued to be extended to all public and private pensioners during 1994-2004. The constitutional amendment of 2005 put an end to granting "Mesada 14" for people retiring after that year.

Figure 2 depicts the change in replacement rates resulting from these reforms, which point to an average replacement rate in the range of 65-70 per cent for new pensioners starting in 2014. Here we assume that the historical low density contributions (of about 50 per cent of labor time) and low wage contributions (below 2 minimum legal wages for nearly 70 per cent of contributors) will continue to be the norm, as a result of high labor market informality. An over-regulated labor market and high payroll taxes (of about 55 per cent on behalf of the firm, including earmarked taxes) would have to be corrected in order to increase labor formality in the future, as will be discussed further.

**Figure 3**

**Expected Replacement Rates under the Private AFP's System**

*(sensitivity to portfolio's real returns)*




Source: Author's computations.

These replacement rates under the paygo system differed markedly with those of the private system instituted under Law 100 of 1993. The average return on portfolios managed through Colombian AFPs during 1995-2007 was close to 10 per cent per-year in real terms. This means that a worker contributing for 30 years (full density) could obtain replacement rates close to 60 per cent, which is about ten percentage points below the expected value under the new paygo rules (see Figure 3).

However, high informality is also affecting private sector contributions, so it is very likely that contributions would be closer to the range of 20-25 years (instead of 30-35) and that annual real returns continue to converge to 6 per cent (as has happened in Chile after 25 years under the private-accounts of the AFPs). Under this scenario, replacement rates under the AFPs would be much lower, in the range 40-50 per cent (instead of 60-70 per cent), implying an increasing gap with respect to the expected return under the reformed paygo system. Note that currently about 70 per cent of contributors are with the AFPs and 30 per cent remain with the paygo system.

Hence, even the reformed paygo system provides implicit fiscal subsidies, which could lead to a substantial burden on the fiscal accounts of Colombia if workers revert to the public system. In both systems, contributions need to improve in density (by means of increasing labor formality) and in amount (increasing the share of earnings that are channeled into the system).

In order to contain the fiscal risks owing to a possible increase in participation in the public paygo system, the Colombian government recently enacted decree 2765 of 2007. Under this decree, the public fund of financial guarantees (FOGAFIN) could provide resources to avoid (cumulative) negative real returns on any AFP account at the moment of retirement (following Art. 99 of Law 100 of 1993). Additionally, Law 797 of 2003 has limited the time period for switching between the public and private regimes to 10 years before retirement age, seeking to contain "last-minute" financial arbitrage between regimes.

Further complications among public-private system movements have emerged from disputes regarding the value of the exit-bond for high wage contributors (above 10 minimum wages) granted under Law 100 of 1993. Decree-Law 1299 of 1994 allowed the value of this bond to reach 20 minimum wages but the constitutional court (C-734 of 2005) reduced it to 10 minimum wages for those moving from the public into the private AFPs after year 2006 (T-147 of 2006). This exit-bond reduction could represent a reduction of about 20 percentage points in terms of replacement rates for those moving from the public into the private system. This means that high wage-earners are likely to remain in the public paygo system due to the double effect of secular declines in the return to private pension portfolios and the capping of exit bonds.

In this light, the rate of return on the private accounts of the AFPs needs to be improved in order to reduce the risk of reversals toward the public paygo system. The world financial crises of 2007-08 caused record-low returns on Colombian-AFP assets (now averaging –2 per cent in real terms over the last 36 months). This difficult financial juncture could exacerbate reversals toward the public system in Colombia.

The approval of the financial reform (currently under discussion in the Colombian Congress), proposing "multifunds" or generational portfolios, is key to improving long-term returns. The reforms are similar in spirit to those implemented in Chile (2002), Mexico (2005), and Peru (2005). As discussed by Conrads (2008), these generational portfolios have the potential of improving the return/risk ratios and avoiding artificial investment "ceilings" that can lead to sub-optimal allocation of portfolio assets. The nationalization of the AFPs by the government of Argentina in late 2008 represents a warning for the region about the need to strike a good balance in terms of coverage and satisfactory replacement rates in private pension systems.

### *2.3 Coverage and labor informality*

Solving the problem of low coverage of the pension system in Colombia (currently at only 25-27 per cent of the active labor force) requires simultaneous efforts on several fronts: 1) a reduction in payroll taxes and 2) restructuring the share of contributions between workers and firms. As shown by Kugler and Kugler (2008), the Colombian social security reforms have increased payroll taxes and only about one fifth of the increase in taxes has been shifted to workers as lower wages. Furthermore, they found that in Colombia a 10 per cent increase in payroll taxes reduces formal employment by between 4 and 5 per cent.

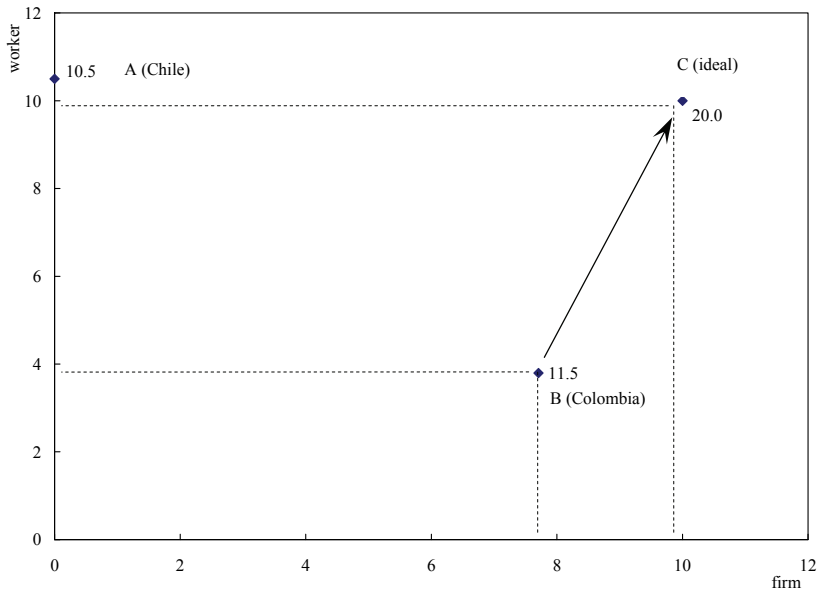
Regarding payroll taxes paid by firms, there is a need for substituting the "pure tax" components through increases in the VAT rate from 16 per cent to 17 per cent. Hence, social expenditures related to child-support programs (ICBF) and labor-training programs (*Sena*), which currently represent 3 and 2 per cent of payrolls (respectively), would be made through regular budgetary channels. The subsidy given to quasi-public entities known as *Co-Familiares* (4 per cent on payrolls) should be dismantled, taking into account that they are now able to run social programs based on their asset accumulation over the last four decades. Taken together, this would allow for a potential reduction of 9 percentage points on firm payrolls, boosting their international competitiveness without affecting key-social programs of the ICBF and *Sena* (Clavijo and Lozano, 2001; Cárdenas and Bernal, 2003).

As for options to achieve a more desirable sharing of the burden of contributions between firms and workers, it is worth highlighting that in Colombia the firms absorb nearly 66-75 per cent of social security costs. This high cost sharing is aggravating labor informality as firms avoid such labor related-costs by out-sourcing and off-shoring. The social drawback of such out-sourcing is that many self-employed workers are left out of the system of social protection, given weaknesses in enforcing mandatory participation for these workers.

While Chile totally dismantled payments on behalf of the firm in the early 1980s (which amounted to 27 per cent of the payroll), Colombia has increased them to nearly 55 per cent (of which 10 percentage points were increased during 1993-2008). Figure 4 compares the cost-sharing between firms/workers in Chile and Colombia regarding pension payments. In Chile the worker pays the entire 13.5 per cent of payroll contribution, where 10.5 per cent of payrolls (78 per cent of the total) goes into his/her account and the remaining 3 percentage points pays for insurance and administrative fees.

**Figure 4**

**Pension Contributions: Worker/Firm Share**




Source: Author's estimates.

By contrast, in Colombia low-wage workers (up to 4 minimum wages) contribute to social security with 16.5 per cent of payroll, where the firm puts up 75 per cent of such contributions. Of these contributions, only 11.5 percentage points (72 per cent) go into the private account (see Figure 4). For high wage workers, the "pure tax" component increases as the share going into the private account falls from 72 to 64 per cent.

In short, the structure of pension contributions in Colombia presents a double misalignment of incentives. Firms face high labor-related costs through their high share of social security contributions (75 per cent) and, second, through extra quasi-fiscal payments (ICBF, *Sena, Co-Familiares*) that finance nonpension social assistance benefits. Workers also face implicit taxes on their social security payments, where only 64-72 per cent of such payments go into their personal accounts, compared with the 78 per cent observed in Chile.

As mentioned earlier, it is likely that higher contributions feeding directly workers' accounts will be needed to support replacement rates above 50 per cent, especially in light of the secular decline in the rate of return on private pension portfolios. In the case of Colombia, the system should target contributions into workers' accounts of 15-20 per cent, with an even sharing of this burden between workers and firms. Furthermore, the payroll tax should not be used to finance redistributive social assistance programs, which should instead be financed out of general tax revenues.

### *2.4 Fiscal impact of pension reforms*

Pension reforms in Colombia have focused on increasing the retirement age and moderating replacement rates. Fifteen years have elapsed since Law 100 of 1993, providing an appropriate

juncture to take stock of these parametric changes, their effects on the fiscal accounts, and the remaining contingent liabilities of the pension system envisaged for the next 30-50 years.

There are two salient issues regarding social security coverage and fiscal costs in Colombia. The first issue involves the early warnings provided by Colombian economists in the mid-1990s about the forthcoming exhaustion of cash reserves of the paygo system, as younger generations migrated toward the private system of the AFPs. In fact, the public system began using general taxes to pay for pension benefits as early as 2004 (less than four decades after launching the paygo-system and two years before the predicted date). Because the system continues to involve only 25-27 per cent of the labor market, under a dual private-public regressive scheme, the central government has been forced to allocate about a third of total tax revenues (nearly 5 per cent of GDP) to cover pension benefits of a population representing just 6 per cent (about one million retirees) of the total population (43 million).

The second issue involves the computation of contingent liabilities. This entails: 1) an estimate of legal claims for higher pensions (under the paygo system); and 2) additional costs stemming from longer life expectancies, under a fixed retirement age (resulting in larger RAG-Net). The population census conducted in 2005-06 indicates that, by the year 2050, the percentage of the population over 60 years of age will have tripled to 18 per cent and years of pension benefits (per retiree) are likely to continue expanding.

The cash flows required to honor pension benefits under the paygo-system were masked by the cash reserves managed by the ISS between 1967 and 2004 (when they were exhausted). In 1996, the stock of the ISS's pension reserves peaked at 2 per cent of GDP and afterwards began to decline as pension contributions were insufficient to honor pension benefits. The lack of significant new entrants under the new paygo system (1993 onwards) and the long delay in applying parametric corrections (until 2014) has yielded an onerous fiscal transition for Colombia, where the long-term deficit of the central government hovers around 2-3 per cent of GDP.

The rest of the public sector has been unable to compensate for this fiscal strain, unlike the case of Chile. The only significant efforts amount to 0.2 per cent of GDP retained by the central government to help territorial entities pay for their own pension liabilities (under the FONPET) and the funding of pension liabilities of the public oil (ECOPETROL) and telecom sectors resulting from capitalizations and/or privatizations. Taxing pension benefits and reducing the minimum pension guarantee (from 100 to 75 per cent of the minimum wage) were also attempted during the years 2003-06, but without any success in Congress.

According to official figures of the Ministry of Finance and the Planning Department (DNP) of Colombia, pension expenditure (on a cash basis) has increased over the period 2000-08, reaching 4.6 per cent of GDP in 2008. It is likely that such pension payments will peak at 5.2 per cent of GDP by 2010 (see Figure 5). This use of about a third of total central government tax collections to honor pension benefits has burdened the fiscal accounts during the last decade.

In the meantime, most of the new pension contributions have gone to the AFPs. Their portfolios have increased from nearly 2 per cent of GDP in 1995 up to 17 per cent of GDP by end-2008, where obligatory savings stand at 14 per cent of GDP, voluntary savings at 2 per cent of GDP, and unemployment insurance-payments (*cesantias*) at 1 per cent of GDP.

Official computations indicate that the Net Present Value (NPV) of pension liabilities over the years 2007-50, under the new rules, would amount to nearly 160 per cent of 2007 GDP (see Figure 6). This figure entails a significant reduction (of about 100 per cent of GDP) with respect to the NPV of 260 per cent of GDP estimated under no pension reform (pre-Law 100 of 1993), as estimated by Echeverry *et al.* (2001) and Osorio *et al.* (2005).

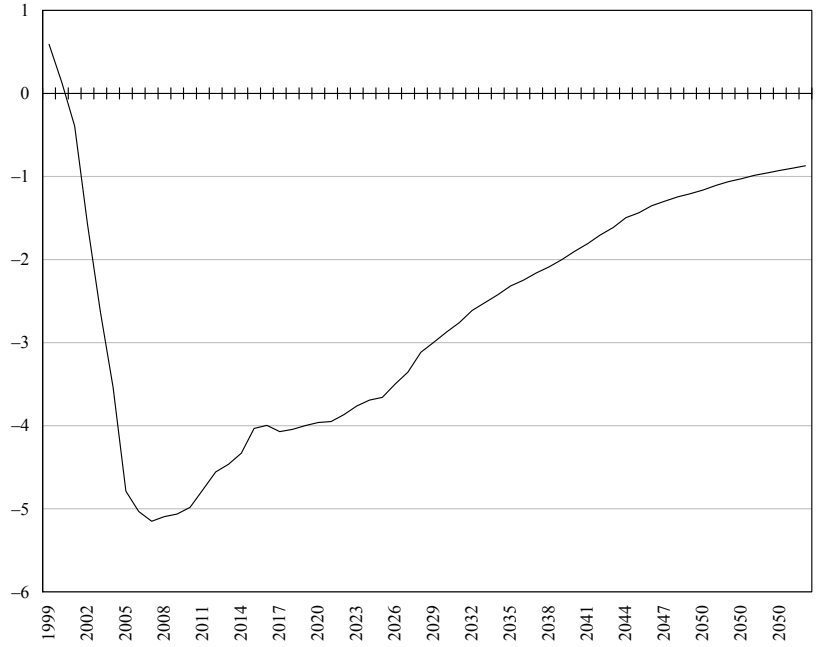
About 40 per cent of the GDP reduction in the NPV of pension liabilities can be attributed to Law 100 of 1993, which focused on reducing replacement rates and raising retirement ages. The remaining 60 per cent of the GDP reduction stems from Laws 797 and 860 of 2003, by further reducing replacement rates, and from the Constitutional reform of 2005, which forbade the use of special regimes into the future.

If the Constitutional Court had not ruled out (through C-754) bringing forward the effective year for the new pension parameters (as proposed by Art. 4 of Law 860), an additional 16 per cent of GDP could have been saved in the public accounts. The Court argued that "expectations of retirement dates" resulting from Law 100 of 1993 constituted valid "acquired rights" that could not be altered in subsequent laws. As we commented earlier, these judicial rulings make it imperative to move early when attempting to change pension parameters (retirement age and/or replacement rates), in order to avoid the risk that the courts intervene.

This reduction of about 100 per cent of

**Figure 5**

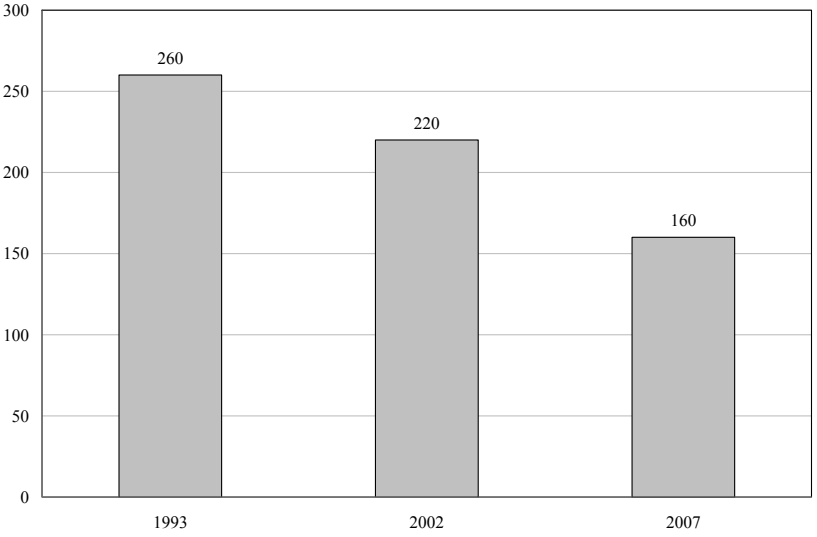
**Projected Cash Payments to Support Paygo**
*(percent of GDP)*




Source: Ministry of Finance and Department of Planning of Colombia.

**Figure 6**

**Estimated NPV of Pension Liabilities**
*(percent of GDP)*




Source: Author's estimates, based on Echeverry *et al.* (2001) and Osorio *et al.* (2005).

GDP in the NPV of fiscal obligations observed in Colombia is below the 200 per cent of GDP accomplished in Chile, where the NPV of pension liabilities was reduced from 300 to 100 per cent of GDP (Vial, 2008), as a result of a more expeditious pension transition from the paygo system into the private AFP system.

Low pension coverage (23-25 per cent of the working force) and implicit subsidies in the new paygo system rules still represent major challenges. These will need to be tackled through the reduction of payroll taxes levied on firms and increases in retirement ages as life expectancy continues to increase.

## 3 Health reforms in Colombia

### *3.1 Improving coverage and subsidies allocation: Law 100 of 1993*

Law 100 of 1993 effected fundamental changes in the organization and day-to-day functioning of the health care system in Colombia. The main objective was to achieve universal health care coverage. At the beginning of the 1990s, just 28 per cent of the population had health care coverage, mainly those in upper income groups. In general, the private sector accounted for 45 per cent of hospital admissions and about 40 per cent of medical appointments.

Before Law 100, the health system was divided in three sub-systems: 1) a social security area, in which the public-entity of the *Instituto del Seguro Social* (ISS) handled simultaneously the insurance and health services; 2) a public network consisting of a complex and inefficient regional hospital structure; and 3) a private system, expensive in per capita terms and inclusive of only the highest socioeconomic strata.

Law 100 dismantled this disjointed system and constructed a single insurance system based on "cross subsidies" between two components: the Contributive System (CS) and the Subsidized System (SS). The CS divides the health-care contributions cost, at 12.5 per cent of payrolls, between the employer (67 per cent) and the employee (33 per cent). The SS was designed for individuals who lack financial means to pay for health care contributions.

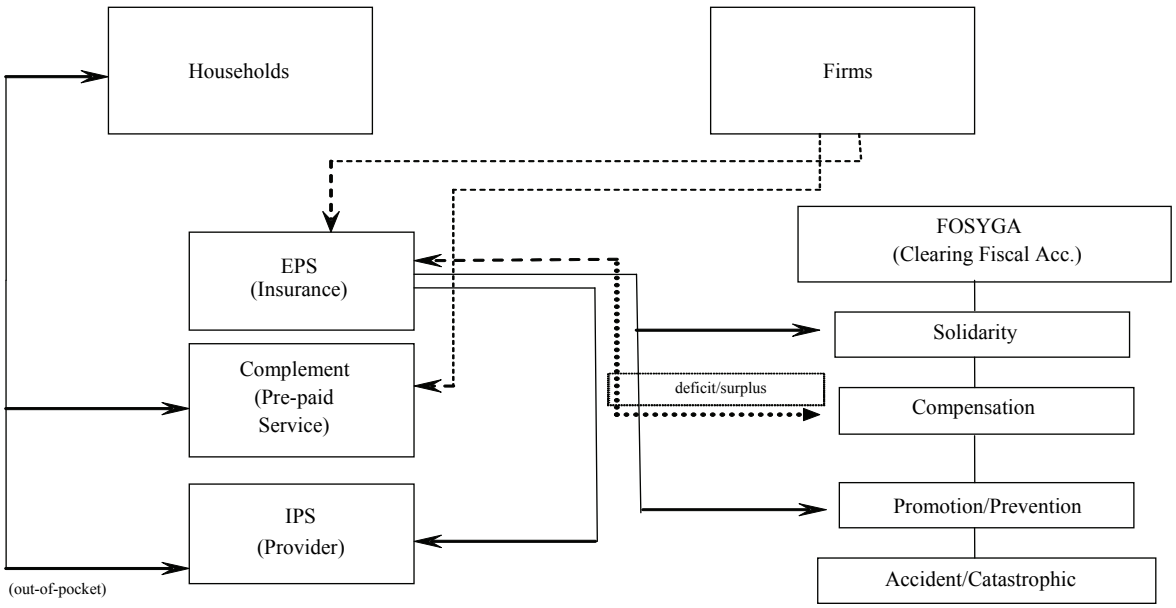
The insurance component of the health care system is based on the *Empresas Promotoras de Salud* (EPS), offering the mandatory basic health care plan known as *Plan Obligatorio de Salud* (POS). The service component is provided through the *Instituciones Prestadoras de Salud* (IPS). The EPS were permitted to create their own IPS, thereby integrating the insurance and health care services process (see Figure 7).

Fiscal decentralization in the Colombian health care system was implemented by Law 60 of 1993 and Law 715 of 2003. Each piece of legislation detailed the sources (revenue-sharing) and the uses (social expenditure) of territorial transfers. The main objective of Law 715 was to reduce volatility regarding territorial transfers, which were linked to tax collection of the central government in the previous year. About 85 per cent of such territorial transfers are earmarked for social expenditure, with 60 per cent devoted to education and 25 per cent for health services.

The *Fondo de Solidaridad y Garantía* (*Fosyga)*, a public institution affiliated with the Ministry of Social Protection, serves as the principal mechanism for distributing funds within the health system. Contributions received by the *Fosyga* through payrolls are re-allocated to each *EPS* according to the wage level of each contributor (at the notional value of the so-called *Unidad de Pago por Capitacion,* UPC) and the basic service insured under the mandatory basic health plan (POS). The remaining funds help *Fosyga* pay for the subsided component (SS). The gap between these collected funds and the expenditures of the health system are to be supplied by the central government. The POS plan differed among systems and social strata during 1993-2007, but the

**Figure 7**

**Colombia: Structure of the Health Care System**
*(Law 100 of 1993)*




Source: Author's conception, based on Clavijo (1998) and Barón (2007).

constitutional court recently ordered the harmonization of benefits (T-760 of 2008). More details can be found in Carrasquilla (2008), Clavijo and Torrente (2008), and Santa Maria and García (2008).

Law 100 also realigned subsidies from the supply-side to the demand-side. Instead of allocating resources to public hospitals, Law 100 directed these resources toward users of health care services. The idea was to stimulate competition among the providers of such services and to improve the productivity of the health sector as a whole (see Masis-Pinto, 2008). Such a transition did not occur as rapidly as hoped. At the local level, some estimates indicate that demand subsidies have only increased from 6.4 per cent to just 14.5 per cent of total subsidies during the last decade.

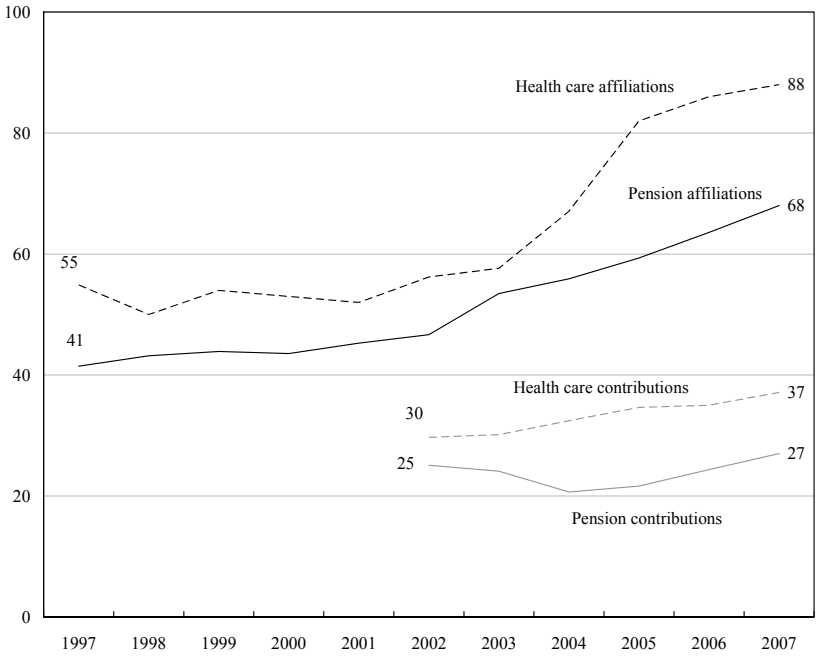
The regional public health care entities have faced difficulties in learning new billing procedures, resulting in a slow transition from the "supply" into the "demand" system. By contrast, the private sector has been relatively successful in adopting the demand-driven system and has gained efficiency through the vertical integration of health services (EPS-IPS). Vertical integration has occurred quickly, estimated currently at 50 per cent within the system. For this reason, Congress recently imposed a limit of 30 per cent on new services contracted through integrated EPS-IPS in order to promote larger competition within the health-care system, according to Law 1122 of 2007.

### *3.2 Health care results*

In Colombia, health care coverage has increased significantly, from 28 per cent of the population in the early 1990s up to 86 per cent by end-2006 (see Figure 8). The coverage of the

**Figure 8**

**Colombia Health Care and Pension Coverage**




Source: Author's computations based on MHCP, DNP, Ministry of Social Protection and Dane.

subsidized system (SS) rose from 4.8 million (12.4 per cent of the population) to nearly 20 million (46 per cent of the population), whereas coverage of the contributive system (CS) tripled from 5 million (13 per cent of the population) to almost 17 million (40 per cent of the population). Special health care programs (including the military) account for an additional coverage of 2 per cent, so total health care coverage is currently close to 88 per cent of the Colombian population.

Unfortunately, this gain in coverage has not occurred with the expected financial balance (that is, two-thirds of the resources from the contribute system (CS) and one-third from the subsidized system (SS)). The CS is currently financing only 55 per cent of the health costs, and the SS the remaining 45 per cent, including both public and private services. The public sector comprises the central government services, whose scope is being reduced under the new ISS, and the regional hospitals operated at the State level. The private sector comprises EPS-IPS services.

In fact, the ratio of workers actively contributing/labor force has increased slightly from 30 to 37 per cent during 2002-07 in the area of health services (see Figure 8). The ratio of those contributing to pensions remains ten percentage points lower at 27 per cent, given the fact that the retired continue to contribute to the health system (albeit at a reduced rate). As we will later explain, it is likely that the imbalance between the CS and SS components of the health system will be aggravated in the future as problems of labor informality persist, causing additional fiscal stress.

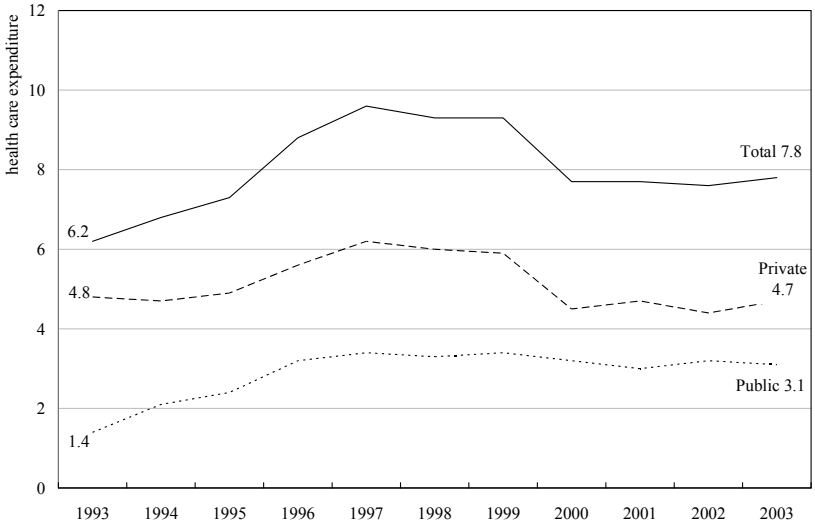
In 2003, Colombia spent the equivalent of 7.7 per cent of GDP on health care after averaging 8.5 per cent of GDP from 1998-2002. According to Baron (2007), Colombia has recently witnessed one of the most pronounced increases in health care spending, going from 6.2 to 7.7 per cent of GDP between 1993 and 2003, mainly as the result of coverage expansion (see Figure 9).

This level of health care expenditure surpasses Chile (5.9 per cent of GDP) and Mexico (5.7 per cent), countries with similar rates of health coverage. Correcting by GDP-per-capita levels, Colombia's health-care expenditure is about 36 per cent above the world average (Gottret *et al.*, 2008). Furthermore, Colombia's expenditure on health care is also above the average level observed in United Kingdom (7.3 per cent of GDP) and Japan (7.6 per cent of GDP) during 1993-2003, where quasi-universal coverage is the norm.

### 3.3 *Fiscal impact of health care reforms*

**Figure 9**

**Colombia: Health Care Spending**
*(percent of GDP)*




Source: Author's computations, based on Barón (2007).

According to Oliveira *et al.* (2006), the main drivers of health care cost can be divided between demographic factors (population growth and epidemiological profiles) and non-demographic factors (including income evolution and technological changes). In OECD countries, health care spending has increased at an annual rate of 3.6 per cent during 1981-2002, where the bulk of such changes stemmed from income factors (2.3 per cent).

In what follows, we will focus on building up a simple accounting framework that would allow us to project the possible evolution of the health-related revenues and expenditures (*i.e.*, health accounts) in Colombia. We lack information regarding epidemiological profiles (now being surveyed by the Ministry of Protection) or technological changes affecting the health-care sector of Colombia, precluding analysis in these areas, as done, for example, by Weisbrod (1991). For these reasons, we will concentrate on changes produced by population growth, income, labor participation rates, and labor formality rates.

We will first take stock of the overall situation back in 2006 and compute the (implicit) fiscal imbalance. We will then make some projections of the health accounts over the years 2007-50, where a key variable will be the evolution of labor formality, which drives the health-care contributions into the contributory system (CS). Finally, we will compute the NPV of such health-care public obligations.

In 2006, the total population of Colombia is estimated at 43 million. The rate of population expansion has been decelerating 1.5-1.85 per cent per-year between 1987-93 down to 1.25-1.5 per cent over the period 1993-2006. In this light, it is reasonable to assume that population growth will continue to decelerate, and reach about 1 per cent per-annum in 2020-50 (see Table 1).

In 2006, the ratio of the working age population (WAP) to total population was about 78 per cent, and the ratio employed/WAP was 53 per cent in Colombia. Both ratios have been stable over time. However, the open unemployment figure has been very volatile, increasing from a long-term average of 10.5 to 14-16 per cent in the crisis years of 1998-2002. More recently, unemployment has been reduced to an average of 11 per cent over 2007-08. All these demographic and labor variables play a role in determining the ratio of workers actively contributing to health care as a percentage of the labor force, currently at 37 per cent.

As noted above, Law 100 of 1993 ended up placing the burden of the health system on public resources, given the high labor informality and the small share of the population

**Table 1**

**Colombia: Population, Labor and Health Care Coverage Projections**
*(millions of people)*

| | 2006 | 2020 | 2050 |
|---|---|---|---|
| Total population | 43.2 | 50.8 | 68.5 |
| Working age population (78 per cent) | 33.8 | 39.6 | 53.4 |
| Employed population | 17.9 | 21.0 | 28.3 |
| Subsidized system members | 20.1 | 26.8 | 34.3 |
| Contributive system members | 17.0 | 21.3 | 32.6 |

Source: Author's computations, based on Dane.

participating in the contributory system. The fiscal burden will increase if the government's objective of universal coverage by 2012 is realized. For purposes of the analysis, we assume that the government's objective is achieved by 2011 and that the balance between the SS and the CS regime will be determined by the intensity of labor reforms leading to an increase in the ratio of active contributors as a share of the labor force.

Health care coverage will be determined by the family density of each contributor, at the ratio of 2.26 persons per contributor (the average of the last five years). The CS component would be in equilibrium if the per-capita cost (UPC), recognized by the *Fosyga* to the EPS, happens to cover for all health services claimed by family coverage. Notice that the ratio of an UPC-cost should be enough to pay for the average cost of each family, at the ratio of 1-UPC for each 2.26 persons per family.

### *3.3.1 Sources and uses of the health care system*

We have classified CS contributors in three wage earning ranges: high, medium, and low. The average wage of the high-wage contributors is equivalent to 12 times the Legal Minimum Wage (LMW) and represents 1 per cent of total contributors. The medium-wage contributors earn on average 6 times the LMW and represent 12 per cent of the total. Finally, the low-wage contributors have an average wage twice the LMW and represent 87 per cent of total contributors.

The system's expenditures consist of: 1) the mandatory basic health plan (POS) and 2) out-of-pocket expenses. We will assume that the cost of the POS will remain in line with the share recognized by the *Fosyga* to the EPS through the CS-UPC value, which equaled $408,000 in 2006 (or US$203 per beneficiary). The demand subsidies are divided between: a) full subsidies (91 per cent of the SS population is affiliated through this modality); and b) partial subsidies (9 per cent of the SS population). The *UPC* value of the full subsidy represents 4.4 per cent of the annual LMW.

Supplementary health care expenditures are represented by out-of-pocket spending, representing 1.3 per cent of the annual LMW for high-wage workers, 2.4 per cent for medium, and 1.6 per cent for low-wage workers, according to data obtained from the 2001 household survey. Studies for the OECD countries (Severinson, 2008) suggest an income elasticity of health care expenditures slightly above one. Hence, we will assume a unit income elasticity for out-of-pocket

health care spending in our simulations. For the SS component, out-of-pocket health care expenditures were approximated by historical data.

One particular item that is difficult to forecast is supply-driven subsidies, since they occur on a discretional basis. We assume that the government maintains its current rate of capital contributions to public hospitals and state health enterprises, representing about $100,000 (or US$50) per member attended through the ISS (now launched as a New-IPS in association with several quasi-public entities, known as *Co-Familiares*).

For the purposes of this study, we will focus on the "compensation account" of the *Fosyga*, while maintaining relatively constant the other three accounts (Solidarity, Accident/Catastrophes, and Promotion-Prevention, at 0.4 per cent of the UPC value). The budgetary support for populations displaced by violence is here included as a supply-side subsidy administered through the *Fosyga*.

The fiscal costs of lawsuits presently compose a substantial fraction of health care obligations borne by the State (through the *Fosyga*). Preliminary data suggest that nine of every ten lawsuits are resolved in favor of the patient, so *Fosyga* must reimburse the EPS out of the national budget. Following the creation of a technical health board to resolve judicial disputes between the EPS and the *Fosyga* (Law 1122 of 2007), the Constitutional Court ordered the EPS to fully implement the recommendations of this board when requiring reimbursement for expenses that were not covered under the health plans (ruling C-463 of 2008).

Taking into account the evolution of both nondemographic and demographic factors, we have constructed three scenarios where the key policy variables are the government's coverage goal and the ratio of active contributors/employed. The baseline scenario assumes: 1) population growth beginning at 1.18 per cent per-year during 2006-10 and ending at 1 per cent per-year over 2020-50); 2) health coverage increasing from 86 to 98 per cent of the population; and 3) the contributors/employed ratio increasing from 40 to 50 per cent.

We use the historical correlation between GDP per capita and labor formality over 1979-2003 in order to establish a "target-level" for labor formality in Colombia under different scenarios. Figure 10 shows the results for the cases of Argentina, Brazil, Chile, and Mexico. Depending on the real rate of growth of GDP per-capita and the magnitude of labor reforms (previously discussed), Colombia could increase the Contributors/Employed ratio from 40 (currently) to 60 per cent between 2009 and 2050.

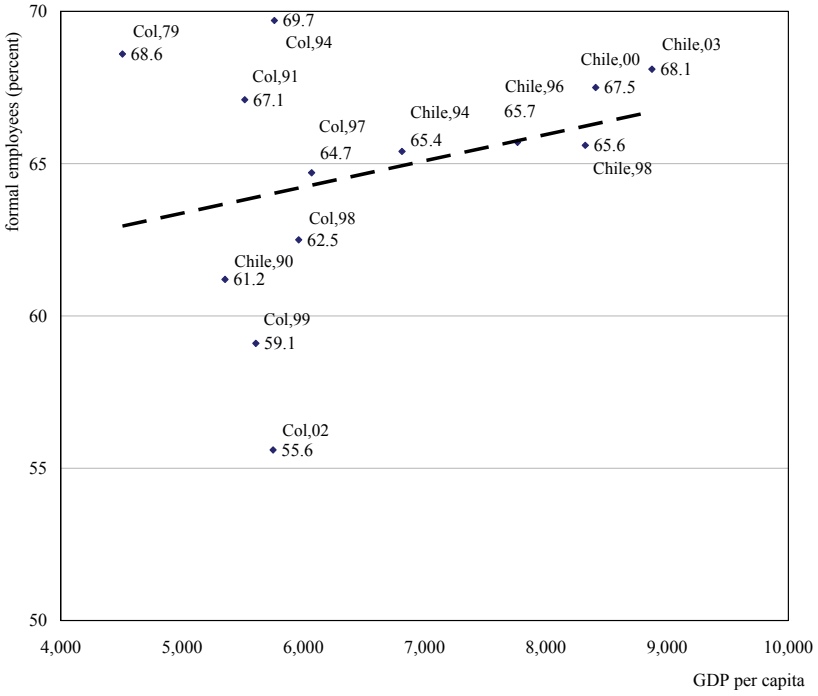
### *3.3.2 The fiscal impact of the health care sector in 2006 (base-year)*

The baseline estimation corresponds to 2006. The revenue and expenditure balance (CS+SS) shows a deficit of 1.9 per cent of GDP, with a small surplus for the CS and large deficit for the SS. The high- and medium-wage groups of the CS come out in relative equilibrium, but for low-wage workers, the system has a large deficit.

The private sector produced a slight surplus (0.1 per cent of GDP) in 2006. By contrast, the public sector recorded a significant deficit (2.2 per cent of GDP). In revenue terms, the public sector makes contributions on behalf of one million employees (6 per cent of all employed workers). These contributions, in turn, are divided between regional employees (5 per cent) and central government employees (95 per cent), with the latter including teachers and police. The SS demand subsidies are funded by either the specific regional institution or through the Fosyga. At present, regional or local authorities contribute 15 per cent of the partial subsidy and 60 per cent of the full subsidy, with the remainder funded by the Fosyga (central government).

**Figure 10**

**GDP Per Capita and Labor Formality Correlation**
*(US$, purchasing power parity)*




Source: ECLAC (2007).

In summary, our computations indicate that the health care sector in Colombia produced a deficit close to 2.1 per cent of GDP in 2006. In that year, the fiscal deficit of the entral government was 4.4 per cent of GDP, although the consolidated fiscal deficit was close to 1 per cent of GDP.

### *3.3.3 Baseline scenario: improved labor formality*

Using our estimations of the health accounts of year 2006 as a foundation, we simulated changes in labor formality that could improve the fiscal accounts by means of increasing the contributive component in relative terms. Under the baseline scenario (gradual increase in the contributors/employed ratio from 40 to 50 per cent), we find that the public health care deficit increases from 2.1 per cent of GDP in 2006 to a peak of 4.3 per cent in 2038. Thereafter, the deficit stabilizes in the range of 3.0-3.5 per cent of GDP through 2050 (see Table 2 and Figure 11).

Three important phases over the period 2006-50 can be identified. The first phase, covering 2006-10, is characterized by coverage expansion, responsible for the fiscal deficit deterioration from 2.1 to 2.8 per cent of GDP. In this stage, the government's ambitious coverage goal (4.7 million additional affiliates to the SS for a total of 24.8 million and 0.5 million to the CS for a total of 17.8 million) overwhelms earnings contributions growth (0.7 per cent of GDP in the four-year period).

The second phase relates to the interval 2010-35, in which a steady deterioration in fiscal performance is projected, attributed mainly to demographic factors. The health care deficit would rise from 2.8 per cent of GDP to a maximum of 3.8 per cent of GDP. This rise in the deficit is explained by the estimated growth in the affiliated population, predicted to jump from 42.6 million (92 per cent of population) to 56.7 million (96 per cent of population), although total population growth is assumed to slow down from 1.1 to 1 per cent. On the revenue side, the relationship contributors/employed continues to increase from 40 to 47 per cent, improving contributions marginally.

Finally, in the years 2036-50, the health deficit declines from 3.8 to 2 per cent of GDP. This is explained by the increase in contributors as labor formality helps the ratio contributors/employed to further increase from 47 to 50 per cent. This "U"-shaped health care deficit trajectory is driven

**Table 2**

**Health Care and Fiscal Cost Projections**

| | Improved Formality | | | Status-quo Formality | | High Formality Improvement | |
|---|---|---|---|---|---|---|---|
| | 2006 | 2020 | 2050 | 2020 | 2050 | 2020 | 2050 |
| CS contributors/Employed *(percent)* | 40 | 44 | 50 | 40 | 40 | 47 | 60 |
| *(millions)* | 7.4 | 9.2 | 14.2 | 8.4 | 11.3 | 9.8 | 16.7 |
| Health coverage *(percent)* | 86 | 95 | 98 | 95 | 98 | 95 | 100 |
| *(millions)* | 37.1 | 48.1 | 67.1 | 48.1 | 67.1 | 48.1 | 68.2 |
| Health Care sector deficit *(percent of GDP)* | –2.1 | –3.3 | –1.8 | –3.8 | –6.8 | –3.1 | +1.9 |

Source: Author's computations.

by a better balance between the CS and SS. Indeed, as the population and labor formality grow – and the contributors/employed ratio increases from 40 to 50 per cent – the fiscal deficit declines. However, our model suggests this increase is still insufficient to compensate for health care coverage expansion, resulting in a "structural health care" deficit of nearly 2 per cent of GDP by year 2050.

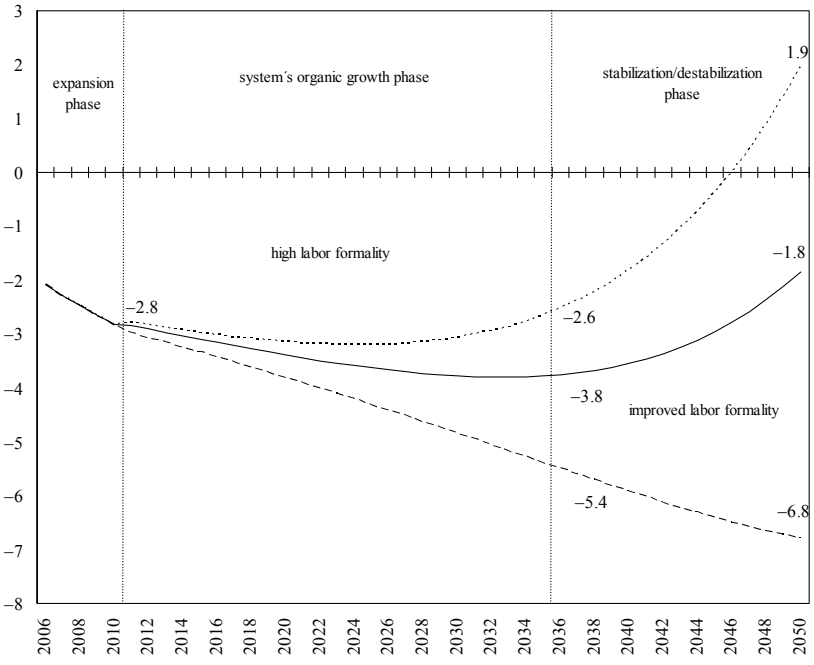
*3.3.4 Scenario 2: status quo in labor formality*

Under this scenario, we shall assume that the ratio contributors/employed will remain constant at 40 per cent, implying no significant labor and/or payrolls reforms. This means a potential loss of about 3 million new contributors with respect to the previous scenario, where labor formality induced an increase in the contributors/employed ratio from 40 to 50 per cent (see Table 2).

Under this scenario there is a significant fiscal deterioration as a larger

**Figure 11**

**Health Care and Fiscal Cost Projections**
*(trend over 2006-50, percent of GDP)*




Author's estimates.

share of the population moves to the SS (increasing from 55 to 62 per cent). By year 2020, the fiscal deficit of the health care system would reach 3.8 per cent of GDP, about ½ per cent of GDP higher than the baseline scenario, and by year 2050 would reach 6.8 per cent of GDP, almost 5 percentage points of GDP above the baseline scenario (see Figure 11).

### *3.3.5 Scenario 3: high labor formality improvement*

This scenario assumes a ratio contributors/employed increasing from 40 to 60 per cent over 2006-50, as a result of significant reforms leading to greater labor flexibility and a reduction of payroll taxes on firms (as previously discussed). This means adding about 2.5 million contributors with respect to the baseline scenario (see Table 2). As a result, the CS component would increase to 45 to 56 per cent and the SS component would decrease in tandem from 55 to 44 per cent, implying better compliance with respect to the original scheme envisioned under Law 100 of 1993.

Under these conditions, the health care deficit would peak at 3.2 per cent of GDP by 2024, about ½ per cent of GDP below the baseline scenario By 2034, the health care deficit would have eased to 2.6 per cent of GDP (even before ending the "growth phase") and by 2050, the system could reach a surplus of about 1.9 per cent of GDP as a result of increasing the CS to 56 per cent and containing the SS at 44 per cent (see Figure 11). The recent progress achieved through better surveillance systems (known as PILA), preventing evasion/elusion of health-pension contributions, speaks well of the potential to be gained if labor and payroll reforms provide the appropriate incentives for compliance.

### *3.3.6 Health care liabilities: estimating the NPV over 2006-50*

We now turn to estimating the Net Present Value (NPV) of the fiscal obligations projected above, where we will concentrate on the baseline scenario over the years 2006-50. The first scenario considers a discount interest rate of 4 per cent per year, resulting in an amount of (net) fiscal obligations equivalent to 97 per cent of GDP (see Table 3). The private sector shows a surplus of 35 per cent of GDP. Adding the public sector deficit and the private sector surplus yields a health care sector NPV equivalent to a deficit of 61.4 per cent of GDP.

When calculating the health care system's NPV using a 5 per cent long-term discount interest rate, the net public obligation amounts to about 80 per cent of GDP. This is about 17 percentage points of GDP less than the one obtained with the 4 per cent discount rate.

Of interest at this point is a comparison of these health care liabilities with the pension system, and an assessment of the total fiscal burden over the 2006-50 period As indicated earlier, the NPV of pension obligations is about 160 per cent of GDP, compared with health obligations of about 97 per cent of GDP (discounted at the rate of 4 per cent per year). These liabilities are quite sizable, but lower than those in some industrial countries. Follette and Sheiner (2008) have calculated that the contingent liability of Medicare in the United States (excluding Medicaid), amounts to 90 per cent of GDP. When including Medicaid, the liability increases to 259 per cent of GDP (see Figure 12). The NPV of pension obligations in the United States has been estimated at 117 per cent of GDP. This means that the ratio of pensions/health obligations is about 1.3 times in the United States if excluding Medicaid. This ratio, however, is 0.45 when including Medicaid costs, meaning that it is more costly to honor jointly Medicare and Medicaid obligations than public pensions in the United States.

**Table 3**

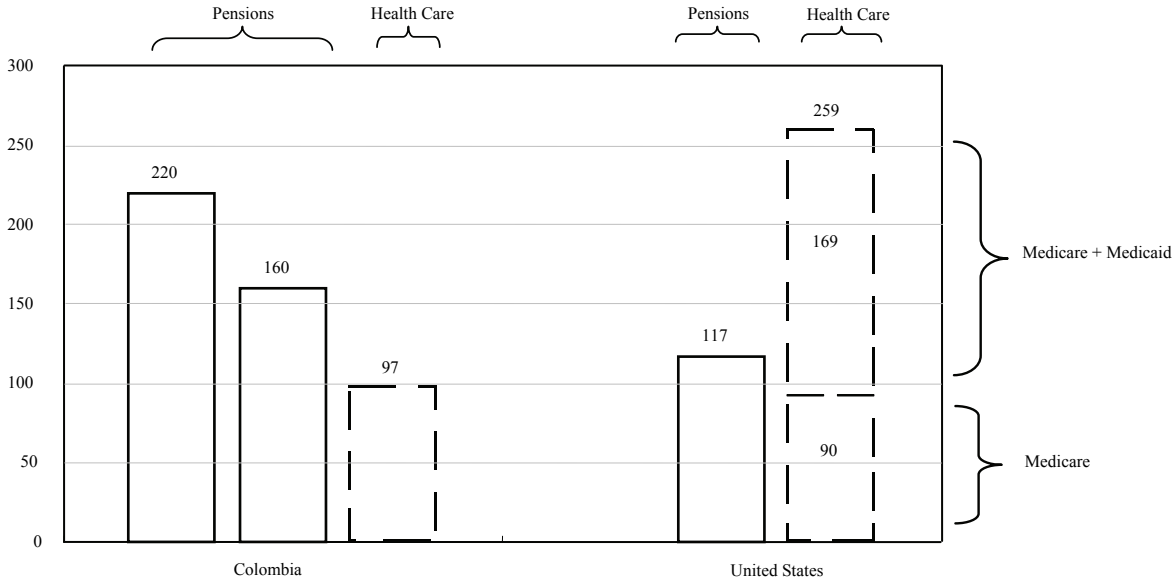
**Health Care NPV by Type of Obligation**
*(percent of GDP of 2007; surplus (+) or deficit (–))*

| | Discounted at Interest Rate of: | |
|---|---|---|
| | ***i*=4.0%** | ***i*=5.0%** |
| Gross public spending | –107.0 | –90.5 |
| Net public duties (deficit) | –96.9 | –80.1 |
| Net private spending (surplus) | +35.5 | +27.2 |
| Total balance (public+private) | –61.4 | –52.8 |

Source: Author's computations.

**Figure 12**

**A Comparison of the NPV of Social Security Public Liabilities of Colombia and the United States**
*(percent of GDP)*




Source: Follette and Sheiner (2008), Echeverry *et al.* (2001), Osorio *et al.* (2005), and author's computations.

## 4 Conclusions

We have analyzed how Colombia underwent first generation pension reform (Law 100 of 1993), in which a dual public-private system was instituted, and also second generation pension reforms (Laws 797 and 860 of 2003), focusing on parametric corrections that aimed at reducing the fiscal costs of a prolonged "transitional-period". As a result of such reforms, the NPV of pension liabilities (projected over 2007-50) has been reduced from 260 per cent of GDP to 160 per cent of (2007) GDP.

However, low pension coverage (23-25 per cent of the working force) and implicit subsidies in the new paygo system rules still represent big challenges ahead. These need to be tackled through the reduction of payroll taxes levied on firms and increases in retirement age as life expectancy continues to increase. Continued reform of the pension system is thus a key challenge for Colombia in achieving fiscal sustainability.

Regarding the health system, we found that under the baseline scenario (with a gradual increase in the contributors/employed ratio from 40 to 50 per cent), the public health care deficit would increase from 2.1 per cent of GDP in 2006 and peak at 4.3 per cent of GDP by 2038. Thereafter, this deficit would decline and stabilize in the range of 3.0-3.5 per cent of GDP through 2050. The NPV under this scenario would yield (net) fiscal obligations equivalent to 97 per cent of GDP over the period 2007-50. Under a more optimistic scenario of significant labor reforms, the ratio of contributors/employed could be increased from 40 to 60 per cent over 2006-50, resulting in an addition of about 2.5 million contributors with respect to the baseline scenario. As a result, the CS component would increase from 45 to 56 per cent and the SS component would decrease in tandem from 55 to 44 per cent.

A comparison between the pension obligations of 160 per cent of GDP and the health obligations of about 97 per cent of GDP means pension obligations are about 1.7 times more costly to honor than health obligations in Colombia. However, health obligations are likely to increase significantly if labor informality problems are not tackled in the near future as a way to improve contributions. Looking forward, additional research could incorporate the potential impact of epidemiological profiles and technological changes over the health care system as information becomes available in the near future.

The results of this paper underscore that labor market reforms can have important effects on the fiscal accounts, through their impact on contributions in formal pension and health systems. Thus, moving forward on labor market reforms could provide a welcome boost not only to Colombia's growth and labor market flexibility, but also strengthen the fiscal accounts over the longer term.

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# THE REFORM OF THE PORTUGUESE PUBLIC EMPLOYEES' PENSION SYSTEM: REASONS AND RESULTS

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*In the context of the ageing population and with the Portuguese public social security system reaching maturity, pension expenditure recorded a marked upwards trend in the last decade, jeopardizing the system's long-term viability. This paper illustrates how the recent reforms in the social security system, in particular in the case of the public employees pension system, are expected to contribute to its financial sustainability and, hence, to the country's overall public finance sustainability. In addition, the potential distributive impact of the new rule on pensions indexation is analysed.*

## Introduction

Ensuring long-term sustainability of public finances has steadily become a main political priority in most developed countries. Both technological progress and lower fertility rates have increased the ratio of dependants to contributor, while tight budgetary constraints and additional pressure to increase spending in areas such as health care, have compelled public authorities in many developed countries to reform their social security systems.

In Portugal, the scenario was even more acute given the generosity of the overall pension regime, but in particular of the public employees' pension system. Until 2005, public employees hired until 1993 were entitled to keep their last wage after they retired as long as they had at least 36 years of contributive payments, and furthermore, pensions were *de facto* indexed to the evolution of public wages, causing pension levels to also increase over the years. When an increasing number of public employees entitled to full pension started retiring, the pressure on the system became unbearable.

Therefore, in 2005, a further convergence of the public employees' pension scheme with the private sector's one occurred and, in 2006, a major overhaul of the system was imposed and an agreement was reached based on new rules for the calculation of pensions and for their indexation over time. In particular, a sustainability factor was established such that the calculation of the pension dynamically reflected changes in life expectancy, while the yearly update of pensions became indexed to consumer inflation, depending on the GDP growth and the value of the pension.

In this context, the purpose of this paper is twofold. First, we analyse the impact of this set of changes on the system's sustainability, focusing most closely on the most significant changes; second, we measure the potential distributive impact of the new indexation rule. The paper proceeds as follows. In the following section, we describe the evolution of the Portuguese social security system since its inception, both in terms of its major institutional changes and its financial commitments; next, we evaluate demographic trends and their implications on pension expenditure; in Section 3 we discuss the situation of the pension system before the 2006 reform and in Section 4 we analyse the impact on public spending of the reform. We conclude by discussing our main findings.

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## 1 A historical perspective

The public employees' pension scheme was the first far-reaching system of social protection in Portugal. Until the inception of *Caixa Geral de Aposentações* (CGA), in 1929, only feeble attempts of social protection for few occupational groups had been made, based on the Bismarck's seminal social protection system, as in most other European countries. In the '30s, the public employees' pension scheme was extended to the descendants and spouses (survivors' pensions) and a general framework of social protection for the private sector workers, financed on a funded basis, was defined.

As in other European countries, during the '60s and '70s, the Portuguese social security systems progressively became universal and financed on a pay-as-you-go (PAYG) basis. In 1972, the public employees' retirement regime turned into an integrated legal framework, the so-called *Estatuto da Aposentação*, which provided a wider coverage of the scheme to all general government subsectors' employees and stipulated generous conditions to retirement: i) the old-age full pension was granted to beneficiaries who were 60 years old and after 40 years of contribution to the scheme; ii) the pension value was identical to the last net wage (or the last ten years average if higher); and iii) the pensions' updates followed, in general, the public sector wage growth. The system became financed by the employees' contributions (6 per cent of gross earnings), employers' contributions and State transfers. In 1979, the system became even more generous by only requiring 36 years of contribution to give entitlement to a full pension.

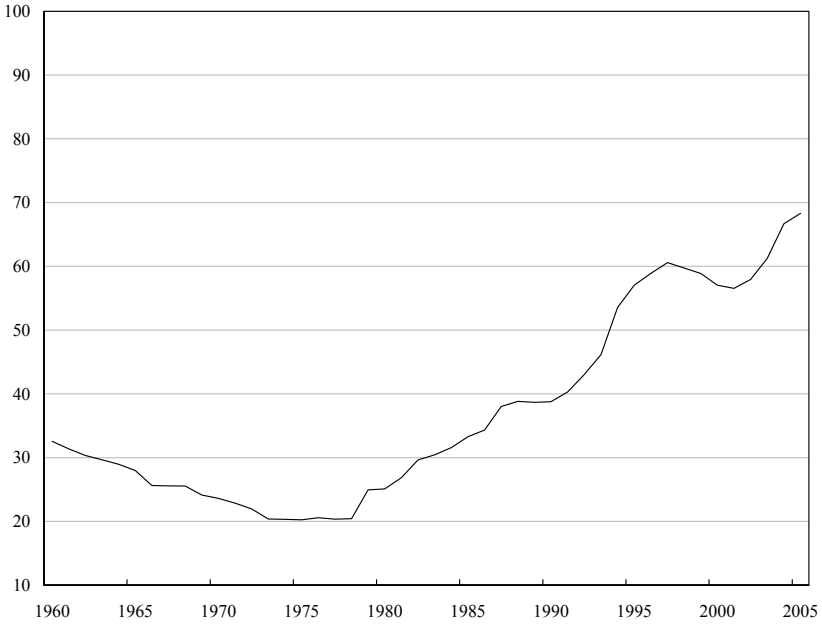
As regards the private sector social security scheme, it was enlarged in the '70s to agricultural workers, the self-employed and homemakers. A social pension for those above 65 years old and a 13$^{th}$ month of a pension were also given to retirees. Nevertheless, in 1984, when the first Social Security Framework Law was published, the pension system for private sector employees was less generous than the public employees' one: the legal retirement age was 65 for men and 62 for women, the reference earnings to the pension value were the average of the best ten out of the last fifteen years and the pensions' updates took into account inflation prospects. The financing system was also redefined with the contributive regime financed by employees and employers contributions and the non-contributive regime financed by State transfers. In 1986, the standard contributory rate for the general scheme of social security was fixed at 35 per cent (of which 11 per cent was relative to employees contributions), while in the case of public employees their contributory rate was 8 per cent (6.5 per cent for old-age and disability pensions and 1.5 per cent for survivors pensions).

Given the growth of pension expenditure compared to contributions revenue in the '80s, a result of the maturing process of the social security systems and the ageing of the population, the first reforms in both public pension schemes in Portugal occurred in the '90s, in the context of stricter budgetary discipline (Figure 1). In 1993, the *Estatuto da Aposentação* was revised and new public employees (*i.e.,* those hired from September 1993 on) started having the same pension scheme rules than the ones of the private sector. In the following year, the contributory rate of public employees rose to 10 per cent (7.5 per cent for old-age and 2.5 per cent for survivors pensions), converging to the Social Security rates.

The Social Security general regime was also revised in 1993, by increasing the legal retirement age for women to 65 years (the same as that of men) and rising the minimum entitlement contributory period from ten to fifteen years. The employers' contributory rate also rose to 24.5 per cent. In 1995, this rate was reduced by 0.75 percentage points but the Social Security benefited from the 1 per cent increase of the VAT standard rate that was assigned to this system.

**Figure 1**

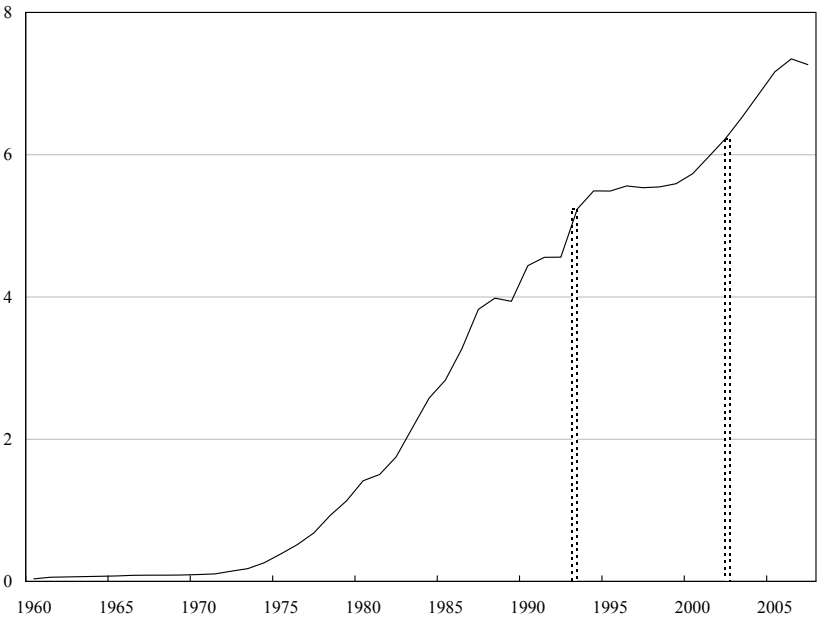
**Number of Pensions over Contributors – CGA**
*(percent)*




Source: CGA.

**Figure 2**

**Pension Expenditure – Social Security**
*(percent of GDP)*




Source: MTSS.

From 2000 to 2005, further measures were taken to improve the financial sustainability of the public pension systems. In the context of the first waves of retirement of the individuals with full contributive career and, hence, entitled to higher pensions, the public pension expenditure increased significantly in spite of a not so marked growth in the number of Social Security's pensions (Figures 2 and 3).

As to the CGA system, this trend was strengthened by the retirement of a large number of public employees that were hired after the 1974 Revolution and by the fact that public employees' scheme was still relatively more generous than the Social Security scheme (Figure 4). The need for reforms to the public pension systems was felt in several European countries, where the pension systems financed on a PAYG basis were reaching maturity when the large number of "baby boomers" was retiring and because of the ageing population.

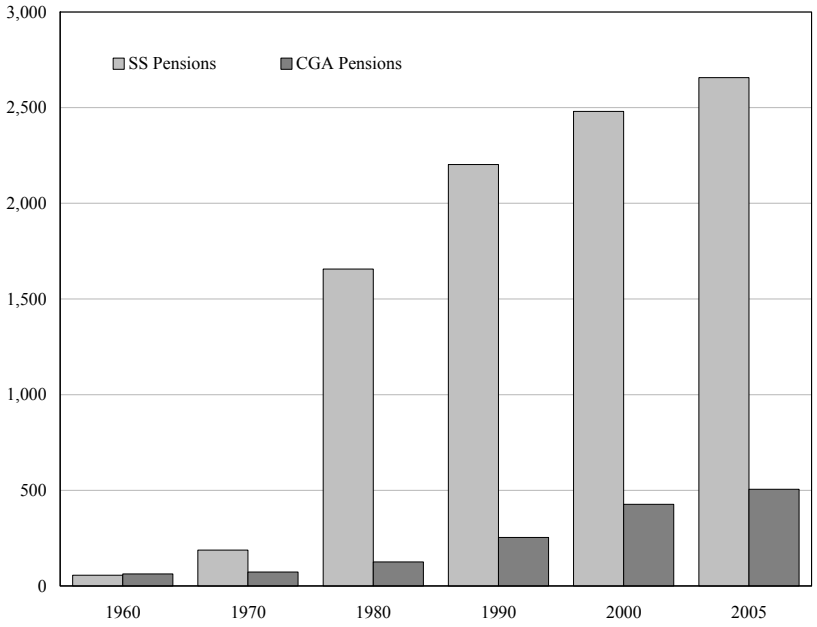
In this context, a new Framework Law for Social Security was established in 2002, which revised the rules for the pension value. These rules took into

account the complete contributive career, but raised the accrual rate from 2 to 2.3 per cent, depending on the reference earnings. However, these rules would apply only from 2017 onwards with a transitory period until 2042, while other measures, like the convergence of earnings-related minimum pensions to national minimum wage until 2006, put immediate pressure on public pension expenditure. In 2005, a second revision of the *Estatuto da Aposentação* occurred aiming at a further convergence of the CGA and the Social Security pension regimes. From 2006 onwards, new public employees were enrolled in the Social Security system, and it was defined by a progressive increase (at a pace of 6 months per year) in the legal retirement age of all public employees to 65 years old in 2015 and in the complete career length to 40 years in 2013. In addition, the pension formula of public employees enrolled in CGA until August 1993 would also converge to the one of private sector workers.

Nevertheless, these reforms proved to be insufficient to ensure the financial sustainability of

**Figure 3**

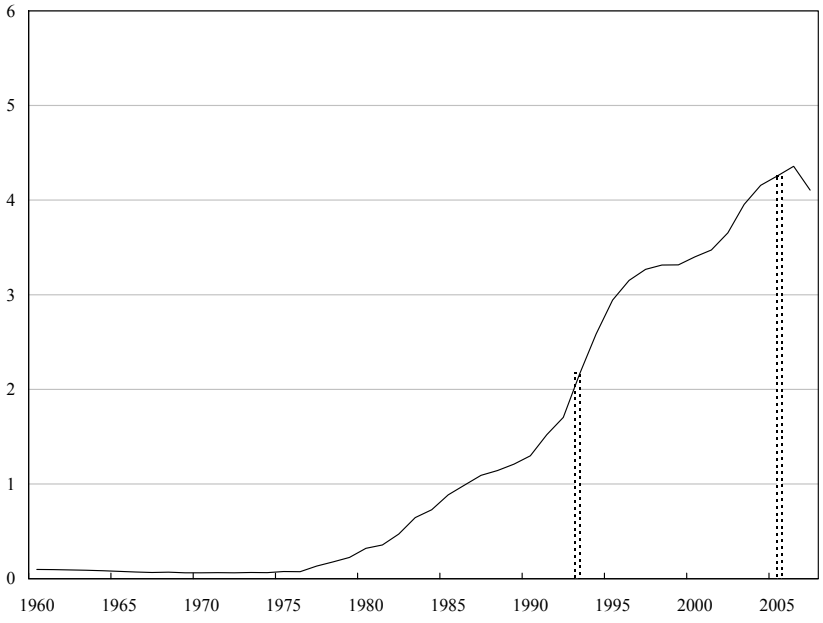
**Number of Pensions (Social Security and CGA)**
*(10^3)*




Source: CGA and Ministry of Labour and Social Security (MTSS).

**Figure 4**

**Pension Expenditure – CGA**
*(percent of GDP)*




Source: CGA.

**Table 1**

**The Evolution of the Portuguese Public Pension System**

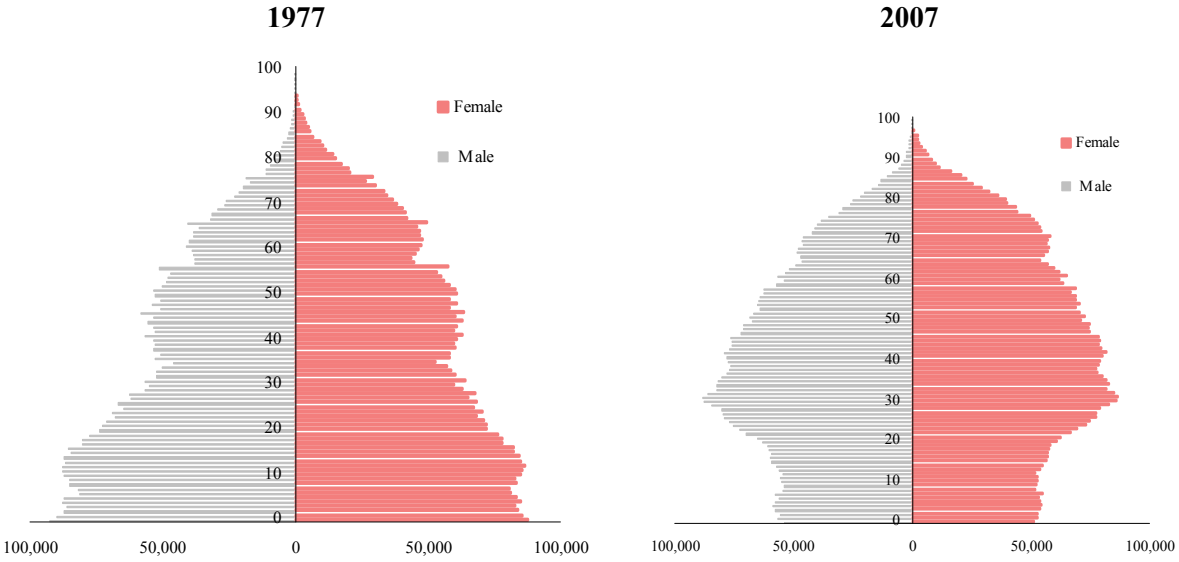
| | |
|---|---|
| 1929 | Creation of the public employees old-age pension scheme (Decree No. 16669 of 27 March) |
| 1972 | Creation of *Estatuto da Aposentação* (Decree-Law No. 498/72 of 9 December): integrated legal framework of public employees retirement regime |
| 1984 | First Social Security Framework Law (Law No. 28/84 of 14 August)<br>System PAYG: contributive regime financed by employees and employers contributions and non-contributive regime financed by State transfers |
| 1993 | Revision of *Estatuto da Aposentação* (Decree-Law No. 277/93 of 10 August and others): from September on, the pension scheme of new public employees became subject to the rules of the private sector system (Social Security General Regime) |
| 1993 | Reform of the Social Security general regime (Decree-Law No. 329/93 of 25 September) |
| 2002 | New Framework Law for Social Security (Law No. 32/2002 of 20 December) |
| 2005 | Revision of *Estatuto da Aposentação* (Law No. 60-B/2005 of 29 December) – further convergence of CGA and Social Security pension regimes |
| 2007 | Reform of the Social Security pension regime (revision of the Framework Law – Law 4/2007 of January 16 and Decree Law 87/2007 of May 10) |
| 2007 | Transposition of Social Security reform measures to CGA from 2008 on, with a transitory period until 2015 (Law No. 52/2007 of 31 August) |

Note: A more detailed description is presented in Annex A.
Source: CGA and Ministry of Labour and Social Solidarity (MTSS).

the Portuguese public pension system and, in October 2006, the government and social partners agreed on a new social security reform. This agreement turned into a new Social Security Framework Law at the beginning of 2007 and the transposition of the reform measures to the CGA system in the second half of 2007 and early 2008 (Table 1). This means that the public employees' pension system is now under a transitory period (until 2015) of convergence to the (reformed) Social Security system. The main recent measures are: i) the anticipation of the new pension formula established in 2002; ii) the introduction of a sustainability factor that links the pension value to the evolution of life expectancy at 65 years old; iii) the definition of a rule for pension updates; and iv) the promotion of delaying retirement by increasing the financial penalty for early retirement and granting bonuses in case of postponing retirement. The detailed description and the estimated effects of these measures are presented in Section 4.

**Figure 5**

**Population Pyramids for Portugal**




Source: EUROSTAT and National Statistics Institute (INE).

## 2 Implications of demography on pension expenditure

Portugal, like other European countries, has been deeply affected by ageing population. In particular, in the last 30 years, a deteriorating birth rate and gains in life expectancy led to a significant shrink in age cohorts below 30 y.o. and an increase in those between 30 and 60 y.o. and also in the oldest ones (Figure 5).

Migration flows have also had a role in the demographic structure: Portugal experienced significant net migration flows out of the country in the ’50s and ’60s followed by net migration inflows after the former colonies independence in the ’70s. In the last decade, net inflows intensified, with emigrants belonging to older age cohorts returning to Portugal and with the entrance of immigrants mainly from Eastern European countries, Brazil and former Portuguese colonies in Africa.

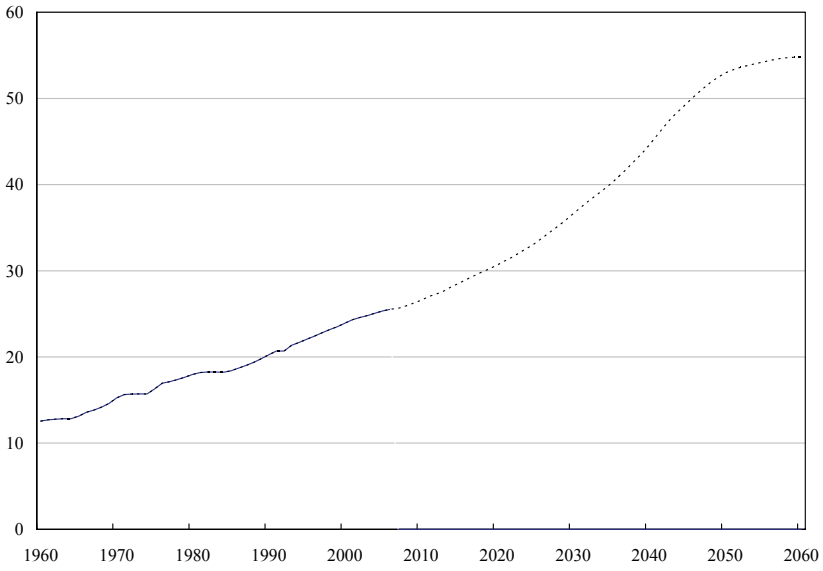
The change in the demographic pyramids yields an increasing old-age dependency ratio, which has duplicated between 1960 and 2007, while life expectancy at 65 grew around 4 years in the same period (Figure 6).

These developments coupled with productivity and economic growth are major factors that influence the dynamics of the Social Security systems financed on a PAYG basis. At the present time, the increase in the old-age dependency ratio poses a big challenge to the financial sustainability of these systems as it puts into risk the intergenerational income distribution from active to inactive population (Figure 6). The projected ageing population according to EUROSTAT’s exercise EUROPOP2008 is visible in the following charts, with the patterns for men and women.

As explained in the previous section, social security schemes have revealed a significant increase in their pension liabilities as a share of GDP, in particular in the last decade. As shown in the chart below, the relationship between pension expenditure as a percent of GDP and the old-age

**Figure 6**

**Old-age Dependency Ratio***
*(percent)*

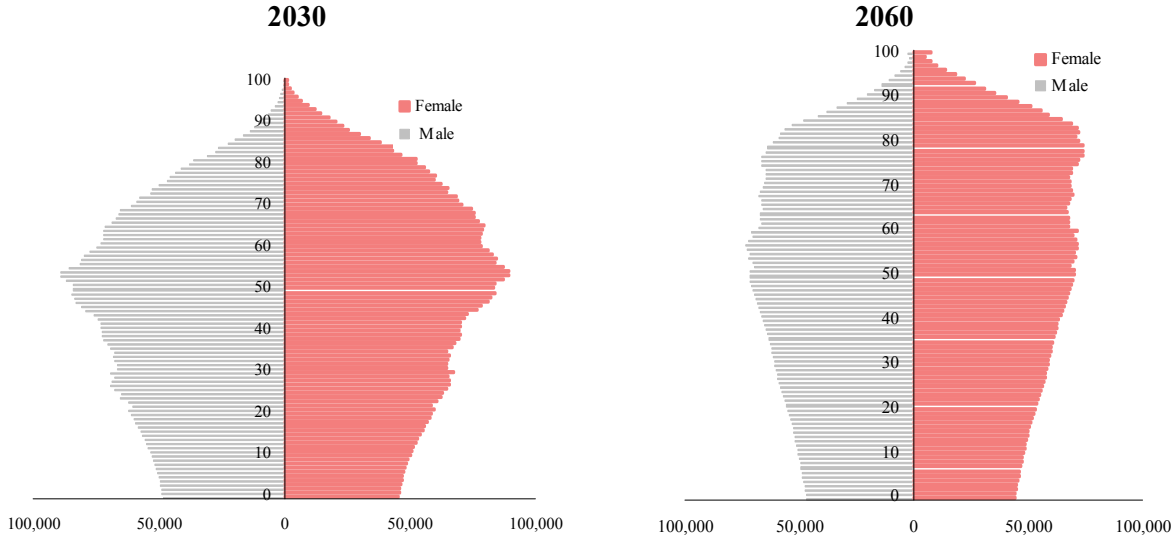



* Ratio of individuals aged 65 and older over individuals aged between 15 and 64.
Source: EUROSTAT and INE.

dependency ratio can be well approximated for by a linear relation.[1] Pension expenditure until now basically reflect the old-age pension formation rules in force until the beginning of the 1990s and the annual updates that have taken place. Without policy changes in the social security schemes and taking into account the observed variables till 2007, this linear regression indicates that pension expenditure would increase from 11 per cent of GDP in 2007 to about 30 per cent in 2060, when the forecast for dependency ratio reaches close to 55 per cent.

**Figure 7**

**Population Pyramids for Portugal – Projections**




Source: EUROSTAT (EUROPOP2008).

[1] In the linear regression model, both variables are integrated of order one according to the results of Dickey-Fuller tests; the residual of regression are stationary. The sample ranges from 1977 to 2007.

These results are compatible with other studies for Portugal, using specific pension modelling. Rodrigues and Pereira (2007) developed a general equilibrium model, and projected an increase in public pension expenditure close to 26 per cent of GDP by 2050 before taking into account the reforms since 1993, and EPC (2006) and Pinheiro and Cunha (2007) projected an increase of about 20 per cent of GDP by 2050 considering the reform measures adopted until 2005 using accounting models (Figure 9).

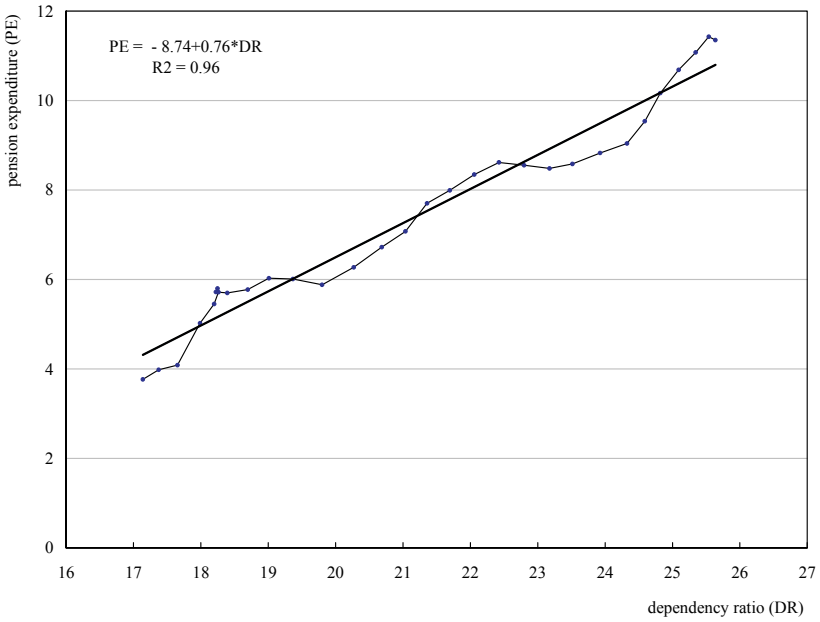
These projections revealed the measures implemented until 2005 insufficient to ensure the financial sustainability of the social security systems and, therefore, justify the need for the additional pension reform measures taken between 2006 and 2008.

## 3 The need of the public pension system reform

The serious financial imbalance of the Portuguese public pension systems by the mid-2000s decade was in fact revealed by several studies and the European Commission classified Portugal as a high risk country in

**Figure 8**

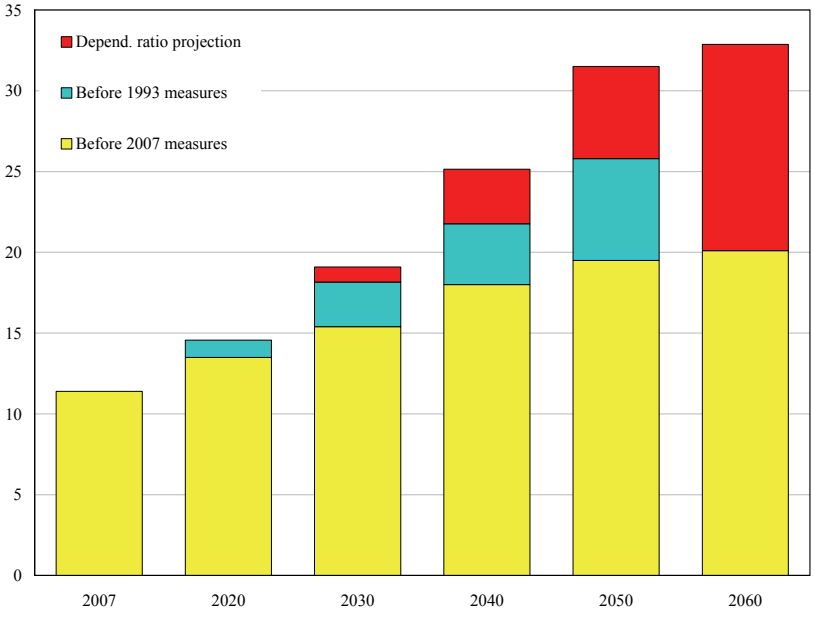
**Pension Expenditure and Old-age Dependency Ratio**




Source: authors' calculations.

**Figure 9**

**Projections for Pension Expenditure, 2007-60**
*(percent of GDP)*




Source: Rodrigues and Pereira (2007), Pinheiro and Cunha (2007) and authors' calculations.

**Table 2**

**The Four European Models**

| Equity | Efficiency | |
|---|---|---|
| | **Low** | **High** |
| **High** | Continentals | Nordics |
| **Low** | Mediterraneans | Anglo-Saxons |

Source: Sapir (2005).

terms of the sustainability of public finances (DGECFIN 2006).

Pension system reform has been widespread throughout Europe and other OECD countries mainly in the last decade. As referred to in Sapir (2005), "Europe's labour and social institutions need urgent reform if we are to grasp the opportunities offered by globalization and avoid the threats. (…) Critically, the 'Continental' and 'Mediterranean' models, which account together for two-thirds of the GDP of the entire EU-25 and 90 per cent of the 12-member euro area, are inefficient and unsustainable. These models must therefore be reformed, probably by adopting features of the two more efficient models [Nordic and Anglo-Saxon]. These reforms may also involve changes towards more or less equity." The author argued that the European institutions were established in the 1950s and 1960s when the economic environment was relatively stable and predictable, but that the institutions are no longer adequate in a world of rapid changes. He classifies the four European Models according to their efficiency (incentives provided to work or employment rates) and equity (probability of escaping poverty) (see Table 2) and finds Portugal in the Mediterranean group in terms of equity and in the Anglo-Saxons group in terms of efficiency but below the average of these.

Models that are not efficient are not sustainable in face of the public finance pressure coming from globalization, technical change and population ageing. The combination of the latter with low employment rates jeopardises the future benefits of the institution. The Mediterranean countries[2] concentrate their social spending on old-age pensions and generally have high employment protection but rather low unemployment benefits. They are also less successful in keeping the employment rate for older workers high and the unemployment rate for younger workers low. The degree of equity is generally proportional to the level of taxation, but models that are not equitable may be financially sustainable. Therefore, increasing the incentives to work without raising the poverty risk would be desirable.

Previously, for instance, Disney (2000) discussed the reform options in OECD countries for public pension programmes in difficulties. He analysed the strengths and weaknesses of the reform strategies being discussed and implemented in various countries and considered two main strategies: i) retaining a strong unfunded component and ii) involving a strong funded private component. In the first group, two options are possible: a "parametric" reform or an "actuarially fair" programme and in the second group either by "clean break" privatization (*i.e.*, no further contributions are made into the existing unfunded programme) or by a partial privatization (only certain individuals are allowed to join the funded scheme or allowing individuals the choice of joining a funded or unfunded scheme). The strategy of keeping a strong unfunded component was presented as a defensible one, in particular the "parametric" reforms by "raising legal retirement age, or more specifically linking it explicitly to expected longevity is generally a key policy to the problem of financing public pension programmes." Funded schemes can also be attractive: a funded scheme is transparent "in the sense that benefits are explicitly related to contributions and capital market performance rather than to some formula of the public programme." The transition

[2] Greece, Italy, Portugal and Spain.

issue has to be handled and there is the conflict over who bears the burden of the transition: current taxpayers or pensioners or future generations of taxpayers and pensioners. Another drawback relates to the fact that it "rules out any explicitly redistributional component to the public pension programme and it subject participants to potential investment risk and annuity rates will continue to fall as longevity increases".

Recent developments in financial markets turned this discussion more pertinent. PAYG schemes are relatively robust to the financial crisis. In the case of persistent economic downturn and higher public debt it may increase the need for adjustments in the pension schemes in order to ensure their long term sustainability. Private pension funds saw their asset value dropping by 20 per cent on average in the OECD countries between January and October 2008 (OECD 2009). Even if long-term investment performance is rather healthy it highlights the need of looking again to the best way of dealing with funded schemes. Defined benefit (DB) schemes are the main private schemes that are now paying (defined) pensions but the reduction of their assets may imply adjustments to indexation or contributions or even to close them to new members. At the same time, defined contribution (DC) plans are expected to intensify their growing trend. However, in these schemes the beneficiary takes the investment risk and they may not ensure an adequate income at retirement.

Against this background, the reforms of the existing unfunded pension systems reveal to be of utmost importance across European/OECD countries. This is equally true for the Portuguese public pension system.

## 4 Recent reform measures

### *4.1 Description of the reform*

As previously described, in October 2006 the government and social partners reached an agreement on the reform of the social security pension system and the main measures of this reform were also applied to the CGA scheme since 2008.[3] The most representative measures are:

*i) Sustainability factor*

To tackle the considerable impact that the increase in life expectancy has on the social security systems, the sustainability factor was introduced. The sustainability factor is the ratio between life expectancy in 2006 and life expectancy in the year prior to retirement. It is applied to all new required pensions since the beginning of 2008:

$$Pension_t \times \left( \frac{LE_{2006}}{LE_{t-1}} \right)$$

where:

LE is the Average Life Expectancy at the age of 65, published in an annual basis by the INE, and *t* is the year the pension is required.

It should be stressed that contributors can opt for a combination between two extreme alternatives:[4]

- they can delay their retirement until they completely offset the effect of the sustainability factor; or
- they can retire at the statutory age and accept the financial penalty levied on the pension.

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[3] Laws No. 52/2007 and No. 11/2008.

[4] A third possibility is also available. This involves additional voluntary contributions to public or private capitalization schemes. In its essence, this alternative is already available through pension savings funds (known as PPRs).

**Table 3**

**The Sustainability Factor Evolution**

| | 2007 | 2010 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|---|
| Sustainability factor | 1.00 | 0.97 | 0.93 | 0.88 | 0.84 | 0.81 | 0.77 |

Source: INE and Eurostat (EUROPOP 2008).

In the model developed for CGA, it was assumed that in order to partly offset the financial penalty derived from this factor, CGA contributors tend to postpone the retirement age in line with the evolution of the sustainability factor until the legal age limit for retirement (70 years old).

Taking into account the evolution for the weighted average of (male and female) life expectancy at 65 in the EUROPOP2008 scenario, pointing to an increase of around 5 years by 2060 the projected trend for the sustainability factor is outlined in Table 3.[5]

*ii) The new rule for updating pensions*

This new rule determines that, from 2008 on, the annual increase of pensions is linked to an effective change rate of the Consumer Price Index (CPI) and also to the effective growth of Gross Domestic Product (GDP), which affects the social security revenue pattern. This means a change from recent years, where there have been pension increases significantly higher than inflation, above all as a result of the rise in the minimum pension level.[6] The new rule brings pension updates within a regulatory framework, removing the discretionary element. The annual increase of all types of pensions[7] should be set according to Table 4.

At this point, it should be mentioned that in order to assure that the National Minimum Wage itself constitutes an instrument of Labour Market policy, it was replaced as a reference for the indexation of pensions by a new social support index *Indexante de Apoios Sociais* (IAS). For 2007, it was defined as the 2006 mandatory minimum wage updated by the consumer inflation of that year (Law 53-B/2006). This Law provides that the rule for IAS updating in the future is to be identical with the rule for updating lower pensions (lower bracket), which is independent from the annual update set for the National Minimum Wage.

To determine the reference GDP growth rate it was established that, in the first year of implementation of this new rule (2008), the GDP considered should be the real growth rate of GDP in the previous year and, thereafter, the consideration of average GDP growth rate of the two previous years.[8] The relevant CPI corresponds to the effective average growth rate of CPI (without considering housing prices) regarding the last 12 months available on November 30 of the year before the pensions update.

---

5 See Annex B.

6 The main reason for this was the convergence of minimum old age and disability pensions to the mandatory minimum wage until 2006 as set down in the Social Security Framework Law of 2002 (Law 32/2002).

7 Including minimum pensions that range from 44.5 per cent to 89 per cent of IAS and are updated according to the first bracket of the pensions value.

8 This average was firstly used for the 2009 update, taking into account the GDP growth in 2008 and 2007. The annual GDP growth rates to be considered are the ones ended on the third quarter of the year prior to the pension update or the quarter before if there are no official figures regarding the third quarter until December 10.

**Table 4**

**Rule for Updating Pensions**

| | GDP Real Variation Rate Less than 2% | GDP Real Variation Rate From 2% to 3% | GDP Real Variation Rate Equal or Greater than 3% |
|---|---|---|---|
| **Pensions under 1.5 IAS** | CPI change rate | CPI change rate + 20% GDP real variation rate (minimum: CPI change rate + 0.5 percentage points) | CPI change rate + 20% GDP real variation rate |
| **Pensions 1.5 to 6 IAS** | CPI change rate – 0.5 percentage points | CPI change rate | CPI change rate + 12.5% GDP real variation rate |
| **Pensions 6 to 12 IAS** | CPI change rate – 0.75 percentage points | CPI change rate – 0.25 percentage points | CPI change rate |
| **Pensions above 12 IAS** | no update | no update | no update |

Note: IAS stands for the social support index *Indexante de Apoios Sociais*.
Source: MTSS.

In the modelling of CGA pensions it was assumed that this rule corresponds to indexation to the consumer price index growth plus 0.1 percentage points (minus 0.4 percentage points), depending on the economic growth above (below) 2 per cent. These drifts were obtained by using the 2007 distribution for CGA pension amounts and computing a weighted average of the drifts for each bracket of pension value, according to the above mentioned rule. In 2007, 32 per cent of the pensioners belonged to the first interval, 60 per cent to the second and 8 per cent to the highest one. This distribution was held constant throughout the projection horizon. However, the evolution of this distribution is somehow undetermined: on the one hand, as the IAS benchmark is updated according to the lower bracket, higher pensions tend to steadily move to lower brackets; on the other hand, the maturing of the system and incentives to postpone retirement lead new pensions to be higher than those that leave the system. If this second effect prevails, the hypothesis considered tends to be conservative as future updating will be less generous than assumed.

According to the CGA legislation, this rule applies from 2008 on only for pensions less than 1.5 IAS, from 2009 on for pensions between 1.5 and 6 IAS and from 2011 on for pensions above 6 IAS. However, in the projection exercise, it was assumed that the rule applied to the whole range from 2008 on for all pensioners.

The approved legislation foresees that this rule for updating pension will be reassessed every five years, in order to check its adequacy in terms of social security system financial sustainability and of the pensions' real value. However, in the current exercise, under a "no policy change" general rule, it was considered to prevail.

*iii) An early transition to a pension benefit formula that considers contributions over the whole career*

The Decree Law 35/2002 set out a formula for calculating the amount of new pensions in the social security general regime[9] which differs from the one set out in the Decree Law 329/1993 in

[9] That is the one that applies to CGA (new) subscribers since September 2003.

**Table 5**

**Pension Accrual Rate**

| Contributive Career | Reference Earnings | Accrual Rate |
|---|---|---|
| less than 21 years | - | 2.00% |
| 21 or more years | until 1.1 IAS | 2.30% |
| | from 1.1 to 2 IAS | 2.25% |
| | from 2 to 4 IAS | 2.20% |
| | from 4 to 8 IAS | 2.10% |
| | upper 8 IAS | 2.00% |

Source: MTSS.

two fundamental points: it takes the earnings over the whole contributive career (instead of the best ten out of the last fifteen years) and sets out different accrual rates, depending on the workers compensation (the higher the compensation, the lower the marginal rate, varying between 2.3 and 2 per cent) and on career length, as presented in Table 5.

The 2002 decree also established a transition period, during which the pension to be applied will be whichever is higher, either the new regime one or as calculated as a weighted average of the pension from the last regime and from the new regime, where the weights correspond to the number of years of service before and after 2001. The same decree set down 2017 as the start of the transitional period, but in 2006 the decision was taken to bring forward the transition to the new formula to 2007. As far as the transition to the new pension benefit formula affects the income of new pensioners there are transition clauses to the full application of the new rules:

- to all contributors registered on Social Security before 2001 and that will retire before 2016, the pension is calculated according to a temporary benefit formula that accounts proportionately for the length of service before and after 2007 through the application of a formula that takes into account both the old and new benefit:

$$Pension = \frac{P_1 \times C_1 + P_2 \times C_2}{C}$$

  where: *Pension* is the monthly amount of statutory pension (before the application of the sustainability factor); $P_1$ stands for the pension calculated with the benefit formula that accounts for the best ten out of the best fifteen years of wage history[10] (old formula); $P_2$ stands for the pension calculated according to the new formula that considers the whole contributory career; $C$ is the number of years of contributory career with registered wage; $C_1$ stands for the number of years of contributory career with registered wages until the 31st of December 2006; and $C_2$ stands for the number of years of contributory career with registered wages after the 1st of January 2007;
- for those registered on Social Security before 2001 but that will retire after 2016, pension will be calculated as a weighted average between the pensions that result from the new benefit

[10] It is set according to the number of calendar years with a contributory density equal to or higher than 120 days (up to the limit of 40).

formula and the old benefit formula, with reference to the length of service before and after the 31st of December 2001.

In the computation of pensions, the component that takes into account the best ten out of the last fifteen years of declared wages will always be based on the effective last years of contributory career and not on the last fifteen years before the introduction of the mechanism of transition to the new benefit formula;

- for all individuals first registered on Social Security after 2002, the pension will be calculated with the new rules, accounting the whole contributory career (up to the limit of 40 years).

In the case of CGA scheme, the anticipation of this transitional period is in force after 2008. However, the effects of this change are quite mitigated in this subsystem; for the contributors covered by the *Estatuto da Aposentação*, the only relevant change is higher accrual rates for the years of contribution from 2008 on instead of 2017 on. For the other public employees (enrolled since September 1993), the new rules also apply what concerns the consideration of the whole contributive career instead of the best ten out of the last fifteen years, but the probability of contributors retiring before 2016 is quite small and, therefore, the impact is negligible. Table 6 synthesizes the evolution of pension calculation rules for CGA contributors.

*iv) Additional penalty for early retirement*

Another of the measures – within the scope of the so-called "promotion of active ageing" – consists in introducing a disincentive to early retirement, with a bigger financial penalty for retirement prior to the legal retirement age, but computed on a monthly basis (0.5 per cent for each month of anticipation) instead of on a yearly basis (4.5 per cent per year). This measure entered into force in 2007 for Social Security but, in the case of CGA, it is to be applied to new pensions from 2015 on. The current projection exercise includes the additional financial penalty and does not consider any changes in the probability of those eligible actually retiring. This assumption is a cautious one in what concerns the effects of this reform measure.

Table 7 compares the evolution of entitlement conditions for full old-age pensions and early retirement pensions in the CGA scheme.

*v) Other measures*

*Promoting active ageing*

Aside from the reform measures included in the projections there are other measures aimed at promoting active ageing, namely: for long contributory careers, the no-penalty retirement age can be reduced one year for each of the three years of the contributory career above 30 years at the age of 55 (beneficiaries can retire, without penalty, at the age of 64 with 42 years of contributions, at the age of 63 with 44 years of contributions, at the age of 62 with 46 years of contributions and so on).

When claimed after 65 years of age (with more than 15 calendar years of earnings registration and, at most, 70 years of age), the pension is increased by applying a monthly rate to the number of months of effective work completed between the month the pensioner reaches 65 years of age and the month of the pension beginning, as presented in Table 8. This means, for instance, that an individual with 65 years old that decides to postpone retirement for one year will get a 3.96 per cent bonus if he has a career of 20 contributive years or 12 per cent in the case of having 40 contributive years.

*Introduction of a ceiling to higher pensions*

In a context of sustainability strengthening of social security and in order to complement the professional solidarity embedded in the pension benefit formula, but also safeguarding the

**Table 6**

**Calculation Rules for Full Old-age Pension in the CGA Scheme**

| CGA Regime | From 1993 on | DL 35/2002 | From 2006 on | From 2007 on | From 2008 on |
|---|---|---|---|---|---|
| *Estatuto da Aposentação* (hired until August 1993) | P = 90% last wage (LW) (since 1972) | | P = P1 + P2<br>P1 = LW x C1 x R1<br>P2 = RE x C2 x R2<br>RE = all career reference earnings (of 2nd part)<br>C1 = % career until 2005<br>C2 = % career since 2006<br>R1 = accrual rate 2.5% (variable with C from 36 to 40)<br>R2 = accrual rate (2% until 2015 and 2 to 2.3% hereafter) | | FP = P x SF<br>SF = sustainability factor<br>P = P1 + P2<br>P1 = LW x C1 x R1<br>P2 = RE x C2 x R2<br>R2 = accrual rate (2 to 2.3%) |
| Hired from September 1993 on | P = BE x 40 x 2%<br>BE = best earnings 10 out of last 15 years | | | | |
| until 2001 | | Best of A) or B)*<br>A) $P_{2017\ on}$ = P1 + P2<br>P1 = BE x C1 x 2%<br>P2 = RE x C2 x R2<br>C1 = % career until 2001<br>C2 = % career since 2002 | | $P_{2007\text{-}16}$ = P1 + P2<br>P1 = BE x C1 x 2%<br>P2 = RE x C2 x R2<br>C1 = % career until 2006<br>C2 = % career since 2007 | FP = P x SF |
| since 2002 | | B) $P_{2017\ on}$ = RE x 40 x R2 | | | FP = P x SF |

Notes: * In the case of public employees, the best case is B) as they have less then ten contributive years (BE = RE) and the accrual rate is higher in case B.
The shaded cells refer to regimes no longer applicable.

**Table 7**

**Entitlement Conditions (Transitory Period)**
**A) Full Old-age Pension**

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LRA | 60 | 60.5 | 61 | 61.5 | 62 | 62.5 | 63 | 63.5 | 64 | 64.5 | 65 |
| Contr. years | 36 | 36.5 | 37 | 37.5 | 38 | 38.5 | 39 | 39.5 | 40 | 40 | 40 |

Notes: LRA stands for legal retirement age.
Special regimes have longer convergence periods to LRA = 65 and 40 contributive years.

**B) Early Retirement Pension**

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| Contr. years | 36 | 36 | 36 | 33 | 30 | 25 | 23 | 21 | 19 | 17 | 15 |

Note: For each year before LRA there is a 4.5 per cent penalty in the pension value. From 2015 on it increases to 0.5 per cent per month of anticipation. In case only LRA is attained, the pension value is reduced proportionally to the contributive years missing.
Source: CGA.

**Table 8**

**Incentives for Postponing Retirement**

| Contributive Career | Monthly Bonus Rate *(percent)* |
|---|---|
| From 15 to 24 | 0.33 |
| From 25 to 34 | 0.50 |
| From 35 to 39 | 0.65 |
| 40 or more | 1.00 |

Source: MTSS.

earning-related principle, it was considered adequate to establish a pension ceiling (at 12 IAS). It must be stressed that pensions that result from a benefit formula that accounts the average of lifetime wages do not have any ceiling. This way this measure has a temporary effect. In terms of the pension ceiling, it was decided:

- to introduce a pension ceiling for the new pensions, exclusively for the component that considers the best ten out of the last fifteen years of recorded earnings (P1);
- when the pension component calculated with the new formula (P2) is higher than the pension component calculated with the old formula (P1), no pension ceiling will be applied to P1;
- if P1 and P2 are higher than the pension ceiling and P1 is larger than P2, then only the new formula will be applied (where there is no pension ceiling);
- all existing pensions above the ceiling will not be annually updated. This rule does not apply when the two prior conditions are verified for the new pensions and for those computed under

**Table 9**

**Projected Public Pension Expenditure and Contributions**
*(percent of GDP)*

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 | 2060-07 | Peak Year |
|---|---|---|---|---|---|---|---|---|
| Public pension spending after reform | 11.4 | 12.4 | 12.6 | 12.5 | 13.3 | 13.4 | 2.1 | 2053 |
| Public pension spending before reform | 11.4 | 13.3 | 14.7 | 15.5 | 16.9 | 17.5 | 6.1 | 2060 |
| Contributions after reform | 10.7 | 10.4 | 9.6 | 9.2 | 9.0 | 9.0 | –1.7 | 2010 |

Source: MTSS and authors' calculations.

previous legislation (considering that the value of P2 is calculated according to the new formula). This rule, as the new indexing rules, should be reassessed every five years.

However, this restriction only applies to a few cases (less than 1 per cent of all pensions).

### *4.2 Effects of the recent reform measures*

The reform measures that entered into force in 2007 for the Social Security regime and in 2008 for the CGA scheme are measures that, by their nature, will provide effects essentially in the long run. These effects were estimated through projection exercises carried out by authors for the CGA scheme and by the Ministry of Labour and Social Solidarity for the Social Security system. In the case of the Social Security system, the reform measures and modelling assumptions are similar to those of the CGA scheme, except in the following cases:

i) regarding the introduction of the sustainability factor, it was assumed that Social Security contributors accept the financial penalty retiring at the statutory age, with no changes in the behaviour of the economic agents. This assumption makes the projections "conservative". In fact, an increase in the retirement age would lead to a higher participation rate for older workers (whose importance is increasing) raising the contributory revenue, which is only partially offset by a marginal increase of the new pensions value for those contributors who retire later.[11]

ii) in the new updating rule for Social Security pensioners, it was assumed that it corresponds fundamentally to the consumer price indexation plus 0.35 percentage points (minus 0.15 percentage points), depending on the economic growth above (below) 2 per cent. These drifts were obtained from the 2005 distribution for Social Security pension amounts and computing a weighted average of the drifts for each bracket of pension value according to the above mentioned rule. In 2005, 72 per cent of the pensioners belong to the first bracket, 24 per cent to the second and 4 per cent to the highest one.

According to the projection results for both subsystems, those measures will allow for a reduction of less than 1 percentage point of GDP in 2020 but around 4 percentage points by 2060[12] (Table 9). Another important feature is that the peak year for pension expenditure in now within the

[11] For further details on this issue, see Pinheiro and Cunha (2007).

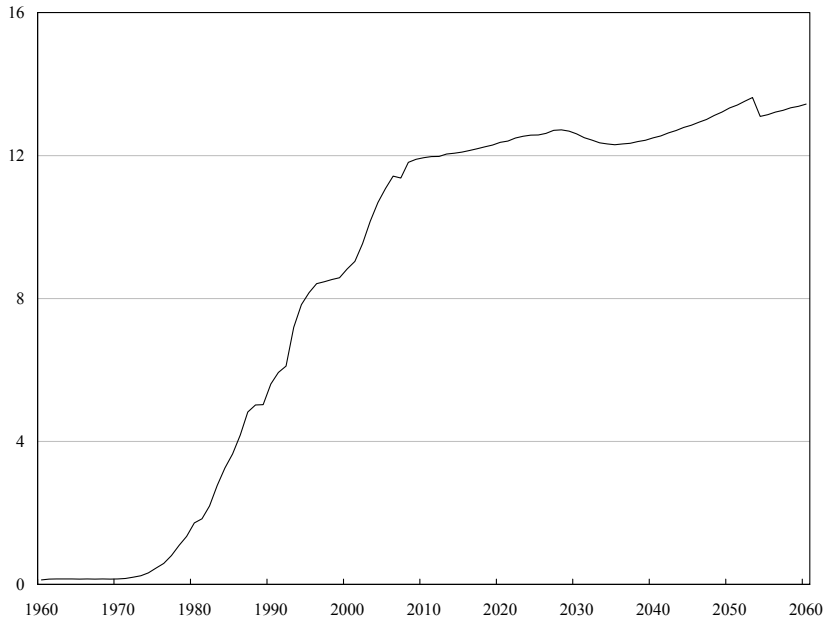
[12] These projections were made in the context of the Economic Policy Committee Working Group on Ageing Population and Sustainability and, therefore, used the common assumptions on demography and macroeconomic developments (EPC 2008). The main assumptions used in these projections are presented in Annex B and the CGA model is described in Annex C.

projection horizon (2053) while in the scenario before the recent reform, measures show that the pension expenditure trend was continuously increasing. Given the assumptions regarding demography and employment, which foresee a progressively higher employment rate for older workers as a result of the measures designed to promote active ageing, the contributions revenue trend tends to stabilize from 2040 onwards.

The effects of the reform measures in containing the public pension expenditure growing trend are quite visible when analysing its evolution since 1960 until the horizon of the projections (Figure 10).

**Figure 10**

**Pension Expenditure**
*(percent of GDP)*




Source: CGA, MTSS and authors' calculations.

In the particular case of CGA, as it is a closed system since 2006, the effect of the more recent reforms is more limited in the long run, representing a 0.3 percentage points of GDP reduction in the public expenditure by 2060 (Table 10). However its impact increases by 2040, while the number of pensioners is still growing. The new rules also anticipate the peak year for CGA pension expenditure to be 2009 while the former maximum was reached in the 2020s, when the cohorts corresponding to peak admissions in the Public Administration retire.

In order to better assess the effects of the reform measures on the pension system of all public employees, we run the CGA model in the counter factual situation of non-closure of CGA to new registrations, assuming that these would come under the rules pertaining to public employees registered in the Social Security system. As additional assumptions it was considered that: i) no enrolment of non-public employees would take place as has happened in the past, mainly with the employees of public-owned or formerly public-owned enterprises that were traditionally registered in the CGA; and, ii) the number of new public employees would respect the rule "2 out 1 in" until 2011, as defined in the December 2007 update of the Portuguese Stability Programme, and the share of public employees in total employment would remain stable thereafter. It should be recalled that in the context of the Public Administration reform enhanced in 2005, the reduction in the number of admissions in public service cut the public employment share from about 15 per cent in 2005 to 13.5 per cent in 2007 and it is estimated to remain at around 12 per cent after 2011.

In this scenario, the recent reform measures allow a declining in the pension expenditure related to public employees of 0.6 percentage points of GDP by 2060, representing a reduction of almost 2 percentage points of GDP from 2007 expenditure (Table 11).

**Table 10**

**Projected CGA Pension Expenditure and Contributions**
**"CGA Closed System"**
*(percent of GDP)*

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 | 2060-07 | Peak Year |
|---|---|---|---|---|---|---|---|---|
| CGA pension spending after reform | 4.1 | 4.0 | 3.9 | 2.9 | 1.8 | 0.9 | –3.2 | 2009 |
| CGA pension spending before reform | 4.1 | 4.3 | 4.3 | 3.4 | 2.2 | 1.2 | –3.0 | 2025 |
| Contributions after reform | 2.1 | 1.1 | 0.5 | 0.1 | 0.0 | 0.0 | –2.1 | 2007 |

Source: CGA and authors' calculations.

**Table 11**

**Projected Public Employees' Pension Expenditure and Contributions**
**"CGA Open System"**
*(percent of GDP)*

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 | 2060-07 | Peak Year |
|---|---|---|---|---|---|---|---|---|
| CGA pension spending after reform | 4.1 | 4.0 | 3.9 | 3.1 | 2.4 | 2.2 | –1.9 | 2009 |
| CGA pension spending before reform | 4.1 | 4.4 | 4.4 | 3.7 | 3.1 | 2.8 | –1.3 | 2026 |
| CGA pension spending before 1993 reform(1) | 4.1 | 4.9 | 5.1 | 4.9 | 4.4 | 4.0 | –0.1 | 2029 |
| Contributions after reform | 2.1 | 1.6 | 1.4 | 1.3 | 1.3 | 1.3 | –0.8 | 2007 |

Note:
(1) But starting from actual 2007.
Source: CGA and authors' calculations.

As a way of evaluating the process of convergence of the CGA to the Social Security regime that started in 1993, the estimated effects of the reforms since then are worth a reduction of 1.8 percentage points of GDP by 2060. It should be noted that this effect is somehow underestimated as the exercise takes as a starting point the 2007 pension expenditure value which is already affected by the measures adopted in the meantime. In the no convergence scenario, the pension expenditure is related only to public employees, and it would rise by 1 percentage points by 2030 and afterwards it would decrease reflecting the evolution of public employment until the 1990s and its reduction in the 2000s.

How these reductions in public pension expenditure reflect on the pensioners' welfare is also a question that should be analysed. Two measures usually used are the replacement rate and the

**Table 12**

**Replacement Rate**
*(percent)*

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| **Replacement rate** | | | | | | |
| CGA[(1)] | 81 | 75 | 72 | 72 | - | - |
| Social security scheme[(2)] | 58 | 53 | 49 | 53 | 54 | 56 |
| Old age[(3)] | 61 | 55 | 51 | 55 | 55 | 58 |
| | | | | | | |
| *Coverage* | | | | | | |
| *CGA* | *14* | *14* | *14* | *13* | *11* | *8* |
| *Social Security* | *83* | *82* | *82* | *83* | *86* | *88* |

Notes:
(1) Ratio between the average pension of new pensioners (earnings-related old-age and disability pensioners) and the average wage of CGA contributors.
(2) Ratio between the average pension of new pensioners (earnings-related old-age and disability pensioners) and the average declared wage of general regime of wage earners.
(3) Considering only old-age pensions.
Source: CGA, MTSS and authors' calculations.

benefit ratio. The first one compares the value of new pensions with the last wages and the second one relates the average pension to the average wage of the economy. Table 12 shows the evolution of the "average" gross replacement rate, where is considered the average of new gross pensions, reflecting a wide range of situations in terms of age of retirement, contributive career length and applicable regimes, namely in the transitory period that goes until 2042 in the case of the Social Security system. Regarding CGA the last new pensions should occur around 2045, as this system was closed at the end of 2005.

It can be observed that, as expected, the replacement rates in the CGA regime are significantly higher than in the Social Security regime. The long-term evolution is similar in both systems with a reduction before 2030 reflecting both the less "generous" rules of pension formation and higher increases in wages in line with the productivity projections. However, from 2030 onwards, the average replacement rate is projected to recover to levels similar to the current ones due, essentially, to longer contributive careers of new pensioners. In the specific case of CGA, before the consideration of the recent reform measures, this "average" replacement rate would range from 81 to 76 per cent between 2007 and 2040, as a result of the changeover to the social security rules in the convergence period initiated in 1993 and strengthened in 2005.

The evolution of the replacement rate along with the pension updating formulas reflects on the benefit ratio[13] developments. In the case of CGA, the ratio[14] reaches its peak in the late 2020s and decreases thereafter. This scheme is only relevant until the 2040s. As regards to Social Security, the benefit ratio reduces its value until 2040, recovering afterwards in line with the evolution of the replacement rate.

---

13 Computed as the average old-age pension (including early retirement pensions) over the average wage.

14 In the case of CGA, the average pension includes also disability pensions.

**Table 13**

**Benefit Ratio**
*(percent)*

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| **Benefit ratio** | | | | | | |
| CGA | 73 | 74 | 75 | 66 | - | - |
| Social security scheme | 46 | 47 | 43 | 39 | 40 | 42 |

Source: CGA, MTSS and authors' calculations.

The models used in these projections do not allow for the computation of individual replacement rates, as contributors and pensioners are modelled grouped by age and gender strata. However, taking the economy wages evolution and the rules applicable in each year of the projection horizon it is possible to calculate "theoretical" replacement rates for individuals entitled to a full old-age pension at different points of the earnings distribution (Table 14 A).

As expected, these replacement rates computed for complete contributive careers are higher than the average ones and their evolution mainly reflects the effect of two measures: the introduction of the sustainability factor and the new pension formula that differentiates the accrual rate according to the reference earnings. This leads to a slightly smaller reduction in the replacement rates for lower earners than for higher earners. In these estimates, it is assumed that individuals retire as they fulfil the entitlement conditions and do not postpone retirement. If that is the case, *i.e.,* labour market conditions and individual choices match favourably in postponing retirement, the financial penalty induced by the sustainability factor would be (at least partially) offset according to the rules presented in Table 8.

Excluding the sustainability factor effect, the replacement rates would present a more stable pattern, in particular in the Social Security case (Table 14 B). For CGA, the reduction is more marked as a result of the convergence effect of the pension formation rules to the ones of the Social Security.

### *4.3 Further analysis on the two main measures*

#### *4.3.1 Sustainability factor*

Recent reform measures have an estimated effect of reducing public pension expenditure by about 4 percentage points of GDP by 2060. More than 50 per cent of this result is explained by the introduction of the sustainability factor that accounts for 2.4 percentage points of GDP (Table 15).

These calculations are somewhat prudent by assuming that CGA contributors postpone retirement proportionally to the evolution of the sustainability factor, not accepting the whole financial penalty associated with retirement at age 65 as in the case of the Social Security beneficiaries. However, CGA new retires will not be relevant from 2045 on as it is a closed system since 2006. As discussed in Pinheiro and Cunha (2007), if contributors postpone their retirement beyond the legal retirement age, the "saving effect" due to the higher employment rate and the reduction of the period during which individuals receive pensions is higher than the marginal growth of the pension amount due to the increased career.

**Table 14**

## A) "Theoretical" Gross Replacement Rates
*(percent)*

### CGA

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| **Individual Reference Earnings** | | | | | | |
| 50% average earnings | 89 | 78 | 75 | 68 | - | - |
| 75% average earnings | 89 | 78 | 75 | 68 | - | - |
| 100% average earnings | 89 | 78 | 75 | 67 | - | - |
| 200% average earnings | 89 | 77 | 74 | 66 | - | - |
| 250% average earnings | 89 | 77 | 73 | 65 | - | - |

### Social Security

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| **Individual Reference Earnings** | | | | | | |
| 50% average earnings | 92 | 75 | 63 | 59 | 58 | 58 |
| 75% average earnings | 77 | 66 | 63 | 59 | 58 | 58 |
| 100% average earnings | 77 | 66 | 62 | 59 | 58 | 57 |
| 200% average earnings | 77 | 65 | 62 | 58 | 57 | 56 |
| 250% average earnings | 77 | 65 | 62 | 57 | 57 | 56 |

## B) "Theoretical" Gross Replacement Rates without the Sustainability Factor
*(percent)*

### CGA

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| **Individual Reference Earnings** | | | | | | |
| 50% average earnings | 89 | 84 | 85 | 81 | - | - |
| 75% average earnings | 89 | 84 | 85 | 81 | - | - |
| 100% average earnings | 89 | 84 | 85 | 80 | - | - |
| 200% average earnings | 89 | 83 | 83 | 78 | - | - |
| 250% average earnings | 89 | 83 | 83 | 77 | - | - |

### Social Security

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| **Individual Reference Earnings** | | | | | | |
| 50% average earnings | 92 | 75 | 71 | 70 | 72 | 75 |
| 75% average earnings | 77 | 71 | 71 | 70 | 72 | 74 |
| 100% average earnings | 77 | 71 | 71 | 70 | 72 | 74 |
| 200% average earnings | 77 | 70 | 70 | 69 | 71 | 73 |
| 250% average earnings | 77 | 70 | 70 | 68 | 70 | 73 |

Source: CGA, EPC and authors' calculations.

**Table 15**

**Impact of the Sustainability Factor in Pension Expenditure Projections**
*(percent of GDP)*

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 | Peak year |
|---|---|---|---|---|---|---|---|
| **Projections after reform (1)** | | | | | | | |
| Public pensions | 11.4 | 12.4 | 12.6 | 12.5 | 13.3 | 13.4 | 2053 |
| | | | | | | | |
| **Projections excluding the sustainability factor (2)** | | | | | | | |
| Public pensions | 11.4 | 12.7 | 13.4 | 13.8 | 15.2 | 15.9 | 2060 |
| | | | | | | | |
| **Difference (1)–(2)** | | | | | | | |
| Public pensions | 0.0 | –0.4 | –0.8 | –1.3 | –1.9 | –2.4 | |

Source: CGA, MTSS and authors' calculations.

Moreover, with this factor, the uncertainty underlying the demography projections, in particular in the expected life expectancy gains, is strongly minimized in the projections of public expenditure on pensions.

### *4.3.2 Pension updating rule and dynamic progressivity*

According to the pensions update rule, presented in Table 4, the annual update rate decreases with the pension value. For example, assuming a 2 per cent inflation rate and a 2 per cent real GDP growth, pensions below 1.5 IAS are updated 2.5 per cent while pensions above 12 IAS remain unchanged. In dynamic terms, this difference reduces the gap between extreme values of pensions and therefore decreases the inequality in income distribution of pensioners.[15] However, two factors partially offset this effect: on one hand, even the highest pensions will eventually start to be updated in the future and, on the other hand, for the higher pensions, tax system progressivity combined with updating rates lower for pensions than for tax parameters reduces the average tax rate. This turns the net amount of the pension updating higher than before tax in the case of higher pensions.

The first effect is illustrated in the Figure 11. Taking a pension that in the initial period is equivalent to 15 IAS (and therefore not updated in the first period), due to IAS annual updating, it ends up below the 12 IAS threshold after some periods. In that case, for instance, after 15 years it is equal to approximately to 11.3 IAS.

The second effect may be demonstrated through the example of a pension before tax $p_t^B$ in period *t*.

After *n* periods (years), the pension after tax is given by:

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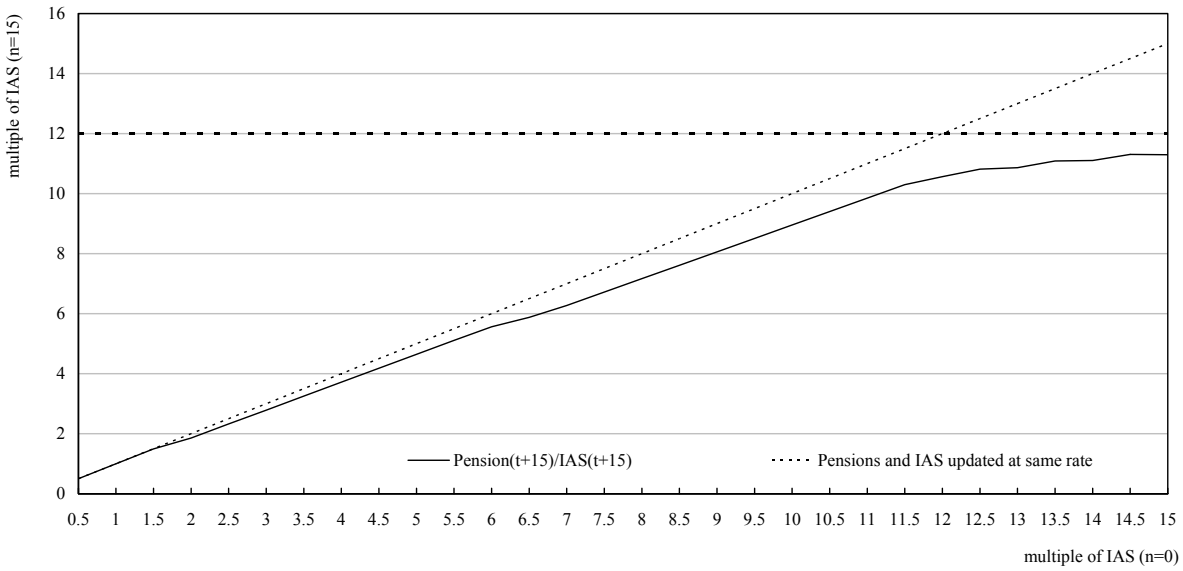
[15] Whitehouse (2009) discusses the effects of "progressive indexation" in four countries, including Portugal, and finds small redistributive effects on the pensioners' wealth in particular in the cases of Italy and Portugal.

**Figure 11**

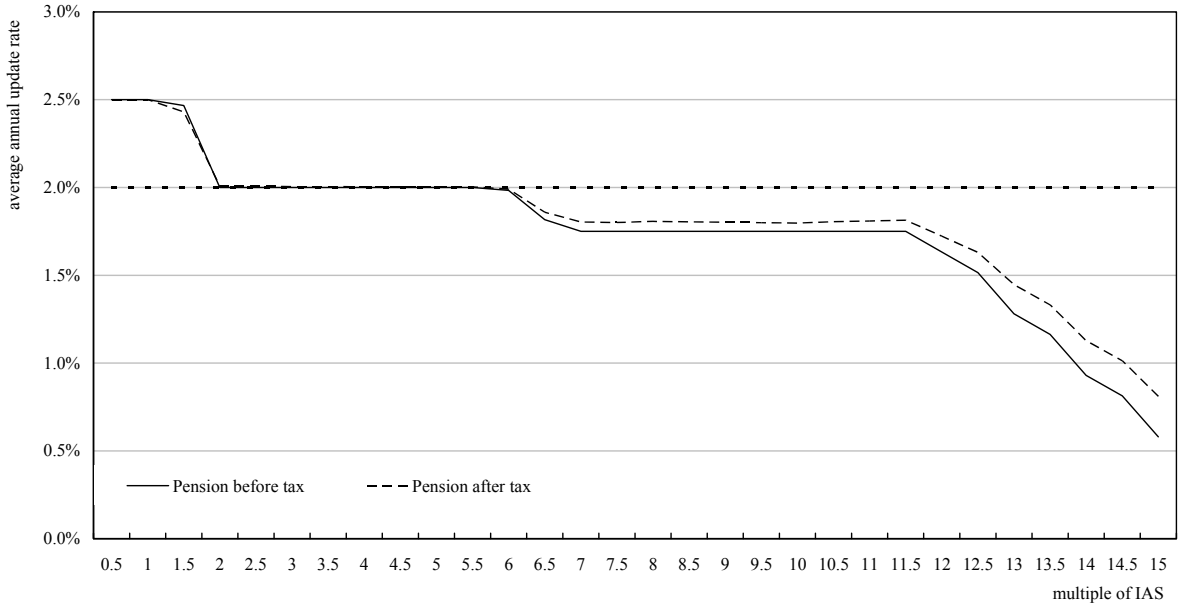
**Pensions Evolution as a Proportion of IAS**
*(15-year horizon)*




Note: assumptions – inflation rate of 2%, GDP growth rate of 2% and fiscal parameters annual update of 2%.
Source: authors' calculations.

**Figure 12**

**Average Update Rate for Pensions**
*(15-year horizon)*




Note: assumptions – inflation rate of 2%, GDP growth rate of 2% and fiscal parameters annual of 2%.
Source: authors' calculations.

$$p_{t+n}^{Net} = p_t^B (1+\theta_n)^n - tax_{t+n} \quad (1)$$

where: $\theta_n$ is the average annual indexation rate after n periods and $tax_{t+n}$ is the tax amount.

Annual updating rate, as defined in Table 4, depends on: i) the pension value *(p)*, ii) the real GDP growth rate ($\varphi$) and iii) the inflation rate ($\pi$). Therefore:

$$\theta_n = f(p, \varphi, \pi) . \quad (2)$$

Tax amount ($tax_t$) depends, each year, on the pension amount and on the tax parameters.

As the tax regime for personal income is progressive, average tax rate grows with the pension value. However, in dynamic terms, as tax parameters are usually indexed to expected inflation rate, for pensions with annual updating rates lower than expected inflation, the average actual tax rate decreases over time. Therefore, the actual rate for pensions update after tax is higher than before tax (Figure 12).

To evaluate the effect of the indexation rule and taxation in pensioners' distribution of income, the initial pension distribution is compared with the one several periods later. The comparison is made through the evolution of percentile ratios and by using the Gini index. These were computed by using the Personal Income Tax database for 2007 (latest information available), which includes all pensioners that are legally obliged to declare taxable income and allows for simulation modelling.[16]

This database presents, however, some caveats for the purpose we are using it and so they should be mentioned: i) sample representativeness – as the lowest pensions are tax exempt, the sample is biased to higher pensions; ii) pensions aggregation – pensions are reported in an aggregate way, *i.e.,* it is not possible to disentangle the value of each pension for individuals that receive more than one pension, which is not neutral in terms of the indexation rule effects; iii) income aggregation for tax purposes leads to an average tax rate and not necessarily to a specific tax rate on pensions income. We assumed that pensioners do not receive income from other sources, which is somewhat a strong hypothesis.

The parameters updating between 2007 and 2009 took into account the available information on GDP growth, inflation rate, IAS and tax parameters updates. From 2009 onwards, we considered the EPC (2008) assumptions for GDP growth and inflation rate (constant at 2 per cent), assuming tax parameters to be indexed in line with inflation.

The results obtained are presented in Table 16. It provides evidence for the pension update rule's progressivity with both the percentile ratio and the Gini Index decreasing in the time period considered. Before tax, percentile ratios decline 4.3 per cent over a ten year's horizon and 8.9 per cent over twenty years. Also Gini coefficient decreases 2.4 and 5 per cent, respectively. Tax effect reinforces these results except in the case of the percentile ratio over twenty years due to the tax impact (discussed above) on highest pensions.

Another important aspect is related to the fact that average pension update before tax is lower than 2 per cent, the value considered for inflation rate. However, the rates denote a small increase when considering after tax pension values, which reflects a lower growth of tax revenue than the one of the average pension.

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[16] It covers around 1.5 millions of pensioners, which account to 83 per cent of total public expenditure on pensions.

## 5 Sensitivity analysis

The results presented above rely strongly on the demography and macroeconomic assumptions considered. In order to assess the robustness of the projections several sensitivity tests were carried out. Each sensitivity scenario was computed in relation to the baseline scenario with the respective parameter change, *ceteris paribus*.

An increase in the employment rate of 1 percentage point does not change the results significantly, while a higher labour productivity scenario of 0.25 percentage points induces a decrease in total pension expenditure by 0.7 percentage points in 2060, as pension updating is no longer linked to wage increases (and productivity gains).

In relation to demography, we tested both the impact of an increase in life expectancy of one year by 2060 and the extreme assumption of zero migration. A one year increase in life expectancy leads to a rise in the pension expenditure ratio of 0.4 percentage points by 2060. This moderate increase reflects the counter

**Table 16**

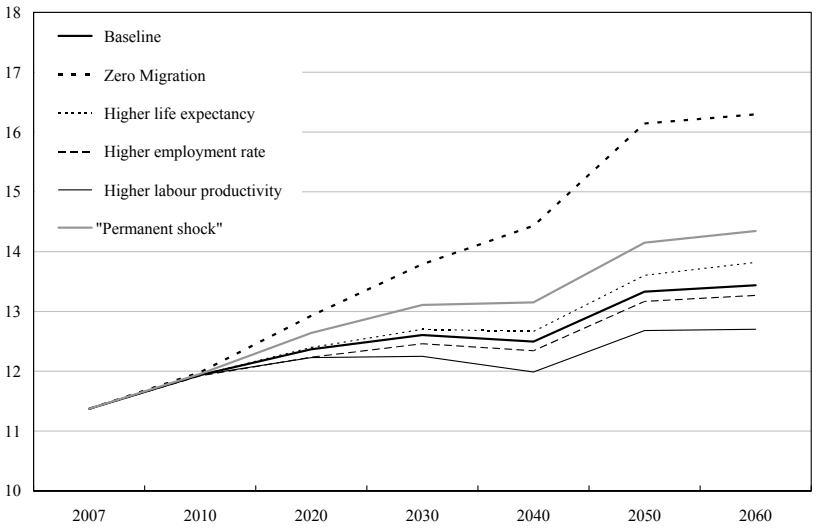
**Pension Distribution Effects**
*(unit: average growth rates, percent)*

| | Number of Years | |
|---|---|---|
| | **10** | **20** |
| IAS update | 2.31 | 2.36 |
| Pensions update | | |
| Before tax | 1.90 | 1.97 |
| After tax | 1.93 | 2.00 |
| Distribution of pensions* | | |
| Before tax | | |
| Percentile ratio (P75/P25) | –4.3 | –8.9 |
| Gini coefficient | –2.4 | –5.0 |
| After tax | | |
| Percentile ratio (P75/P25) | –4.3 | –8.7 |
| Gini coefficient | –2.6 | –5.2 |

Note: * End-of-period growth rates.
Source: authors' calculations.

**Figure 13**

**Pension Expenditure under Different Scenarios**
*(percent of GDP)*




Source: CGA, MTSS and authors' calculations.

**Table 17**

**Effects of a Permanent Economic Downturn**

| | 2007 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| Public pension spending | | | | | | |
| Baseline scenario | 11.4 | 12.4 | 12.6 | 12.5 | 13.3 | 13.4 |
| "Permanent shock" effect | 0.0 | 0.3 | 0.5 | 0.7 | 0.8 | 0.9 |
| | | | | | | |
| Public employees' pension spending | | | | | | |
| Baseline scenario | 4.1 | 4.0 | 3.9 | 3.1 | 2.4 | 2.2 |
| "Permanent shock" effect | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 |

Source: CGA, MTSS and authors' calculations.

effect of the sustainability factor, minimizing the pension expenditure exposure to the uncertainty of the evolution of life expectancy. The assumption of zero migration is by far the most extreme one, leading to an increase of the pension expenditure ratio by almost 3 percentage points in 2060 when compared with the baseline scenario. This assumption is associated to a reduction of employment and economic growth and, therefore, the GDP "denominator effect" exceeds the "numerator effect" of lower pension expenditure in the long term.

Given the more recent economic developments, which were not incorporated in the macroeconomic assumptions underlying the baseline scenario,[17] additional tests were made in order to evaluate the impact of the current economic downturn in the long term projections. At this juncture, it can be considered that the economic downturn is temporary and there will be a convergence to the baseline trend or, alternatively, that there will be a "permanent shock" in the terms of productivity growth and employment rate.

Even considering the "permanent" effects of the economic downturn, assuming a reduction of 0.25 percentage points in the productivity rate and an increase of 1 per cent in the unemployment rate, the projected expenditure for public pensions would rise by 0.9 percentage points of GDP in 2060 (Table 17). Considering only the public employees pension expenditure, the increase would be of 0.2 percentage points of GDP.

In case of a temporary shock, the effects on the pension spending projections would be minor, in particular in the long run. According to the modelling assumptions used, relatively lower productivity (and wages) in the short run would result in relatively lower pensions in the future but due to the "denominator effect", the pension expenditure as a share of GDP should still be higher than in the baseline scenario.

On the basis of the sensitivity tests' results, changes in the demography scenario may have larger effects on the pensions' projections than different macroeconomic assumptions (not considering second-order effects on demography). Pension expenditure revealed particular sensitivity to migration flows assumptions.

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[17] The long-term macroeconomic projections were based on the European Commission Spring 2008 prospects for 2008-10.

## 6 Public Finance Sustainability

Before the introduction of the most recent pension reform package (2006-08), the projected increase in the age-related public expenditure was extremely high, reaching 10.1 percentage points of GDP between 2004 and 2050. Out of this, 9.7 percentage points related to pension spending.[18] In its analysis of the long-term sustainability of public finances in the EU, the European Commission had classified Portugal as a high risk country in 2006. This assessment depends on the initial budgetary position of the Member State (*i.e.,* in the years considered by the annual updates of the national stability or convergence programmes), on the long-term projections on age-related expenditure, and on a wide range of other quantitative and qualitative indicators, as well.

One of these indicators is the sustainability gap S2, which measures the size of a permanent budgetary adjustment that allows fulfilling the inter-temporal budget constraint over an infinite horizon. This indicator may be decomposed into the impact of the initial budgetary position gap to debt stabilizing the primary balance (IBP) and the impact of the long-term change in the primary balance (LTC), which provides the additional adjustment required to finance the increase in public expenditure over an infinite horizon. It is usually computed for two scenarios: the baseline scenario, which takes the programme's first year structural primary balance into account, and the programme scenario that assumes that the medium-term programme objectives for the structural balances are achieved.

In the October 2006 Report, the sustainability gap S2 in the programme scenario was 5.2 percentage points of GDP, significantly above the EU average (1.6 percentage points), reflecting the high value of the LTC component (Table 18). Considering the effect of the recent reform measures, the value of this component halved, allowing a significant reduction in the sustainability gap S2 to 2.0 percentage points of GDP.

The latest sustainability evaluation was based on the January 2009 update of the Portuguese stability programme. It presents a deterioration of the structural balance to be achieved in 2011 vis-à-vis the previous years' programme, since it was updated due to the economic downturn and the fiscal stimulus package introduced in 2008/2009. However, it still considers the same long-term projections and the LTC component remains basically unchanged and S2 increases slightly to 2.3 per cent of GDP.

**Table 18**

**Sustainability indicator S2**
**Programme Scenario**

| | **IBP** (1) | **LTC** (2) | **S2** (3) = (1) + (2) |
|---|---|---|---|
| October 2006 *(2005-2009)* | –1.5 | 6.7 | 5.2 |
| March 2008 *(2007-2011)* | –1.2 | 3.2 | 2.0 |
| March 2009 *(2008-2011)* | –0.9 | 3.2 | 2.3 |

Source: European Commission.

[18] DGECFIN (2006).

With the consideration of the 2008 demography and macroeconomic assumptions, the projected trend for pension expenditure as a share of GDP is even more contained (+2.1 percentage points of GDP between 2007 and 2060), which should allow a reduction in the sustainability gaps and to improve the sustainability of the Portuguese public finances, *ceteris paribus*.

## 7 Conclusion

In 2006, the projected increase of 10.1 percentage points of GDP in the age-related public expenditure between 2004 and 2050 was unsustainable. The need to foster a deep reform of the Social Security system and, in particular, of the CGA system, where the underlying conditions to determine and update pensions were much more generous, became quite stringent. The reform that was implemented relied on a set of structural changes of which we analyze the two most important ones: the implementation of a sustainability factor that links the pension value to the evolution of life expectancy at 65 years old and a new rule for updating pensions.

These reform measures have an estimated effect of reducing public pension expenditure by about 4 percentage points of GDP by 2060. More than 50 per cent of this result is explained by the introduction of the sustainability factor that accounts for 2.4 percentage points of GDP. Equally important is the fact that this sustainability factor significantly reduced the systems vulnerability to changes in the demographic scenario as increases in life expectancy have a minor impact on future pension expenditure.

We also analyze the distributive impact of the new rule for updating pensions and conclude that a significant reduction of the gap between pensions can be forecasted, which may contribute to the system stability but have an undetermined effect on the decision of high wage contributors to postpone their retirement age: either they prefer an initial higher pension or more "generous" future updates.

The importance of this issue and the more demanding macroeconomic environment require further analysis of the impact of the reform measures implemented in 2006. An unexplored dimension of the reform is modelling the agents' reaction to the new system of financial incentives related to the decision of whether or not to postpone the retirement age. In reality, while the bonus for each year of contributions to the system may lead agents to postpone retirement, the sustainability factor may have the opposite effect. Understanding under which conditions each one of them prevails should be of interest to both academics and policy makers.

## ANNEX A
## THE EVOLUTION OF THE PORTUGUESE PUBLIC PENSION SYSTEM

| | |
|---|---|
| End XIX century | First institutions of social protection for the elderly (state industry employees followed by other public and private corporations employees) |
| 1919 | Introduction of mandatory social insurance (first attempt) for employees (some sectors) with low income |
| **1929** | **Creation of the public employees old-age pension scheme (Decree No. 16669 of 27 March)**<br>**Maximum retirement age: 70 years old** |
| **1934** | **Introduction of survivors pensions for public employees (Decree-Law No. 24046 of 21 June)** |
| 1935 | Definition of the general framework of social insurance<br>Old-age and disability pensions financed on a funded basis |
| 1962 | Social Security reform (Law no. 2115 of 15 June and others) with enlargement of social protection for industry, trade and services employees and financed on mixed basis (funded and PAYG) |
| 1972 | Definition of the pensions scheme for agricultural workers (Decree-Law No. 391/72 of 13 October) |
| **1972** | **Creation of *Estatuto da Aposentação* (Decree-Law No. 498/72 of 9 December), integrated legal framework of public employees retirement regime:**<br>**i) wider coverage of the scheme, including contributors aged 55 or older**<br>**ii) pension entitlement with 15 years of contributions to public employees scheme or private employees**<br>**iii) contributory rate: 6 per cent employees**<br>**iv) retirement conditions: aged 60 and contributory career 40 years (full pension)**<br>**v) pension amount: last net wage (or average last 10 years if higher) or in the proportion of the contributive career if less than 40 years**<br>**vi) more favourable conditions for military personnel**<br>**vii) pensions update on a discretionary basis but in practice following public sector wages** |
| 1973 | Minimum entitlement contributory period:<br>5 years for disability pensions and 10 years for old age pensions |
| 1974 | Transition for a unified system of Social Security (Decree-Law No. 203/74 of 15 May)<br>Introduction of social pension for disabled (above 65)<br>Introduction of 13$^{th}$ month for all pensioners |

| | |
|---|---|
| 1975 | First regulation of the State participation in the financing of the Social Security pensions system<br>Introduction of survivors pensions for agricultural scheme |
| 1977 | New organics of Social Security (Decree-Law No. 549/77)<br>Inclusion of self-employed and housewives (or -men)<br>Introduction of means-tested social pension for all above 65<br>Reduction in the minimum entitlement contributory period:<br>3 years for disability pensions and 5 years for old pensions |
| **1979** | **Reduces the full pension condition to 36 contributive years and minimum period for pension entitlement to 5 years (Decree-Law No. 191-A/79 of 25 June)** |
| 1980 | Definition of the non-contributory regime of social security<br>(Decree-Law No. 160/80 of 27 May) |
| 1982 | Enlargement of the minimum entitlement contributory period:<br>5 years for disability pensions and 10 years for old age pensions |
| 1984 | First Social Security Framework Law (Law No. 28/84 of 14 August)<br>System PAYG: contributive regime financed by employees and employers contributions and non-contributive regime financed by State transfers<br>Pensions updates taking into account consumer prices prospects |
| **1985** | **Increases the contributory rate of public employees to CGA to 6.5 per cent (Decree-Law No. 40-A/85 of 11 February)**<br>**The rate for survivors pensions is 1.5 per cent** |
| 1986 | Determines a standard contributory rate for the general regime of Social Security: 24 per cent for employers and 11 per cent for employees (lower rates for special regimes) |
| **1988** | **Extends the CGA coverage to private schools teachers (Decree-Law No. 321/88 of 22 September)** |
| 1990 | Introduction of 14$^{th}$ month for all pensioners<br>(Ordinance No. 470/90 of 23 June) |
| **1993** | **Revision of *Estatuto da Aposentação* (Decree-Law No. 277/93 of 10 August and others): from September on, the pension scheme of new public employees became subject to the rules of the private sector system (Social Security General Regime)** |

| | |
|---|---|
| 1993 | Reform of the Social Security general regime (Decree-Law No. 329/93 of 25 September):<br>Enlargement of the minimum entitlement contributory period: from 10 to 15 years for old age pensions<br>Gradual increase of legal retirement age of women from 62 to 65 years (the same as men)<br>Revision of the contributory rate of Social Security to 35.5 per cent |
| **1994** | **Increases the contributory rate of public employees to CGA old-age pensions to 7.5 per cent and to survivors pensions to 2.5 per cent, similar to Social Security contributors (Decree-Law No. 78/94 of 9 March)** |
| 1995 | Reduction of the standard contributory rate of Social Security by 0.75 percentage points to 34.75 (increase of the VAT standard rate by 1 percentage point earmarked to Social Security) |
| 1999 | Decomposition of the contributory rate of Social Security (34.75 per cent) (Decree-Law No. 200/99 of 8 June) |
| 2002 | New Framework Law for Social Security (Law No. 32/2002 of 20 December)<br>Convergence of earnings-related minimum pensions to national minimum wage<br>Revision of new pension formula: transitory period for new rules taking into account the whole contributive career from 2017 on (Decree-Law No. 35/2002) |
| **2002** | **Early retirement (old-age) pension is possible with 36 contributive years and a penalty of 4.5 per cent per year earlier than 60 years old (Law No. 32-B/2002 of 30 December)** |
| **2005** | **Revision of *Estatuto da Aposentação* (Law No. 60-B/2005 of 29 December) – further convergence of CGA and Social Security pension regimes:**<br>**i) from 2006 on, new public employees are enrolled in Social Security System**<br>**ii) progressive increase in legal retirement age to 65 years old (until 2015) for all public employees and of career length to 40 years (until 2013)**<br>**iii) convergence of new pensions formula for contributors enrolled in CGA until August 1993** |
| 2007 | Reform of the Social Security pension regime (revision of the Framework Law – Law No. 4/2007 of January 16 and Decree Law No. 87/2007 of May 10) |
| **2007** | **Transposition of Social Security reform measures to CGA from 2008 on, with a transitory period until 2015 (Law No. 52/2007 of 31 August)** |
| **2008** | **Convergence (until 2015) of the minimum contributive career from 36 to 15 years to be entitled to a early retirement pension (Law No. 11/2008 of 20 February)** |

Note: text in bold refers specifically to CGA.
Source: CGA and Ministry of Labour and Social Solidarity.

# ANNEX B
# MAIN ASSUMPTIONS UNDERLYING THE LONG-TERM PROJECTIONS

## Demography

| | 2008 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| Life expectancy | | | | | | |
| at birth | 78.7 | 80.6 | 82.0 | 83.4 | 84.7 | 85.9 |
| males | 75.5 | 77.6 | 79.3 | 80.8 | 82.3 | 83.6 |
| females | 82.1 | 83.7 | 84.9 | 86.1 | 87.3 | 88.3 |
| at 65 years old | 18.2 | 19.6 | 20.7 | 21.9 | 23.1 | 24.1 |
| males | 16.3 | 17.6 | 18.7 | 19.7 | 20.7 | 21.6 |
| females | 19.9 | 21.1 | 22.1 | 23.0 | 23.9 | 24.8 |
| Population (10^9) | 10.599 | 11.080 | 11.299 | 11.443 | 11.458 | 11.289 |
| Dependency ratio (DR) *(percent)* | | | | | | |
| young DR –15/15-64 | 22.8 | 22.1 | 20.9 | 21.6 | 22.9 | 22.7 |
| old-age DR +65/15-64 | 25.9 | 30.7 | 36.6 | 44.6 | 53.0 | 54.8 |

Source: Eurostat (EUROPOP2008).

## Macroeconomic Scenario

| | 2008 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| Labour productivity growth (hours worked) *(percent)* | 1.2 | 1.8 | 2.7 | 2.2 | 1.7 | 1.7 |
| Labour input growth (15-71) | 0.3 | 0.3 | –0.1 | –0.4 | –0.5 | –0.3 |
| GDP growth (real) | 1.5 | 2.1 | 2.5 | 1.8 | 1.2 | 1.4 |
| Employment rate (15-64) | 68.4 | 71.4 | 71.6 | 71.7 | 71.8 | 71.6 |
| Unemployment rate (15-64) | 8.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |

Source: EPC (2008).

## ANNEX C
## CGA MODEL

The pension model used for the CGA projections is an accounting/actuarial model that allows a detailed parameterization of the system, including the simulation of different demography or macroeconomic assumptions and changes in the reform parameters. However, as it is not a general equilibrium model it does not permit endogenous analysis of the changes in supply and demand and in the consumption and investment decisions of economic agents stemming from their adjustment, for example, to the reforms in social security that were enacted.

### 1 Assumptions and methodology

The model has four main modules: the first one relates to input data (including macroeconomic and demography data), the second one comprises the dynamics for contributors and number of pensions, the third one refers to the dynamics of contributions and pensions and the last one provides the outputs. Modules two and three are structured by age and gender strata in order to allow more precise results.

### 2 Module for contributors and pensioners dynamics

Due to the fact of CGA being a closed system, the *dynamics of contributors* is quite simple: the number of contributors decreases each year due to mortality and to other motives like moving to the private sector or exoneration. The number of CGA contributors at the end of year is given by:

$$C_{t,a,g} = C_{t-1,a-1,g} \times \left(1 - \mu_{t,a,g} - \pi_{t,a,g}\right) - np_{t,a,g} \tag{6}$$

where:

$C_{t,a,g}$: Number of CGA contributors in year *t*, for age $a$ and gender *g*

$\mu_{t,a,g}$: Mortality rate in year *t*, for age $a$ (for those who would complete age $a$ during year *t*) and gender *g*

$\pi_{t,a,g}$: Contributors rate of exoneration in year *t*, for age $a$ and gender *g*

$np_{t,a,g}$: Number of new pensioners (includes old-age pensioners and disability pensioners) in year *t*, for age $a$ and gender *g*.

In the "open system" variant, the dynamics of contributors was slightly changed in order to include entrants from each year. The end-2007 stock was adjusted by the new public employees enrolled in 2006 and 2007, and between 2008 and 2011 it was assumed that the number of new public employees was around half of the new retirees in each year. The age and gender distribution was assumed to be the same as the distribution of new public employees in 2005. From 2012 on it was considered that the entries in the public sector were such that allowed to keep the share of public in total employment (around 12 per cent).

The *dynamics of pensioners*[19] is calculated for old age and disability pensioners together and for survivors separately. The stock of pensioners increases with new pensioners and decreases

[19] More precisely, available data refer to the number of pensions and not the number of pensioners.

according to pensioners' mortality. In this model, survivor pensioners also depend on a "depreciation rate" that applies mainly to when descendents conclude their studies.

### *2.1 Old age and disability pensioners*

New pensioners (and pensions) are computed according to the legal regime that applies to each type of contributors: regime of *Estatuto de Aposentação* (that applies to public employees registered in the CGA until August 1993) and the social security regime that applies to public employees registered in the CGA between September 1993 and December 2005. For each legal regime, new pensioners are projected with a breakdown by motive: disability, old age (including early retirement) or age limit (at 70 years old).

New pensioners are computed by using "retirement probabilities". The later are defined as the base year ratios of new pensioners over contributors, for those who are aged less than 70. This means that new pensions are not determined only as a function of the legal criteria.

Number of new old-age pensioners:

$$op_{t,a,g} = op_{t-1,g,a-1} \times \frac{C_{t-1,g,a-1}}{C_{t-2,g,a-1}} \tag{7}$$

where: $op_{g,a}(t)$: Number of new old-age pensioners during year *t* for age $a$ and gender *g*.

In the case of old age, including early pensioners, the above mentioned ratios move along legal retirement age (LRA).[20] It should be recalled that the LRA for CGA contributors is increasing from 60 years old in 2005 to 65 years old in 2015, at a pace of 6 months per year, in order to achieve convergence to the private sector regime.

It was assumed that the retirement probabilities for disabled do not change with the above-mentioned increase in the LRA.

The number of CGA new disability pensioners is given by:

$$dp_{t,a,g} = dp_{t-1,a,g} \times \frac{C_{t-1,a-1,g}}{C_{t-2,a-1,g}} \tag{8}$$

where: $dp_{t,a,g}$: Number of new disability pensioners in year *t*, for age $a$ and gender *g*.

The dynamics for the number of old-age and disability pensioners at the end of year *t* is given by:

$$Op_{t,a,g} = Op_{t-1,a-1,g} \times \left(1 - \mu_{t,a,g}\right) + op_{t,a,g} + dp_{t,a,g} \tag{9}$$

where: $Op_{t,a,g}$: Number of old-age and disability pensioners at the end of year *t* for age $a$ and gender *g*.

### *2.2 Survivor pensioners*

New pensioners are a function of old age and disability pensioner's mortality. In the past, on average, 80 per cent of pensioners who died had a survivor entitled to a pension, but this

[20] For pensioners aged between LRA-10 and 70 (age limit).

percentage is expected to decrease (to near 60 per cent), as spouses beneficiaries tend to have their own wage/ pension and would not be eligible to a survivor pension and the number of children tend to decrease as well. Having the estimate for total new survivors' pensioners, the age and gender distribution is the same of base year.

It is also considered that the stock of survivor pensioners depend on a "depreciation rate" that applies mainly to descendants when conclude their studies. So it is necessary to divide the age strata into the following:

- $18<a<27$

$$Sp_{t,a,g} = Sp_{t-1,a-1,g} \times \left(1 - \mu_{t,a,g} - \chi_{t,a,g}\right) + sp_{t,a,g} \tag{10}$$

- Other $a$

$$Sp_{t,a,g} = Sp_{t-1,a-1,g} \times \left(1 - \mu_{t,a,g}\right) + sp_{t,a,g} \tag{11}$$

where:

$Sp_{t,a,g}$ : Number of survivor pensioners in year $t$, for age $a$ and gender $g$

$sp_{t,a,g}$ : Number of new survivor pensioners in year $t$, for age $a$ and gender $g$

$\chi_{t,a,g}$ : Depreciation rate of the survivor pensioners stock, unrelated to the death of the beneficiary in year $t$, for age $a$ and gender $g$

## 3 Module for contributions and pensions' dynamics

Contributions to CGA are a fixed percentage of employees' remuneration (10 per cent supported by employees and 13.1 per cent by the employer).[21] Therefore, the contributions dynamics depends on the remunerations evolution. The data available for 2007 contained average values for remunerations of the subscribers by age and gender strata. The actualized and adjusted average remuneration is:

$$W_{t,a,g} = \max\left(W_{t-1,a,g} \times \left(1+\gamma_t\right); W_{t-1,a-1,g} \times \left(1+\gamma_t\right)\right) \tag{12}$$

where: $\gamma_t$ is the annual update rate for public sector wage scale.

Contributions in each year are given by:

$$Cont_{t,a,g} = \tau_t \times W_{t,a,g} \times C_{t,a,g} \tag{13}$$

where: $\tau_t$ is the CGA's contributory rate.

The average old-age pension is determined by:

$$Pens_{t,a,g} = \frac{\left[\left(Op_{t,a,g} - op_{t,a,g}\right) \times Pens_{t-1,a-1,g} \times \left(1+\alpha_t\right) + op_{t,a,g} \times npens_{t,a,g}\right]}{Op_{t,a,g}} \tag{14}$$

---

[21] In practice, only some general government subsectors employers actually contribute to CGA, while in the case of State it makes an annual transfer to CGA. However, the contributory rate of 13.1 per cent was considered to all employers (as an imputed one, in the case of State) by analogy with the contributory rate to Social Security general regime of new public employees.

where: $\alpha_t$ represents annual pension update and $npens_{t,a,g}$ is the new old-age pension in year $t$, for age $a$ and gender $g$.

$npens_{t,a,g}$ is calculated according to the rules presented in Table 6 for the *Estatuto da Aposentação* contributors and for other public employees (rule B) separately. It is assumed that public employees hired between September 1993 and 2001 will not retire before 2017.

Total old-age and disability pensions expenditure is given by:

$$TE_{t,a,g} = pens_{t,a,g} \times (Op_{t,a,g}) \tag{15}$$

The dynamics of survivor's pensions follows the old-age pension's one:

$$SurvPens_{t,a,g} = \frac{\left[(Sp_{t,a,g} - sp_{t,a,g}) \times SurvPens_{t-1,a-1,g} \times (1+\alpha_t) + sp_{t,a,g} \times nsurvpens_{t,a,g}\right]}{Sp_{t,a,g}} \tag{16}$$

where $\alpha_t$ represents annual pension update (the same of old age pensions) and $nsurvpens_{t,a,g}$ is the new survivors pension in year $t$, for age $a$ and gender $g$.

Each new survivor's pension, according to the law, is equivalent to 50 per cent of the old age pension that originate it. In the model, it was assumed the average new survivors pensions to be around 40 per cent of the average old age pensions.

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# PENSION PLAN REVISION AND FISCAL CONSOLIDATION OF JAPAN

*Motonobu Matsuo*[*]

## Introduction

Japanese fiscal position is the worst among developed countries. One of the main reasons is the expansion of social security expenditure due to rapid aging. Social security expenditure accounts for almost half of the general expenditure of Japanese budget, and is growing very rapidly every year.

Therefore both Japanese social security reform and fiscal reform are indispensable to maintain sustainable social security and fiscal policy.

In this standpoint I want to discuss following issues:

1) first point is to show that Japanese fiscal position is very bad and aging progresses very rapidly. These two points are big constraints in terms of maintaining Japanese fiscal as well as social security sustainability;
2) second point is to explain the Pension Revision of 2004. The basic idea consists of following three points:

   (1) fixing future premium level legally to avoid putting too much burden on the future working age people,

   (2) introducing the system to adjust indexation to respond the aging society as well as decrease of the population of working age people,

   (3) raising the ratio of state subsidy for Basic Pension from about 1/3 to half to maintain the level of the pension. This costs extra 2.5 trillion yen (around 2.5 billion US Dollars);[1]
3) last point is to explain Japanese effort towards fiscal consolidation. Since Japan had to deal with the raise of the ratio of state subsidy to the Basic Pension, as well as stimulus package, Japan needed fiscal reform including obtaining stable revenue resources. Thus last year Japanese government decided "The Medium-term Program" concerning tax reform and social security.

## 1 Japanese aging society and current fiscal position

### *1.1 Japanese aging society*

Figure 1 shows that Japanese aging is progressing faster than any other developed countries. The ratio of population older than 65 is already above 20 per cent in 2005, expected to go up to 30.5 per cent in 2025 and 39.6 per cent in 2050.

The main causes of the aging are:

1) continuous decline of the *total fertility rate*. Total fertility rate is 1.34 in 2008, it was 4.57 in 1947 and it became less than 2 in 1975.[2] 2008 figure was slightly recovered from previous year's 1.32;

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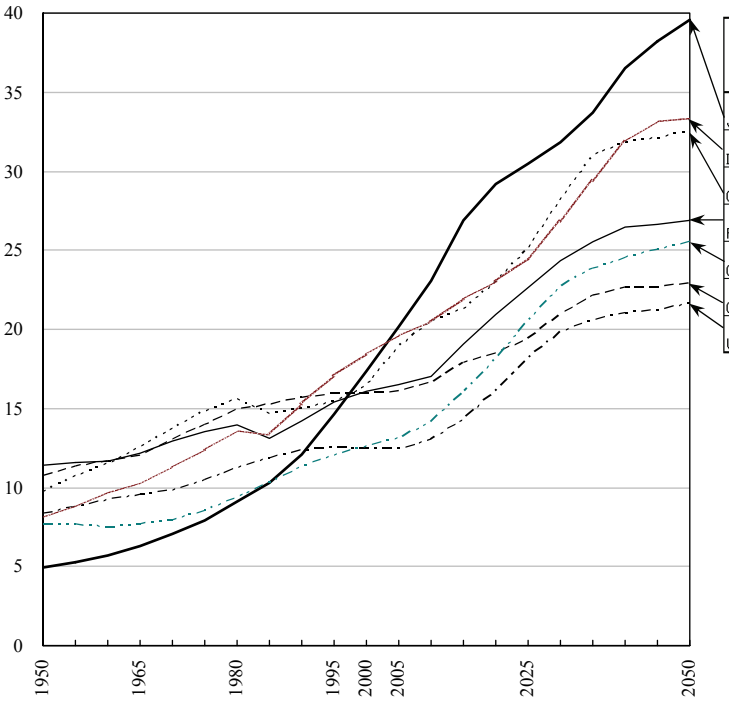
This paper is a compilation of the author's presentation at the workshop held in Perugia, Italy on March 25-27, 2009.

The article is based on the author's personal view and should not be regarded as reflecting official stance of the Japanese government.

[1] Calculate with exchange rate 100 yen per dollar.

**Figure 1**

**Aging in Japan**
*(percent)*




(%)

| (CY) | 1965 | 1980 | 1995 | 2000 | 2005 | 2025 | 2050 | 1965 ↓ 1995 | 1995 ↓ 2025 | 2025 ↓ 2050 |
|---|---|---|---|---|---|---|---|---|---|---|
| Japan | 6.3 | 9.1 | 14.6 | 17.4 | 20.2 | 30.5 | 39.6 | 8.3 | 15.9 | 9.1 |
| Italy | 10.2 | 13.5 | 17.0 | 18.4 | 19.6 | 24.4 | 33.3 | 6.8 | 7.4 | 8.9 |
| Germany | 12.5 | 15.6 | 15.4 | 16.4 | 18.9 | 25.1 | 32.5 | 2.9 | 9.7 | 7.4 |
| France | 12.2 | 14.0 | 15.4 | 16.1 | 16.5 | 22.6 | 26.9 | 3.2 | 7.2 | 4.3 |
| Canada | 7.7 | 9.4 | 12.0 | 12.6 | 13.1 | 20.5 | 25.5 | 4.3 | 8.5 | 5.0 |
| G.B. | 12.0 | 14.9 | 15.9 | 15.9 | 16.1 | 19.4 | 22.9 | 3.9 | 3.5 | 3.5 |
| U.S. | 9.5 | 11.2 | 12.5 | 12.4 | 12.4 | 18.1 | 21.6 | 3.0 | 5.6 | 3.5 |

Note:
Figures for Japan from Ministry of Internal Affairs and Communications, *National Census*, and National Institute of Population and Social Security Research (December 2006), *Population Projections for Japan: 2006-2055.*
Figures for other countries are based on UN projections.

2) continuous longevity. Average life expectancy in Japan was 79 years for male and 85.81 years for female in 2006.[3] In 1947 it was 50 years for male and 54 years for female, so both have become almost 30 years longer in 60 years. Main cause of recent longevity is medical improvement such as treatment with cancer, heart disease, cerebrovascular.

Figure 2 shows the Japanese Population Pyramid. As like other countries, there exist two baby-boomers generations.

The first one is the first baby boomers, 6.73 million people in 2007,[4] born just after WW2 (1947-1949). They are shown in red poles, and beginning to reach retiring age. By 2011 the first baby boomers will begin to reach 65 years and receive formal pension. By 2015 all the first baby boomers receive pension, and they are beginning to be eligible for the late-stage medical care system for the elderly, which covers people more than 75 years old and is financed by tax revenue as well as contribution from other generations.[5]

The first baby-boomers are now in the supporting side of the Japanese social security, but by 2011 or mid-2010s, they are to become being supported by younger generations. This explains why Japanese Government fiscal consolidation targets were Year 2011 or mid 2010s. That is, Japan has to prepare for the first baby-boomers social security expenditure.

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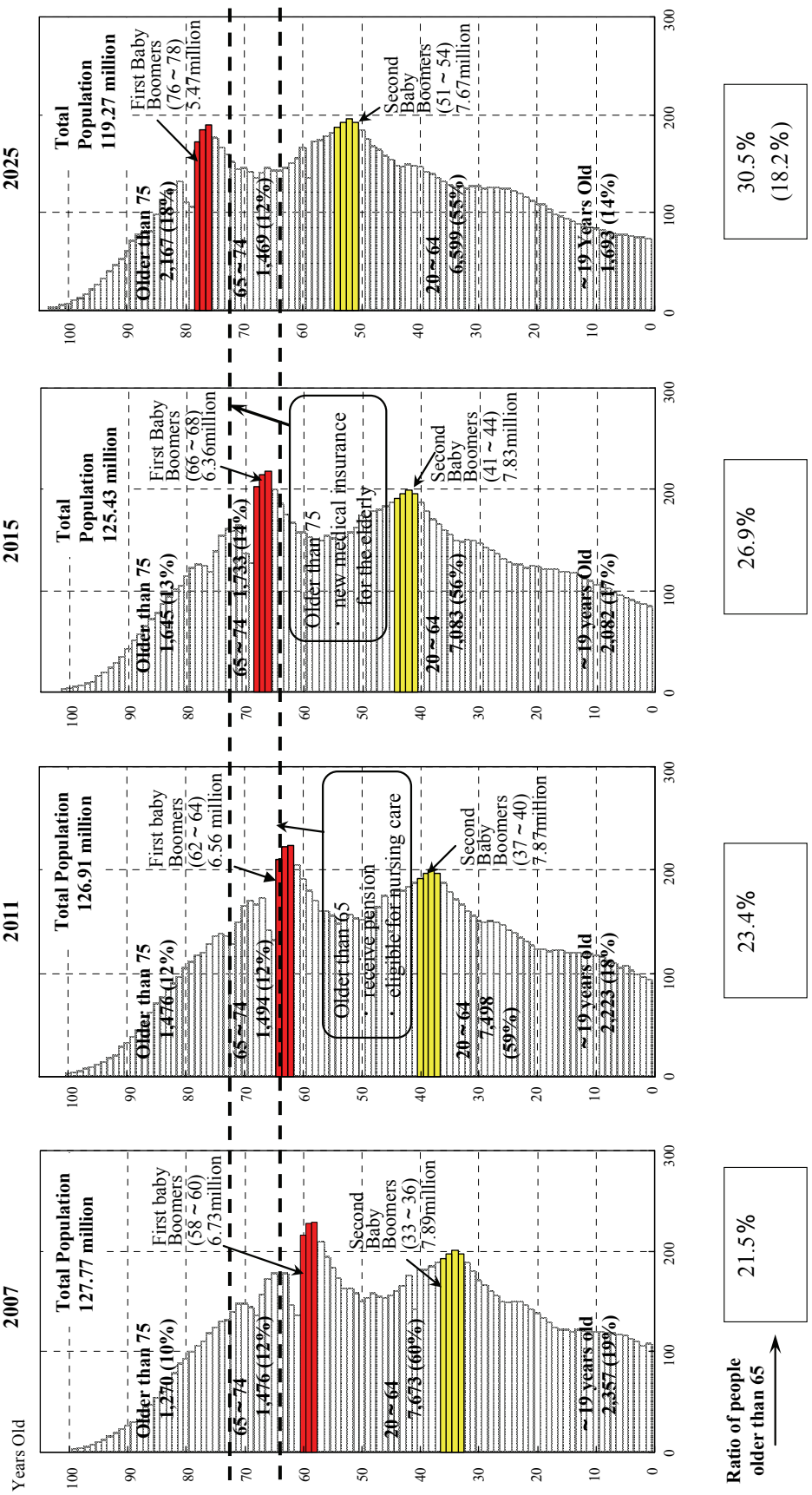
2 Registration of vital statistic in 2008, Ministry of Health, Labor and Welfare.

3 Life table in 2006, Ministry of Health, Labor and Welfare.

4 Figures from "National Census" (the Ministry of Internal Affairs and Communications) and "Population Projections for Japan: 2006-2055" (National Institute of Population and Social Security Research, December 2006).

5 For the late-stage medical care system for the elderly, the co-payment is 10 per cent, and the rest is financed by; 10 per cent from insurance fee of elderly, 40 per cent from younger generation's insurance fee, and 50 per cent is from tax.

**Figure 2**




Note: Figures for Japan from Ministry of Internal Affairs and Communications, *National Census*, and National Institute of Population and Social Security Research (December 2006), *Population Projections for Japan: 2006-2055*.

Figure 3 shows Japanese economy and population of the past and the future.

In 1961 Japan had implemented universal pension coverage and universal medical care coverage system. Those reforms were done during so-called high-growth period, the economy was catching up with other developed countries and growth rate was above 10 per cent. The ratio of working age people (20-64 years old) against elder people (65 years old~) was very high (in 1965 9.1 times). High growth rate combined with young population meant plenty room for social security improvements at that time.

Since then growth rate has dropped, the ratio of elder people has increased dramatically, and the ratio of working age people decreased. In 2025 every 2 working age persons will have to support one elder person and in 2050 almost every single working age person will have to support one elder person.

Take a look at this figure from political side. At the bottom of the figure is the elderly people's share among Japanese voters.

Generally speaking, the bigger the ratio of elderly population is, the more difficult to implement policy change which put burden on, or cut benefit from, elderly people. In 2007 the elder people's ratio among voters is 26 per cent, and already more than a quarter of the voters are more than 65 years old. In 2025 the ratio will go up to more than one-third, and in 2050 the ratio will be 45 per cent.

It is said that elderly people tends to have high election turnout. In 2005 general election, election turnout of elderly people (more than 65 years old) is 73.5 per cent, on the other hand that of working age people (20-64 years old) is 66.4 per cent.[6] If you use these numbers automatically, the voting power of elderly people in 2007 was now 28.4 per cent,[7] slightly less than three-tenth. Since people begin to think about their post-retirement life when their age is close to 65 years old,[8] the potential voting power of elderly people might be even bigger than the figures above.

This political point of view also justifies the fact that Japanese fiscal reform targets were 2011 or mid 2010s, before First Baby-boomers become supported side.

### *1.2 Japanese fiscal position*

Figure 4 is the international comparison of fiscal balance to GDP. In 1990s developed countries other than Japan succeeded in fiscal consolidation. On the other hand, Japanese fiscal balance worsened, suffering from the largest fiscal deficit among the major advanced economies, as a result of economic slump and aging society.

Now the fiscal balance is becoming more and more devastating because of the world economic turmoil caused by sub-prime problem.

The debt was accumulated in the 1990s, which is often called "lost decade" after Japanese bubble economy collapsed.

Figure 5 shows that the ratio of general bonds to GDP has increased from 37 per cent (FY1990) to 120 per cent[9] (FY2009), the increase is astounding 83 per cent, and a total of

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[6] 2005 general election for lower house, figures from the association of promoting fair elections.

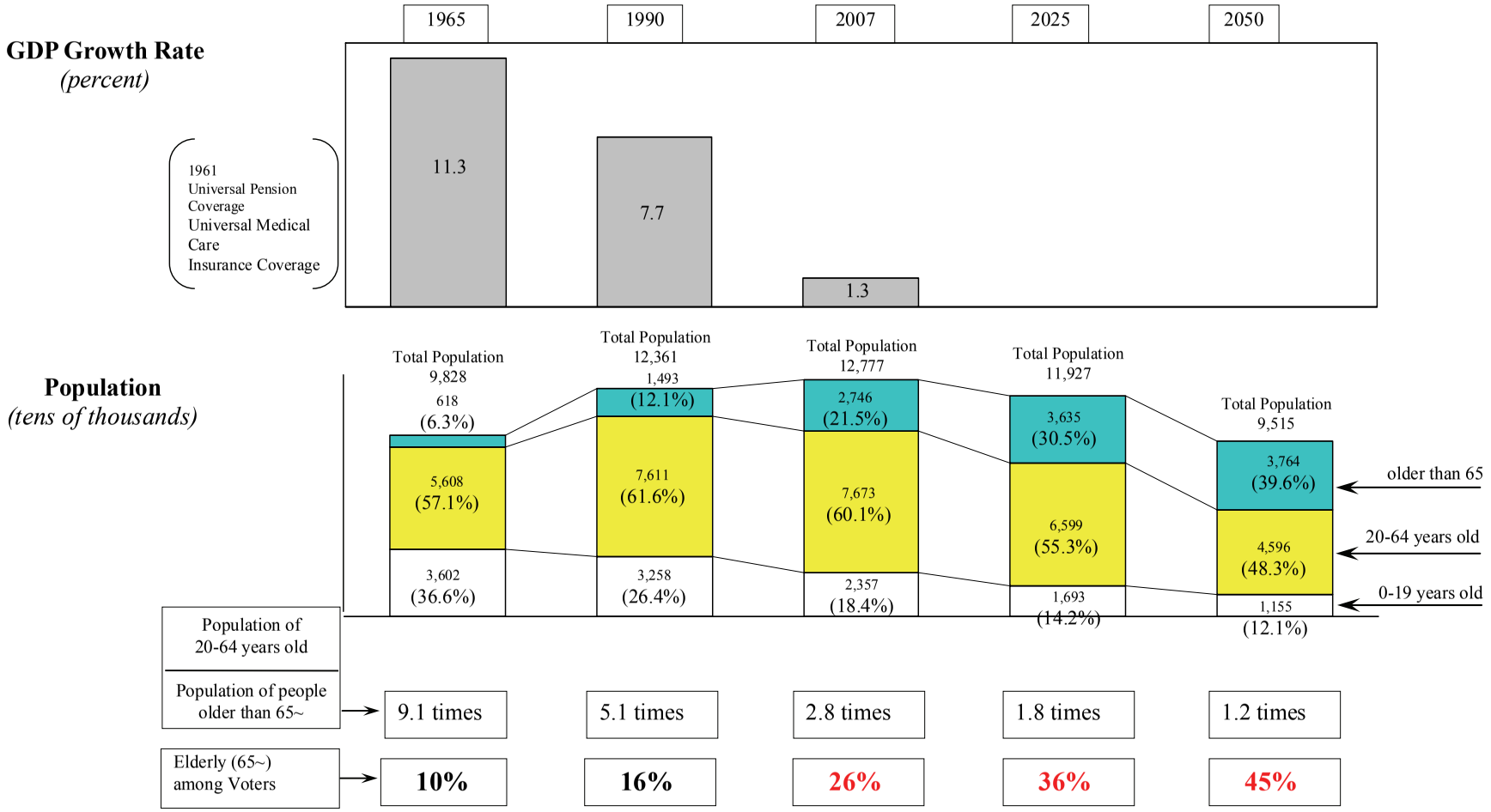
[7] The ratio of elderly people (2007) × elderly election turnout (2005) against elderly people (2007) × elderly turnout (2005) + working age people (2007) × working age turnout (2005).

[8] According to the questionnaire, 83.3 per cent of 50-59 years old male and 92.5 per cent of 50-59 female think about their old age. (Poll about public pension system, Cabinet Office, April 2003).

[9] The ratio drastically worsened from 2008 (105 per cent).

**Figure 3**

## The Economy and Population of Japan, Past and Future

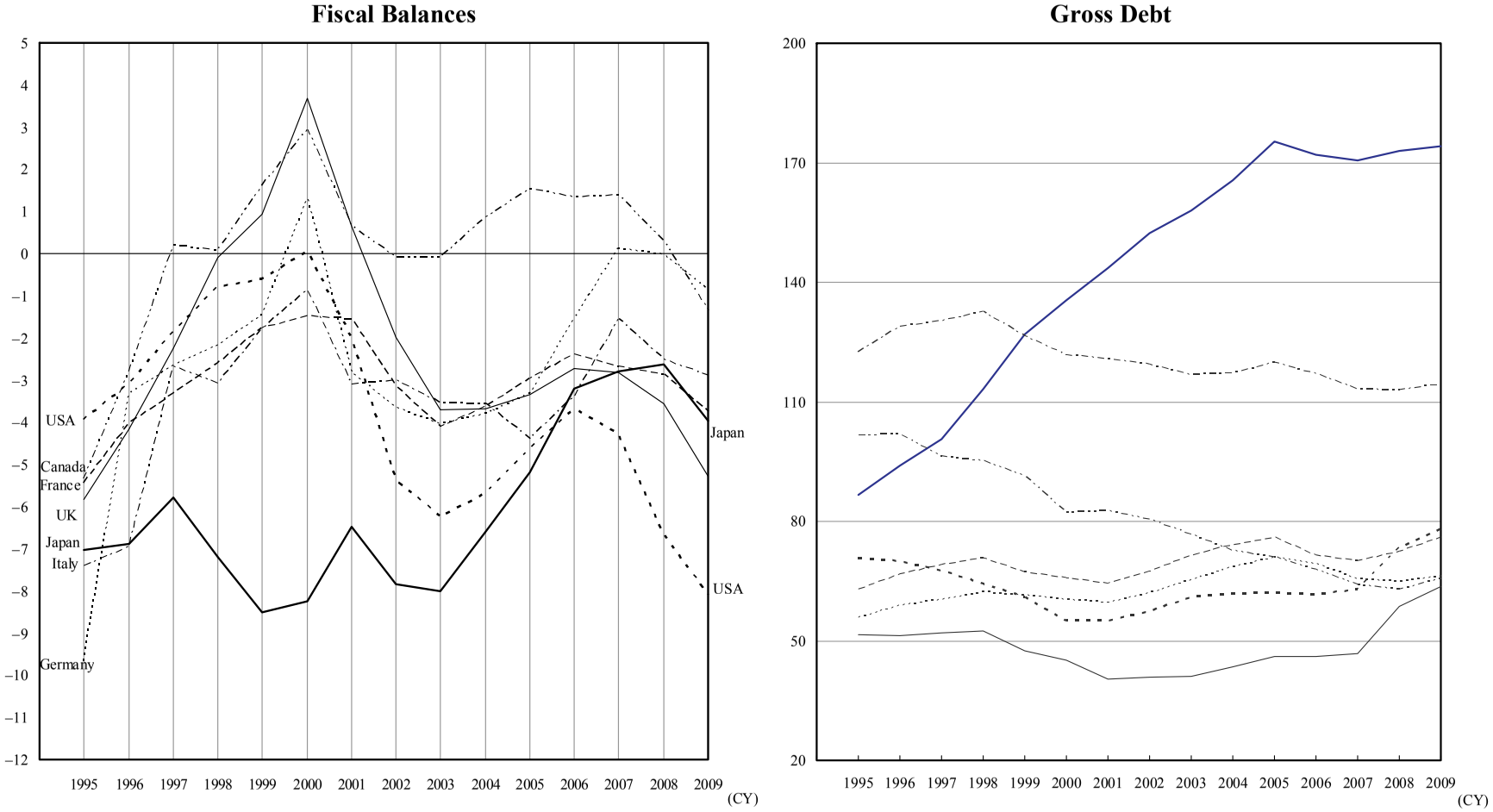



Note: Figures from Ministry of Internal Affairs and Communications, *National Census*, and National Institute of Population and Social Security Research (December 2006), *Population Projections for Japan: 2006-2055.*

**Figure 4**

## General Government Fiscal Balances and Gross Debt – International Comparison

*(percent)*




FY2009 budget is not reflected in the above data.
Japanese figures in FY1998 and FY2005-FY2009 are adjusted in order to exclude special factors.

FY2009 budget is not reflected in the above data.

**Figure 5**

**Factors for Increase in General Bonds Outstanding**

Increase in General Bonds Outstanding from FY1990 to FY2009: 415 trillion yen
(Ratio to GDP: FY1990: 37.0% → FY2009: 120.0% (+83 percentage points)

*(component percentages)*

Contribution of Expenditures: 165 trillion yen (40%)

Social Security related expenditures: 127 trillion yen (31%)

Public works related expenditures: 62 trillion yen (15%)

Other expenditures excluding debt redemption: –24 trillion yen (–6%)

Effect of decline in tax revenues: 154 trillion yen (37%)

Other Factors (e.g. succession of debt from JNR, bad-loan disposal): 46 trillion yen (11%)

Difference in revenue and expenditure in FY1990: 50 trillion yen (12%)

415 trillion yen, mainly because Japan had to deal with tax revenue decrease, stimulus measures and aging society at the same time.

1) 40 per cent of this increase is due to an increase in expenditures including social security.
   - Among them, social security expenditure accounts for 31 per cent, almost one-third of the deficit making. So pension reform, health care reform and nursing reform were indispensable.
   - 15 per cent of the increase is from public works, which was accumulated during successive stimulus fiscal measures to boost economy.
2) 37 per cent, the biggest single cause, is the decline in tax revenues due to the economic downturn. Corporate tax revenue dropped sharply, and tax cuts were implemented to boost economy.
3) Other factors such as succession of debt from privatized companies and bad-loan disposal occupy 11 per cent of the increase. The drastic drop of the asset prices brought about bad loans of the banks, and taxpayer funds were then used.
4) The difference in revenue and expenditure that already existed in FY1990 shares 12 per cent as well.

Figure 6 shows international comparison of benefit and burden. Upper figure shows social security benefit level of each country. You can describe Japanese social security level as Medium-size if you compare with U.S. (rather small) and Germany, France (rather big).

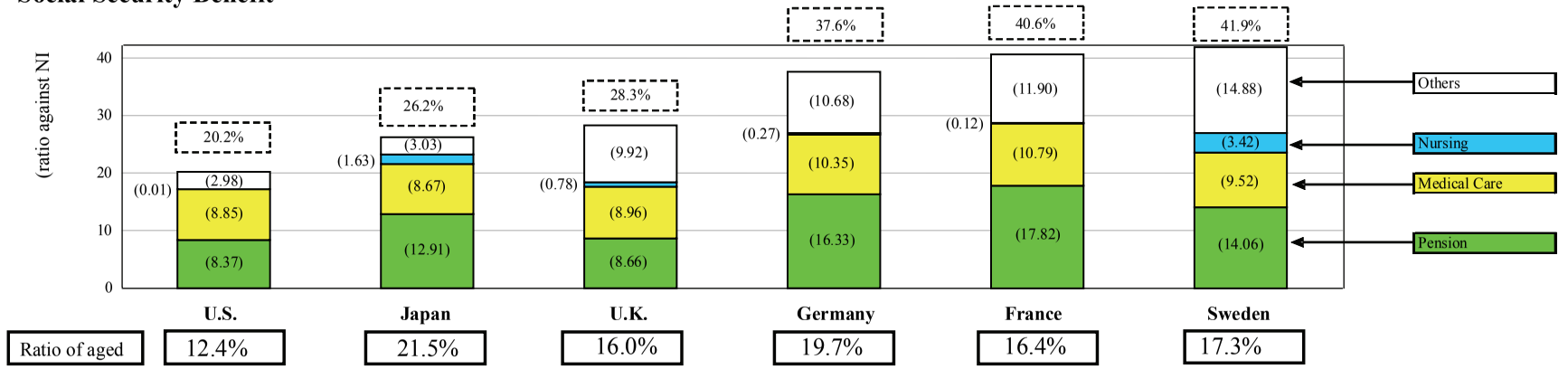
Lower figure shows national burden plus fiscal deficit. If you deduct social security benefit from national burden and deficit, the result is ranged from 16.5 per cent (Germany) – to 24.3 per cent (Sweden), around 20 per cent. That is, around 20 per cent of NI is used to expenditures other than social security benefit. So roughly speaking, social security benefit plus 20 per cent becomes the size of national burden (and deficit). The level of national burden is

**Figure 6**

## Benefit and Burden – International Comparison

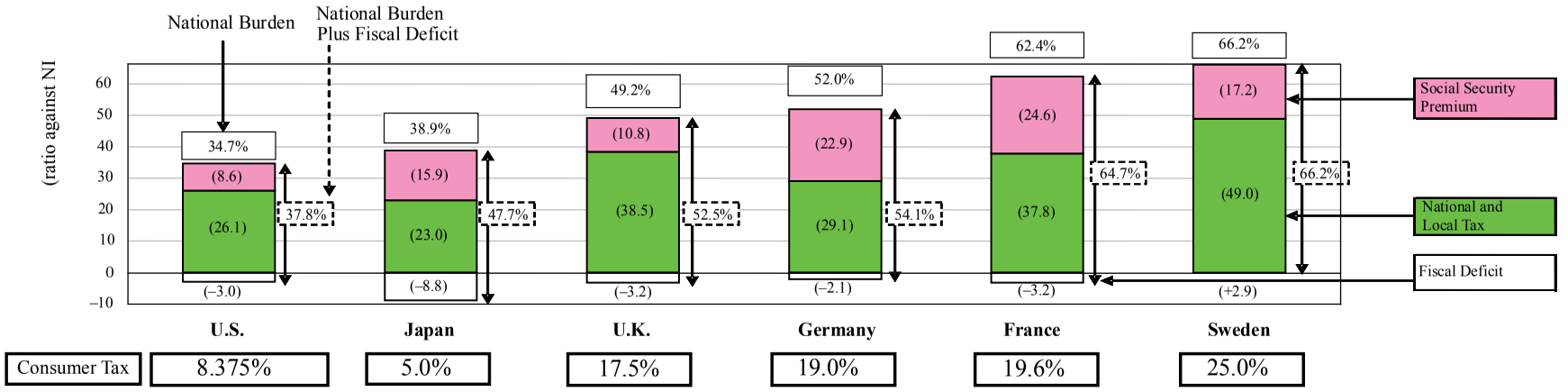
*(percent)*

### Social Security Benefit



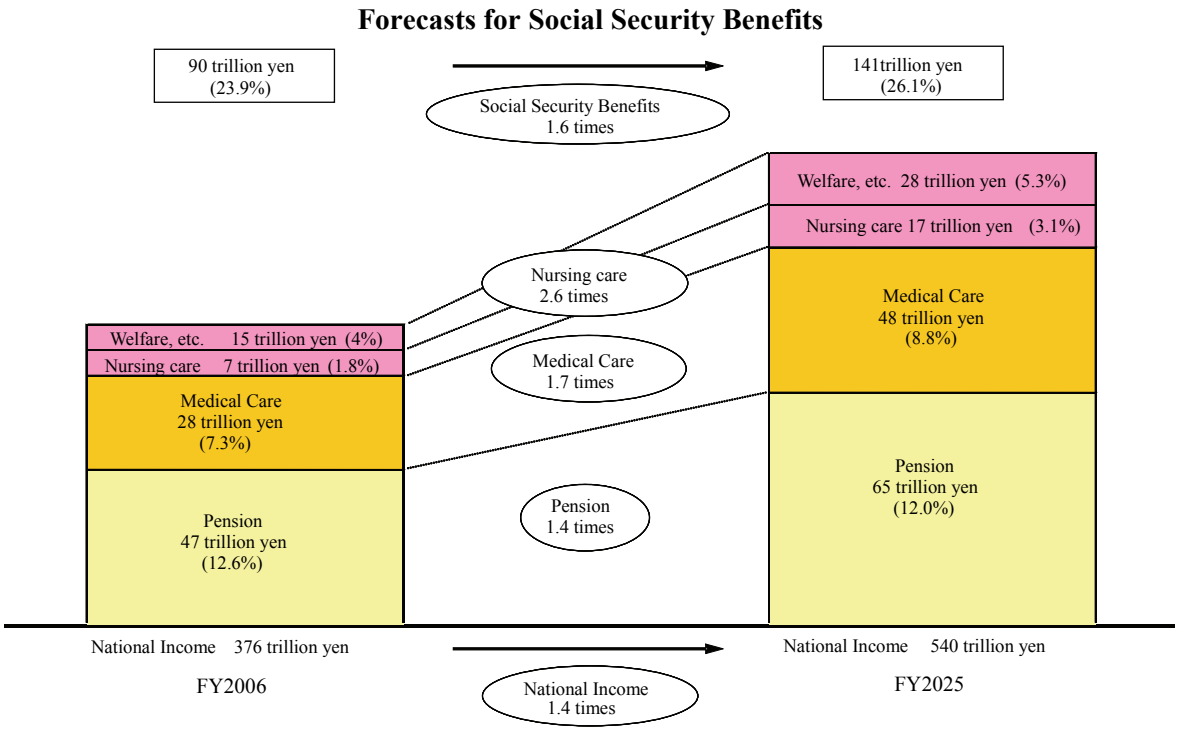

FY2005, Estimated by Ministry of Health, Welfare and Labor based on *Social Expenditure Database 2008*.

### National Burden for All the Expenditures including Social Security




Japan 2009 estimate, other countries 2006 actual. U.S. Consumer Tax: New York case.

**Figure 7**




Source: Health, Labour and Welfare Ministry (2006), *Projection of Social Security Benefits and Burdens* (May).

decided by democratic procedure, thus if you have big national burden, you can have good social security benefit.

In Japanese case, national burden plus fiscal deficit is 47.7 per cent, and 26.2 per cent goes to social security benefit, 21.5 per cent goes to other expenditures. Unlike other countries, Japan has 8.8 per cent deficit. Other countries' deficit is less than half of Japanese one. In this respect it can be said that Japan has medium-size social security, but small-size national burden.

Since social security accounts for biggest part of expenditure, continues to increase every year, and since Japan already have huge deficit, if Japan wants to strengthen social security benefit, Japan has to raise national burden either by raising tax or raising premium.

Figure 7 shows that in line with the rapid aging of the population, social security benefits in total are estimated to increase by 60 per cent from FY2006 to FY2025. Especially medical care and long-term care (nursing) shows great increases.

## 2 Japanese Pension Reform 2004

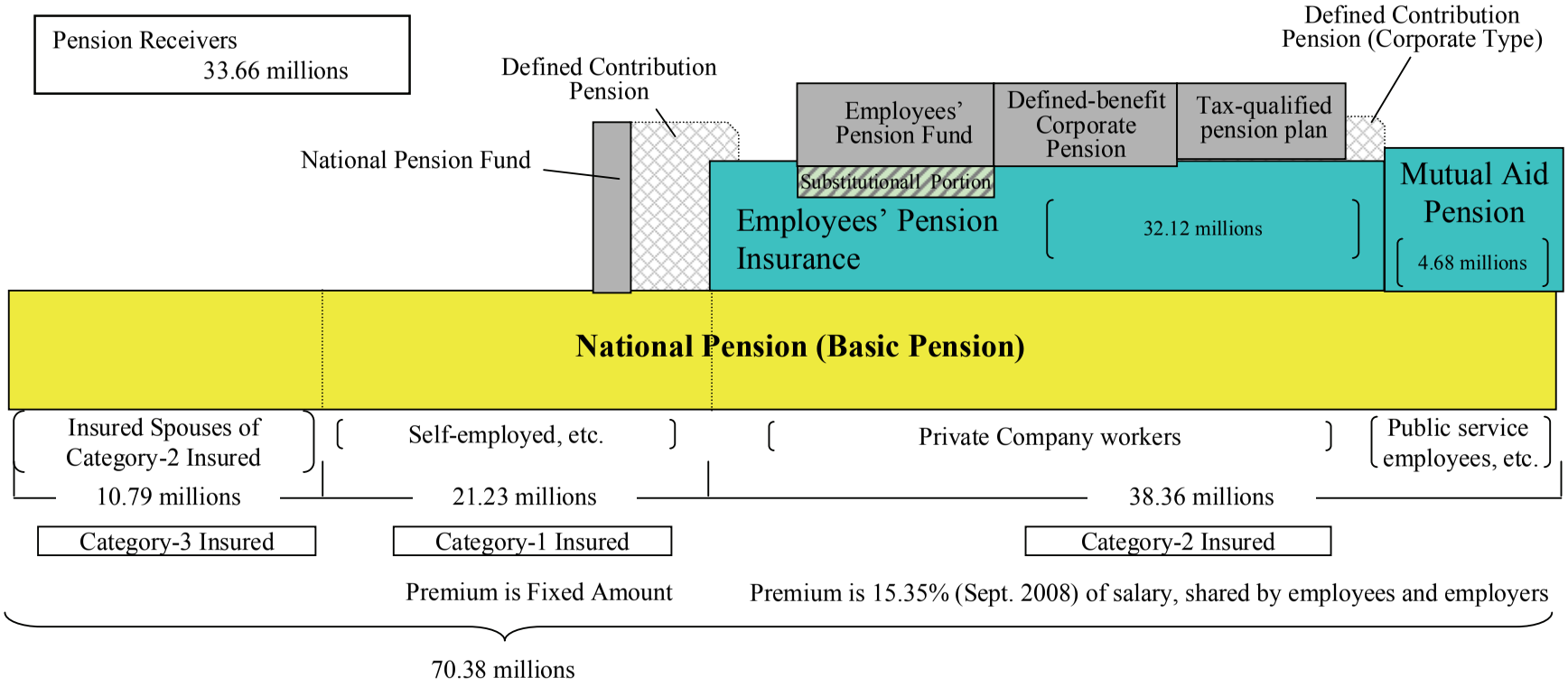
### *2.1 Japanese Pension System*

Figure 8 shows current Japanese pension system. Japanese public pension system is a combination of inter-generation supporting efforts as well as self-relief efforts made by each individual.

There are three pillars of pension, like many other countries.

**Figure 8**

**Overview of the Japanese Pension System**
*(March 2007 figures)*




- Public Pension System is a social insurance System, combination of reserve funds of premium payments and subsidy from tax revenues.
- Basic Pension is provided through mandatory participation of the working generation. 1/3(after 2009 1/2 ) of the payment is financed by the state subsidy.
- Employees (including public service employees) participate in Employees' pension plan. They receive Remuneration-related pension.
- There are also Corporate Pension Fund etc.

The brown part is Basic Pension (National Pension), the 1st Pillar, in which all of Japanese above 20 compulsory join. For the cost of this pillar, half (after 2009) is financed by state subsidy, the rest is paid by each insurer according to the number of the insured people (according to the ability to pay).

There are three types of insured people for the National Pension:

1) category 1 covers self-employed, farmers, not employed etc. The premium is fixed amount, mainly because it is hard to grasp their incomes. There are 21 million people in this category;
2) category 2 covers private company employees and public service employees. These people have Second-pillar, Employees' Pension, and their premiums are paid half by employers, half by employees themselves. The premium is certain percentage of the wages. There are 38 million people in this category;
3) category 3 covers spouses of category-2 insured. They don't pay premium by themselves, the cost of this category is shared by Employees' Pension. There are 11 million people in this category.

There are also Third-pillar for the employees', not compulsory, financed by premium.

### *2.2 Basic points of the 2004 pension revision*

The basic idea of the revision is to make Japanese pension system sustainable for the next 100 years, at the same time not putting too much burden on the working age people, and maintain certain benefit level.

*Point 1)* Fixing premium level in order not to put too much burden on working-age people. Before revision, premium level was 13.6 per cent, and we set legal premium ceiling of 18.3 per cent (as mentioned above, premium is divided equally by employer and employee).

*Point 2)* Taking a balance between burdens and benefits by introducing the system to adjust price indexation.

*Point 3)* Securing the benefit level to support the basic part of aged people. It is aimed that the benefit level is maintained above 50 per cent of average income of the employees.

*Point 4)* In order to achieve points above, the ratio of state subsidy for Basic Pension is to be raised from about 1/3 to half.

Figure 9 shows the basic idea of how the revision tried to take balance of burdens and benefits.

The upper figure shows pension without reform. Because of the rapidly aging society, for the burden side we suffered decrease in the work force, and for the benefit side we had to deal with increase in the life expectancy. Japanese pension system used to make pension projection every 5 years, and the total fertility rate drops beyond estimation.

In order to maintain balance, the lower part of the figure shows, for the burden side, that the future premium level is to be fixed, the ratio of state subsidy is to be raised, and the pension reserve fund is to be utilized. For the benefit side, the benefit level is to be adjusted, to be deducted A (estimated approximately 0.3-1.7 from 2012 to 2030) per cent plus B (fixed 0.3) per cent.

Japanese pension system is mainly adjusted by CPI, thus for example, if CPI goes up 1 per cent and A is 0.6 per cent, pension payment rises 1 – 0.9 = 0.1 per cent.

Figure 10 shows the premium level. Upper graph shows premium for Employees' Pension Insurance, and the lower graph shows premium for Basic Pension.

**Figure 9**

**Outline of the Review of Pension Benefits and Burdens**

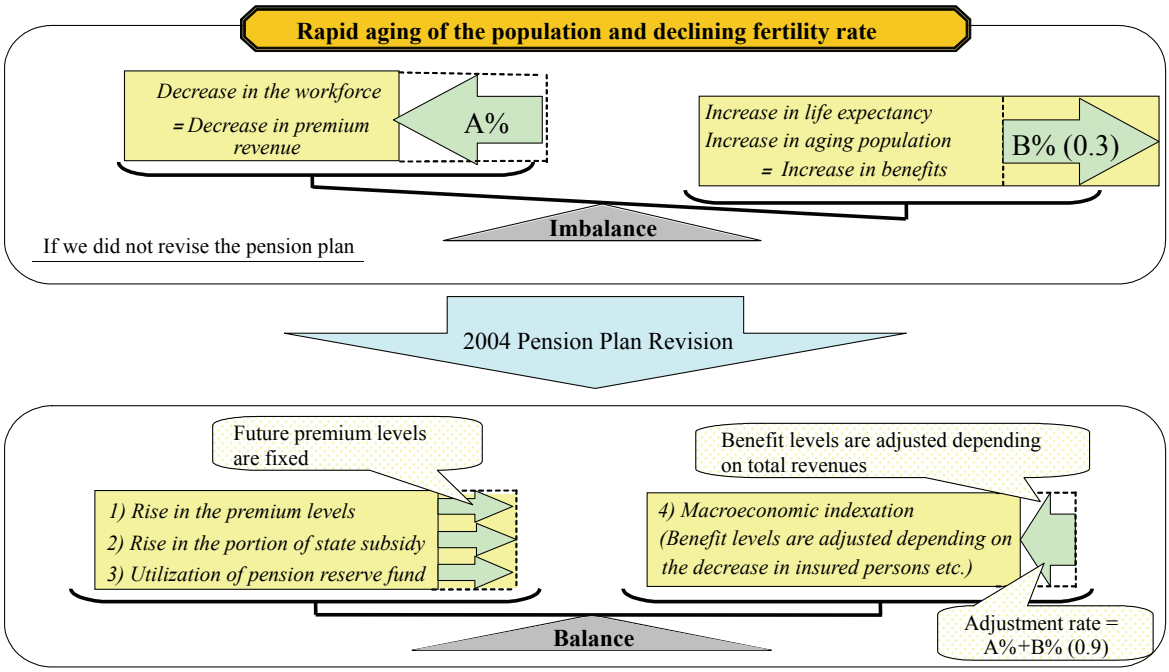



**Figure 10**

**Estimation of the Premium Rate with/without Reform**

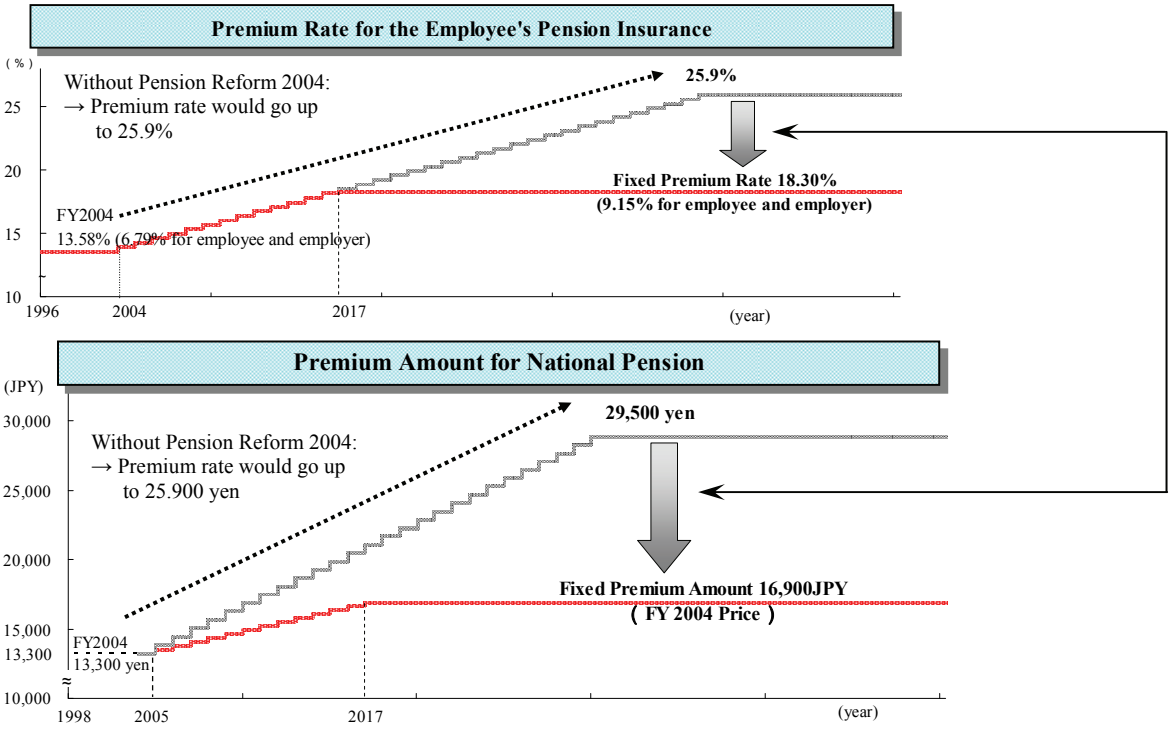
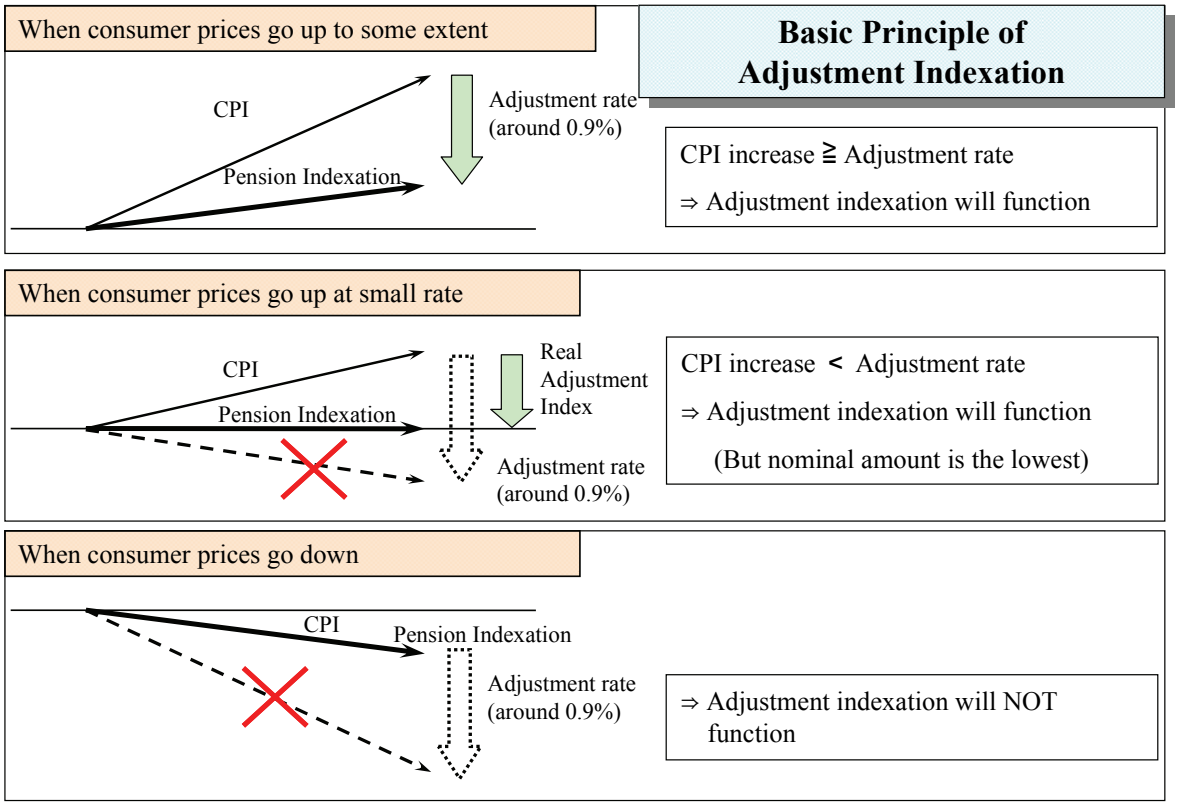


**Figure 11**

**Rules of Adjustment Indexation**




In the upper graph, without revision case, the premium goes as high as 25.9 per cent. In the revision process, avoiding too much future premium rise was put high priority so that future generation can maintain vitality.

Figure 11 is the basic rule of index adjustment.

For the most beneficiaries, the benefit is adjusted by price indexation. The upper graph shows ordinary case. When CPI goes up, pension indexation adjustment rate (decrease of the labor force (A, 0.3-1.7 per cent) plus growth of average life expectancy (B, 0.3 per cent)) will be deducted.

The middle graph shows when CPI goes up small percentage. In this case, adjustment rate is deducted, but if the result is minus, pension indexation adjustment will work until the result will be zero, so that nominal amount of the pension benefit is maintained.

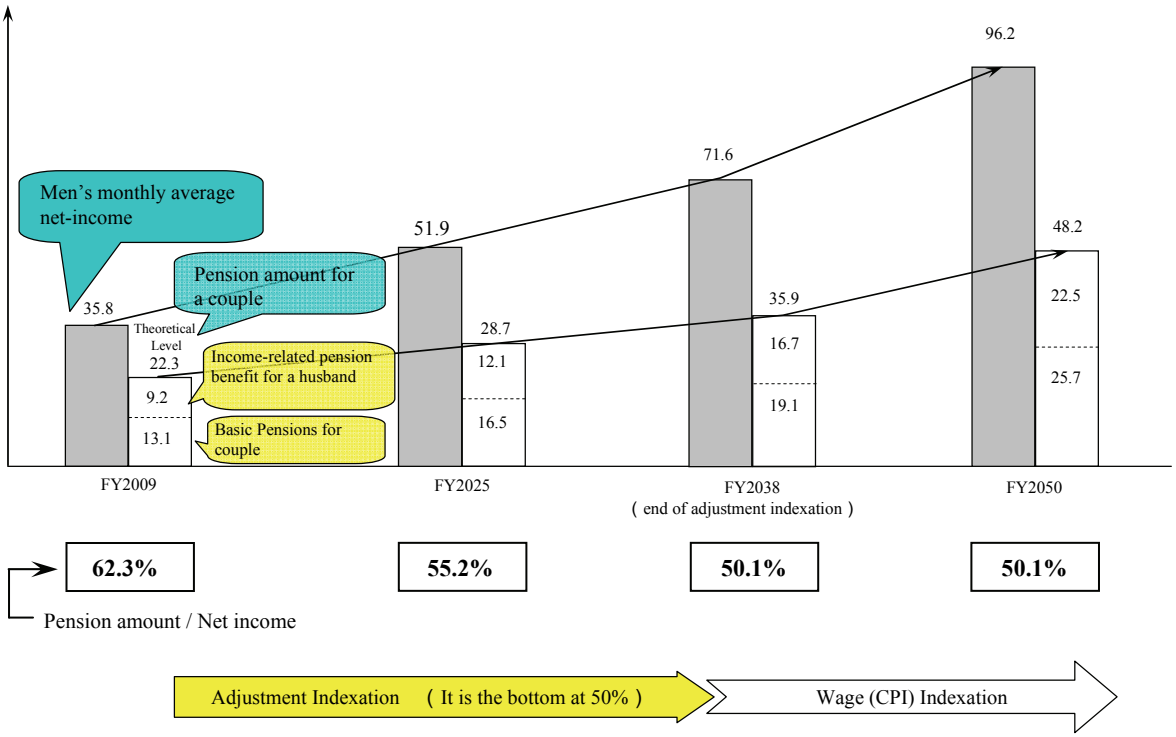
The lower part shows when the CPI goes down, they don't deduct adjustment indexation so that in this case pension indexation equals the decline of the CPI.

Figure 12 shows the projection of benefit level against working people's average income. The ratio of 1st pillar pension for husband and wife plus the 2nd pillar pension for husband against average net-income for active generation has to be more than 50 per cent[10] for the next 100 years, Macro-economic adjustment will be applied until taking a balance burdens and benefits.

[10] 2004 Pension Reform Act (2004.6.11 Law No.104), Supplementary provision, Article 2.

**Figure 12**

**Benefit Level against Average Working Salary**
**Adjustment Indexation and Development of Benefit Level – Employees' Pension**
**2009 Projection**
*(nominal amount, tens of thousands of yen)*




The Pension Law obliges that we re-calculate pension projection for every 5 years.

- The latest projection was done in 2009, and the premises of this projection are different from 2004 original projection, Future total fertility rate 1.39(2004 projection)→1.26(2009 projection)
- CPI 1% → 1%(unchanged)
- Wage Increase 2.1% → 2.5%
- Investment Return 3.2% → 4.1%

According to the projection, benefit level slightly drops from 50.2 to 50.1 per cent, and managed to maintain 50 per cent requirement. Adjustment indexation was originally forecasted to effective from 2007 to 2023, but under new projection, adjustment indexation will be effective from 2012 to 2038.

There are other points of the 2004 pension revision:

- establishing pension plan to meet diversification of lifestyle and working style. In this category Japan introduced system to encourage working of the people older than 65 years;
- introducing the system which allows division of employees' pension upon divorce for the first time;
- trying to make insured people understand how much benefit they can receive after reaching the age of 65.

## 3 Japanese fiscal consolidation

### *3.1 Roadmap and targets for fiscal consolidation in 2006*

The government had launched the basic policy action on integral reform of expenditure and revenues in the *Basic Policies for Economic and Fiscal Management and Structural Reform in 2006*, as endorsed by the cabinet in July 2006 (Figure 13).

In the Basic Policy, the target horizon is divided into three phases, each around 5 years:

- phase 1 is from FY2002 to 2006,
- phase 2 is from FY2007 to early 2010s,
- phase 3 is to mid-2010s. The government tried to gradual fiscal consolidation with surplus in the primary balance of the central and local governments combined in phase 2, and decrease in the debt-GDP in phase 3.

In this time schedule, the social security expenditure played important role. In 2009 pension subsidy ratio was to be raised, and tax reform was planned to take place, so the deadline of phase 2 was decided to be FY2007 to early 2010s.

First baby-Boomers will reach 65 years old and receive formal pension in the mid 2010s and eligible for the late-stage medical care system for the elderly, so the phase 3 deadline is mid-2010s.

As mentioned above, by synchronizing the timing of social security reform and revenue reform, the Government tries to maintain fiscal discipline.

**Figure 13**

**Roadmap and Targets for Fiscal Consolidation**
*(basic policies for economic and fiscal management and structural reform 2006, endorsed at the Cabinet meeting in July 2006)*

Phase I (FY2001-FY2006): Reforms by the Koizumi Cabinet – "No growth without reform"

- Make efforts to advance fiscal consolidation under the concept of the integrated reform of the economy and public finance
- Make steady improvement in the primary balance

Phase II (FY2007-**early 2010**)

- Achieve a surplus in the primary balance as a first step toward fiscal consolidation
  - Continue fiscal consolidation as in Phase I and ensure a surplus in the primary balance of the central and local governments combined by FY2011
  - Aim to achieve a primary balance for the central government as much as possible

Phase III (early 2010-**mid-2010s**)

- Decrease the debt-to-GDP ratio at a steady pace
  - Ensure surplus in the primary balance of the central and local governments
  - Aim at a steady reduction of the central government's debt-GDP ratio

The government sets the target of achieving a primary surplus in FY2011 and calculates the required adjustment from a baseline projection of expenditures and revenues for each category of expenditure.

This plan progressed rather smoothly until last year, but economic turmoil devastated the progress. January projection forecasted, even the world economy recovers moderately, we have 2.9 per cent deficit in FY 2011.

### *3.2 Medium-term program for establishing a suitable social security system and its stable revenue sources*

Japan had to deal with the economic crisis, and took measures necessary.

But on the other hand, Japan have to recognize and make preparation for the next fiscal consolidation, especially because ratio of state subsidy for Basic Pension was to be raised to 50 per cent in 2009 (needs extra 2.5 trillion yen, around 2.5 billion US dollars). Furthermore, Japan has to strengthen social security system, such as acute medical care, securing nursing labor force.

Thus in December 2008, the cabinet decided "The Medium-term Program for Establishing a Sustainable Social Security System and its Stable Revenue Sources".

Basic points of tax reform and social security are as follows:

*1) Tax Reform*

- In order to implement the fundamental reform of the tax system including that of consumption tax from FY2011, necessary legislative action is to be taken in advance so as to establish a sustainable fiscal structure in a stepwise manner by the mid-2010s on the premise that an upturn in the Japanese economy will be achieved within next three years starting from FY2008.
- Specifically, consumption tax revenues are to be allocated in full to social security benefits relating to the pension, medical and nursing care programs, and the expense for falling birthrate countermeasures that have been established and instituted, thus in effect all being returned to the people; not being used for an expansion of government bureaucracy.[11]

*2) The rise of Government's ratio of state subsidy for Basic Pension to half*

The rise of the ratio of state subsidy for Basic Pension to 50 per cent is to be made permanent after securing the required stable revenue sources under the aforementioned fundamental tax reform.

For the fiscal year of 2009 and 2010, the Government's ratio of state subsidy for Basic Pension is to be 50 per cent by allocating temporary revenue sources.

In the case with the "unexpected economic developments", the ratio should also be kept to 50 per cent by allocating temporary revenue sources.

### *3.3 New targets for fiscal consolidation*

After January's projection, the economic situation had worsened, and new target was just implemented in order to fit in recent developments.

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[11] "If Japan tried to revise tax including consumption tax, for the Japanese people the most convincing and understandable way is to have money collected by tax go back to people, by using for pension, medical care and nursing, falling birthrate countermeasures. Without this philosophy it's hard to deal with consumer tax problem" (Upper House Budget Committee, 2009.1.26 Minister of State for Financial Services, Economic and Fiscal Policy Yosano).

On June 24th 2009, the new target was just decided[12] in this new economic environment.

The basic concepts of this new target are as follows:

- in order to maintain fiscal sustainability, as a basic target for fiscal consolidation, the ratio of national and local governments' debt against GDP is to be at least stabilized towards mid-2010s, and stably decreased by early-2020s;
- in this respect, national and local governments' primary balance is to be in surplus within 10 years;
- national and local governments' primary balance (except for balance from stimulus measures) against GDP is to be decreased at least half within 5 years. For this target, considering recent world economy's uncertainty, timely verification should be conducted.

[12] Basic policies 2009, 2009.6.24 cabinet decision.

# PENSION REFORM AND FISCAL POLICY: SOME LESSONS FROM CHILE

*Ángel Melguizo,[*] Ángel Muñoz,[**] David Tuesta[***] and Joaquín Vial[**, ***]*

*In this paper we analyze the short and medium term fiscal costs stemming from structural pension reform, taking Chile as workhorse. The Chilean pension system, based on individual capital accounts managed by the private sector, has been in operation for almost 30 years, providing a rich evidence of the impact of pension systems on public accounts. Besides, a recent reform that crucially changes the solidarity pillar is being implemented now. In the paper we argue that although much lower than its benefits, fiscal transition costs tend to be high and persistent, so a fiscal consolidation prior to the reform is advisable. This also allows filling the coverage holes that labour market informality generates, as illustrated for Chile, Colombia, Mexico and Peru. Finally, in more general terms, the exportability of this type of pension reform depends not only on its specific design, but on the quality of market and public institutions.*

## 1 Motivation

The report *Averting the old age crisis. Policies to protect the old and to promote growth* by the World Bank, published in 1994, set the agenda for pension reform, in particular in Latin America.[1] The rapid demographic transition, the weakening of informal protection networks, and the present and expected financial burden justified the need of setting a multi-pillar pension system, with a complementary participation of the public and the private sector.

"Structural pension reform" (understood as the introduction of a mandatory individual capital accounts, managed by the private sector) was also expected to produce various positive macroeconomic effects, namely an increase of domestic saving and investment, an increase in formal employment, the development of domestic capital and financial markets, and a higher rate of potential growth (see World Bank, 1994 and Lindbeck and Persson, 2003 for the pro-growth vision, and Barr, 2000, Orszag and Stiglitz, 2001 and Barr and Diamond, 2006 for a critical review).

Evidence on these macroeconomic effects is controversial (see Gill *et al.*, 2005 for a survey for Latin America). Even though it might be too early to tell due to the relatively short period of time since the reforms (around fifteen years on average, with long lasting transition rules), it seems that the incentives to join the formal sector and pay contributions to the new system, and the projected increase in potential growth are weaker than expected. However, the general consensus is that the long-term fiscal position of reformer economies is significantly more robust. The financial burden of pensions has been reduced (at least those corresponding to future pensioners), and most of implicit costs have emerged, increasing the transparency of the system as a whole. This process

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[***] Banco Bilbao Vizcaya Argentaria (BBVA), Research Economic Department.

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The views expressed herein are the sole responsibility of the authors and do not necessarily reflect the opinions of BBVA, or of the OECD Development Centre.

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[1] Peru (1993), Colombia (1994), Argentina (1994, re-reformed in 2008), Uruguay (1996), Mexico and Bolivia (1997), El Salvador (1998), Costa Rica and Nicaragua (2000) and Dominican Republic (2003) followed the experience of Chile (1981), introducing mandatory individual capital accounts managed by the private sector.

is not easy. Reformers face significant up-front fiscal costs, since pensioners stay under the old rules, while some or even all contributors move out to the new system. In addition, all the privately managed systems maintain a solidarity pillar.

The Chilean pension reform represents a useful case study. It has been in operation for nearly 30 years and enjoys an extensive political and social support. Besides, the Chilean economy exhibits some of the aforementioned macroeconomic effects. As estimated by Corbo and Schmidt-Hebbel (2003), the overall impact of pension reform (on savings, investment, labour and total factor productivity) could explain almost one-tenth of Chilean economic growth up to 2001. The country enjoys a healthy fiscal position and is entering a phase in which fiscal commitments due to the transition begin to recede. Finally, the ongoing pension reform enacted in 2008, significantly reinforces the structure and size of the solidarity pillar. For these reasons, in this paper we analyze the fiscal impact of structural pension reform using the Chilean case as workhorse.

In a nutshell, the paper concludes that the fiscal impact stemming both from the transition costs and the solidarity pillar is high and persistent (as stated in Mesa-Lago, 2004), but in the long-term is significantly lower than the one in not reformed systems. Besides, its composition should be taken into account, since there are significant heterogeneities within the "transition cost", especially from an international perspective (old-system operational deficit, recognition bonds and minimum pensions). Our analysis suggests some economic policy recommendations: fiscal position would remain more favourable as long as reform is supported by a good combination of market and public institutions, by a gradual development of financial markets, by a fiscal consolidation prior to the reform, and by a careful design of pension and labour regulation.

The paper is organized as follows. In the next section we summarize the "promises" of pension reform in the fiscal front, and report its main results for Chile. A preliminary assessment of the ongoing reform, focused on the minimum pension pillar is presented in section three. In section four we expand the geographic span, highlighting the fiscal constraints and some of the main characteristics of the solidarity pillars in Colombia, Mexico and Peru. Finally, in section five we conclude putting forward some criteria to evaluate the exportability of the Chilean reform.

## 2 The promise and outcome of pension reform: the fiscal impact

As Holzmann and Hinz (2005) put it, the main goal of pension reform is to achieve "adequate, affordable, sustainable and robust pensions", while at the same time contributing to economic development. The Chilean reform considered closely the fiscal sustainability.[2]

Back in the eighties, Chile was a very young society. The population over 65 years was just 10 per cent of the working-age population in 1980, compared to 20 per cent for the OECD average, according to United Nations data (see Figure 1). In spite of it, there were already serious concerns about the fiscal sustainability of pension benefits in the old system at the time of reform in 1981. Workers retired very young and the legitimacy of the pension system had been under question for more than 20 years due to inequities among different retirement regimes. Estimations by the Budget Office in the late 70s foresaw a significant increase of the fiscal burden in the case of no reform, due to excessive benefits in some of these regimes, exacerbated ageing pressures. The World Bank estimated for a no-reform scenario, that the implicit pension debt of the system would have been about 130 per cent of GDP in 2001, the largest in the region after Uruguay's (Zviniene and Packard, 2004).

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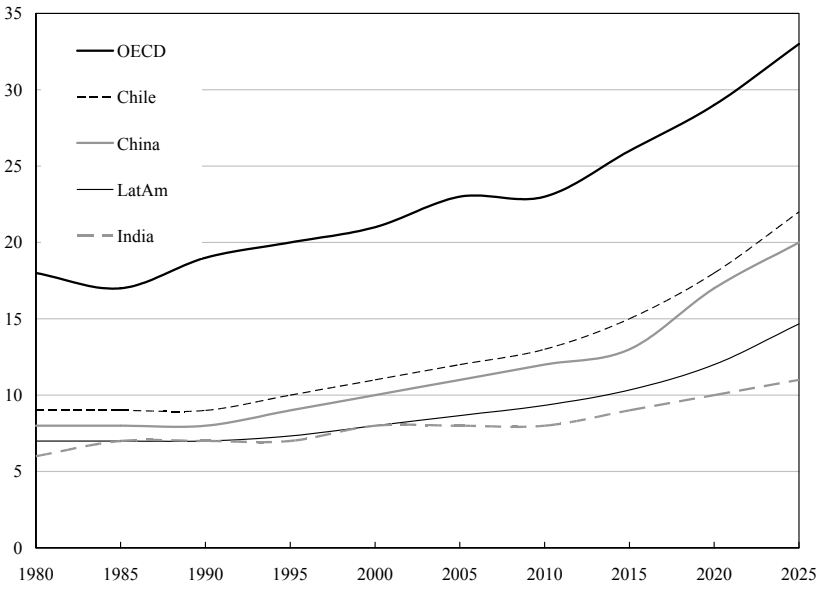
[2] For a description of the context and the contents of the reform, see Superintendencia de Administradoras de Fondos de Pensiones (2003), Arenas *et al.* (2006) and Favre *et al.* (2006), and more recently Iglesias (2009).

**Figure 1**

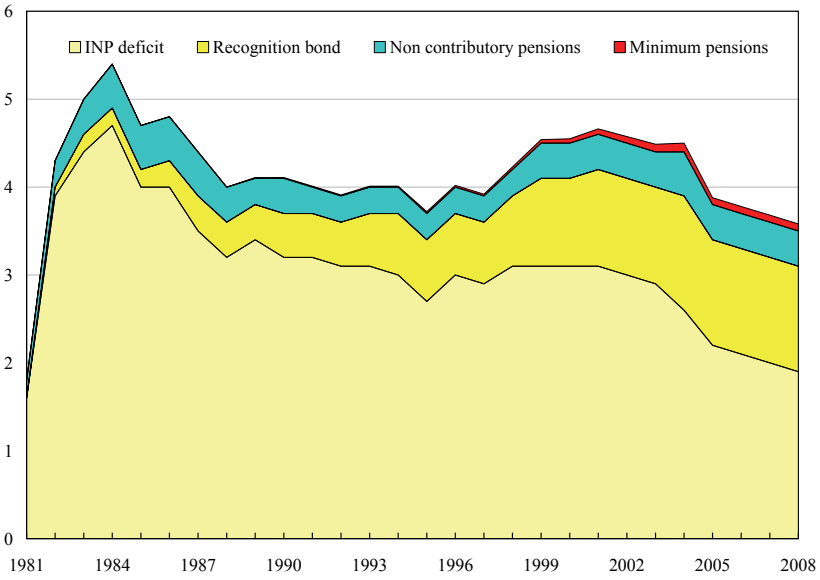
**Old-age Dependency Ratio, 1980-2025**
*(L +65 / L 15-64)*




Note: LatAm is the simple average of Colombia, Mexico and Peru.
Source: United Nations, *World Population Prospects: The 2006 Revision*.

**Figure 2**

**Transition Deficit of the Chilean Civil Pension System**
*(percent of GDP)*




Note: Military system would add 1.5 per cent of GDP on average.
Source: Chilean Budget Office, Arenas and Gana (2005), and own elaboration.

Looking backwards, the Chilean experience shows that pension reform is not cheap, but it can be affordable if fiscal discipline prevails. One of the main issues when a country replaces a traditional defined benefit PAYG system by a new one based on individual capitalization accounts is the "pure" fiscal cost of the transition. Firstly, as affiliates move to the new system (a move in Chile which was voluntary for those in the labour market before the reform, and compulsory for new entrants), they generate a financial gap in the old scheme ("operational deficit"), since they switch their contributions from one to the other. This gap is augmented if the reform takes place at later stages of the demographic transition, when old-age dependency ratio is on the ramping slope. In Chile this expenditure category peaked as a percentage of GDP in 1984, reaching 4.7 percentage points, as represented in Figure 2.

The analysis is made more complex, since a large fraction of the pensions paid in the old system by the *Instituto de Normalización Previsional* (INP) were and still are minimum pensions to retirees of the old system, and their

level depends on political (and not just technical, neither transition-related) decisions, as pointed out in Valdés (2006). Secondly, on top of this, the government may compensate workers who switch from the old system to the new system for the contributions made in the past, under the social implicit contract that characterizes pay-as-you-go pension systems. In Chile this was done by issuing a government bond paying an annual real rate of return of 4 per cent to each affiliate with contributions to the old system. The size of this "Recognition Bond" depended on the number of years and size of contributions to the old system. The bond comes due at the legal retirement age (65 for males, 60 for females). Therefore these fiscal costs come later in the case of Chile and they could be high, as the Chilean experience shows (see figures from Bennet and Schmidt-Hebbel, 2001, Arenas and Gana, 2005 and Valdés, 2006). According to official accounts, the expenditure in "recognition bonds"[3] has been ever increasing, up to 1.2 per cent of GDP in 2008.

Finally, another source of fiscal stress, which can coincide in time with the previous two, but is independent of the transition itself, stems from the solidarity pillar expenditure. In Chile, this pillar was composed by a minimum pension guarantee (MPG, a benefit for those who have contributed at least for 20 years), and a non contributory benefit for old-age and disabled lower income population (PASIS). As a whole, they added permanently around 0.5 per cent of GDP to the total "transition deficit" in 2008.

On the aggregate, our assessment is that the "transition deficit" has been relatively high (around 4.0 per cent of GDP) and persistent,[4] despite the fact that Chile implemented the reform at the early stage of ageing. But, it is crucial to identify and explain each of these factors separately.

What is remarkable in the case of Chile, besides the extraordinary increase in fiscal outlays in pensions, is that it took place at the same time that the overall tax burden was falling by about 10 per cent of GDP. In spite of it, fiscal accounts remained in surplus for most of the time since the end of the eighties. The fiscal consolidation process started in the mid-seventies, and by the end of the decade a major surplus was projected (see Figure 3).[5] According to Melguizo and Vial (2009), the authorities decided to use those resources to fund the pension reform and reduce the tax burden. Even though this was made under military rule, the fiscal position remained in surplus after the switch to a democratic regime in 1990. This sound fiscal policy may have benefited the credit risk rating, since financial markets, and rating agencies in particular, do not significantly weight implicit liabilities, focusing on explicit public debt (Cuevas *et al.*, 2008).

The long-term effects of the replacement of the old system on the fiscal accounts has been positive as shown in almost every projection (see Bennett and Schmidt-Hebbel, 2001 or Favre *et al.*, 2006), as well as in the World Bank estimates of the evolution of the implicit pension debt. Using the *Pension Reform Options Simulation Toolkit* (PROST), the implicit debt may have been reduced in the case of Chile from 211 per cent of GDP without pension reform in 2050, to zero after the reform (see Zviniene and Packard, 2004 and Gill *et al.*, 2005). These benefits are patent even in the short and medium term. According to the same projections, in absence of the structural reform, the pension implicit debt in 2010 would have been 1.5 times the Chilean GDP (vs. 25 per cent after reform).

Even though the reform significantly reduced the inequalities of the Chilean pension system and strengthened its long-term fiscal position, it did not solve the chronic problem of providing proper coverage to all workers, as it stood before the 2008 reform. On one hand, women would

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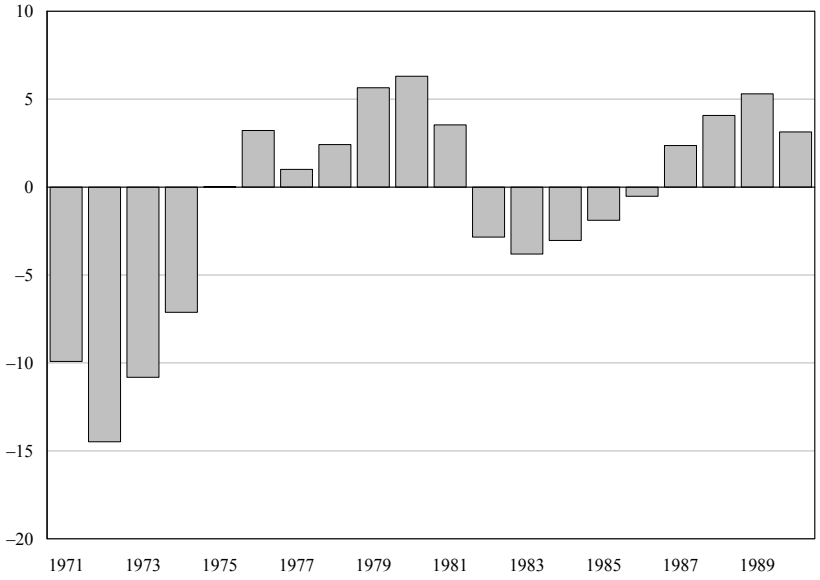
[3] A negative lesson of the Chilean experience, as reported in Vial (2008), is the poor management of recognition bonds due to the absence of precise statistics on workers history, and the lack of reliable statistics, even today, to base adequate projections.

[4] An additional category, which is usually included in the "transition cost", is the military regimen pension deficit, 1.5 percentage points of GDP on average since 1980. See Table 3 in the Annex.

[5] The deterioration of fiscal accounts after 1981 was cyclical, driven by the economic crisis of 1982-83, when GDP fell by 17 per cent in real terms.

**Figure 3**

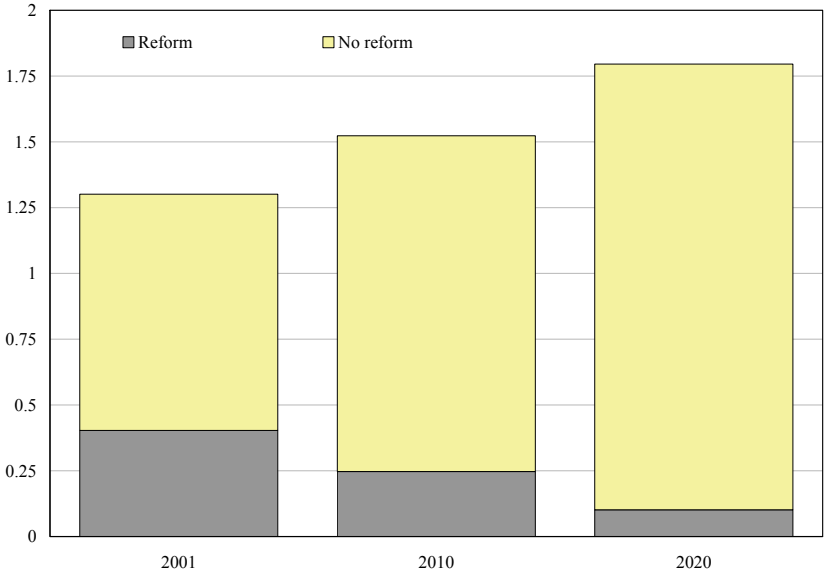
**Central Government Net Lending in Chile**
*(cash, percent of GDP)*




Source: Melguizo and Vial (2009).

**Figure 4**

**Implicit Pension Debt in Chile**
*(reform vs. no-reform scenario, percent of GDP)*




Source: Zviniene and Packard (2004).

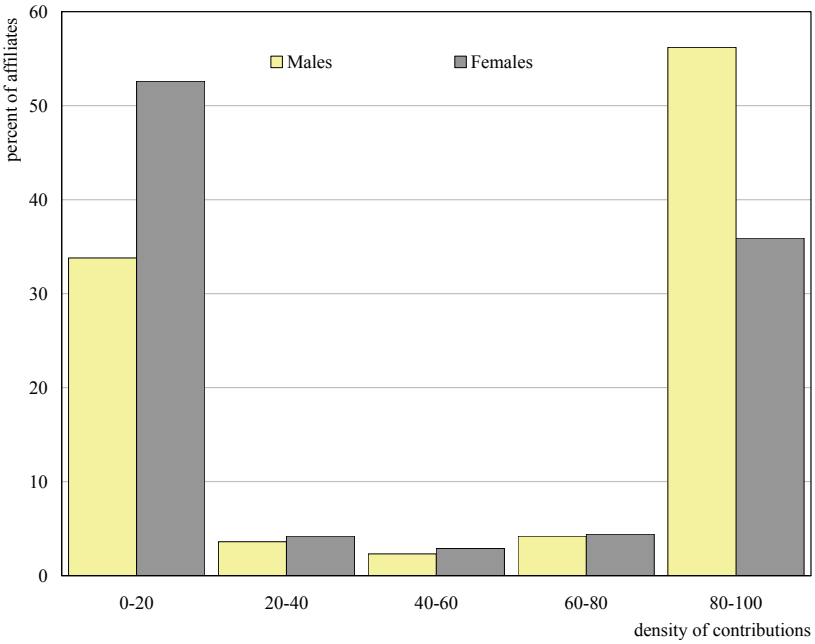
have had very low replacement ratios, due to a higher life expectancy (but lower legal retirement age) and to their traditionally lower participation rates and salaries. On the other hand, Chile shares, although to a lesser extent, a general trend in emerging economies: many members of the labour force have a very precarious insertion into the labour market, with frequent flows between the formal sector, the informal sector and unemployment. As shown in Figure 5, around 34 per cent of men affiliated to the privately managed pension system have an average density of contributions under 20 per cent (that is, they pay contributions to the pension fund administration less than three months per year), a figure that rises to 53 per cent in the case of women. This means that more than one third of those in the labour force would not have a proper income security in old age from the mandatory pension system. Since the MPG is designed to provide income protection to poor workers with 20 or more years of contribution (about 50 per cent density of contributions) this also meant that these workers had very little hope to qualify for that

government-funded benefit.

It is important to note that not all those who do not contribute regularly require fiscal support: some self-employed workers have chosen not to contribute and invest in small business to provide for income security in old age instead of contributing to social security systems (contributions were voluntary for independent workers in Chile until the latest set of reforms). However, there is no doubt that the system would not provide enough coverage for all, especially as the move from the formal to the informal labour market.

**Figure 5**

**Density of Contributions by Gender in Chile, 2004-06**




Source: Social Protection Survey.

In more general terms, it is clear that in spite of better labour incentives that defined-contribution pension schemes introduce (based on a full linkage between contributions and benefits), pension reform is no substitute for adequate social, labour and macroeconomic institutions.

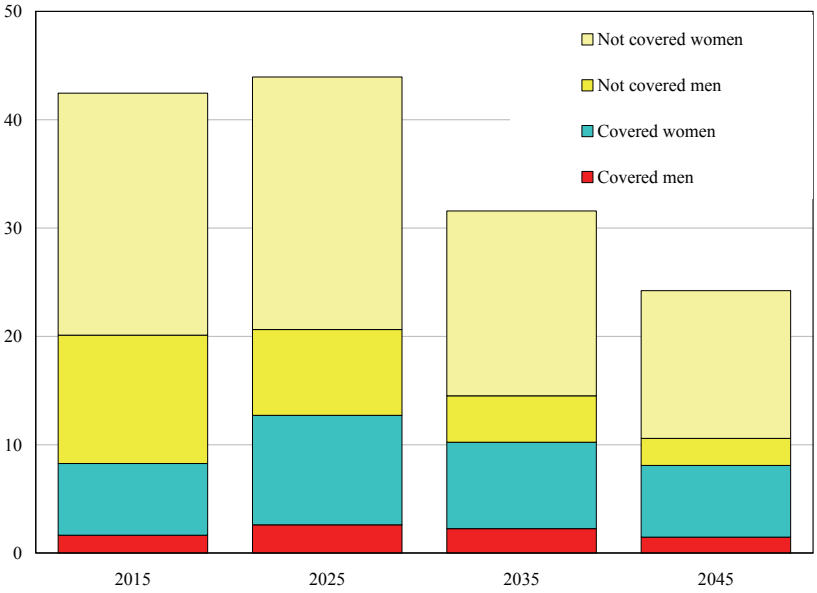
Based on a macro-actuarial model of the Chilean pensions system,[6] with linkages to United Nations demographic projections, and public finances, Favre *et al.* (2006) projected that more than 40 per cent of affiliates up to 2025 would accumulate pension rights below the contributory minimum pension at the age of retirement (see Figure 6). Among them, only between 20 and 30 per cent would have been eligible for the contributory minimum pension guarantee, after having contributed for 20 years. The problem of no coverage is exacerbated for women, who represent three quarters of the affiliates who need, but do not qualify for the contributory benefit. This prognosis was widely shared by analysts both from the public and private sectors (see, among others, Faulkner-MacDonagh, 2005 and Arenas *et al.*, 2008). In the baseline scenario Berstein *et al.* (2005), from the Chilean supervisor, projected that 55 per cent of affiliates would have pension rights below the minimum, and among them, only one tenth would qualify for the MPG.

At the same time, available projections anticipated a significant fiscal relief from 2020 onwards. As shown in Figure 7 (and Table 5 for numbers), the overall transition deficit would decrease down to 2.3 per cent in 2020 and 1.5 per cent in 2025, thanks to the exhaustion of

[6] The model incorporates 19 cohorts (pensioners, affiliates and future affiliates), disaggregated by four groups of density of contributions (see Figure 16 in the Annex), gender and wage. The outcome of the pension system in terms of pension level and replacement ratio, coverage and fiscal costs are driven by quasi-official demographic and macroeconomic projections, starting from the institutional situation in December 2004. Selected results are summarized in Tables 3 and 4.

**Figure 6**

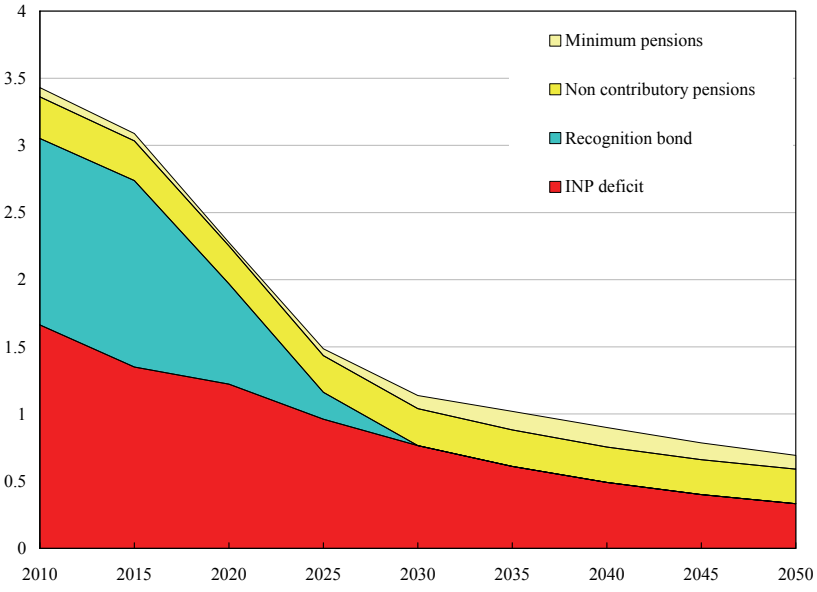
**Projection of Minimum Pension Beneficiaries in Chile**
*(no-reform scenario, percentage of pensioners*




Source: Favre *et al.* (2006).

**Figure 7**

**Projection of the Transition Deficit of the Chilean Civil Pension System**
*(no-reform scenario, percent of GDP*




Source: Favre *et al.* (2006).

recognition bonds, and the gradual decrease of the INP operational deficit (the "pure" transition cost). Official projections by the Chilean Ministry of Finance (Arenas and Gana, 2005 and Arenas *et al.*, 2008) are even more favourable, reducing the transition deficit down to 1.8 per cent in 2020 and 1.3 per cent in 2025.

So, under the old rules, those who needed the minimum pension coverage did not qualify for it, while those who qualified did not need it. Therefore, the social protection network in Chile was, using the World Bank criteria, affordable and fiscally sustainable, but not adequate neither socially sustainable.

## 3 Ongoing reform: strengthening the redistributive system

After more than 25 years of the onset of a new system, at a time in which accumulated savings in mandatory pension accounts have reached 60 per cent of GDP, and right before those switching workers begin to approach retirement age, a lively debate arose in Chile about the need to introduce additional

**Table 1**

**Chilean Pension System – Diagnostic and Reform**

| **Diagnostic** | | **Law 20.255 (March 2008)** |
|---|---|---|
| Poverty risk at old-age (coverage) | | New redistributive pillar (SPS) |
| Low density of contribution among self-employed | | Gradual compulsory contribution<br>Fiscal advantages (same as dependent) |
| Low projected replacement rates for women | | Public contributions in case of maternity |
| Low competition | | Auctioning for new affiliates (based on fees)<br>Join bidding for survivors and diability insurance |

adjustments. The design of the transition allowed some leeway in the short-term, since it incorporated strong incentives for young workers to move from the PAYG system to the new one, while middle-old age stayed in the previous one (the ratio of pensioners of the new system is still limited and a large majority of them correspond to high-income early retirees). Besides, there was a long discussion about the costs of administration of the private capitalization accounts, and the need to introduce more competition to reduce fees. Finally, a third catalyst of the discussion was the industry demand for a revision of the investment limits.

The Chilean government that took power in 2006 appointed a national council (*Consejo Asesor Presidencial para la Reforma Previsional*)[7] to analyze and set the pension reform agenda, while preserving its core components. This council was plural in composition and its members were widely reputated people, with strong academic background. It was headed by Mario Marcel, a much respected economist with strong fiscal credentials. During five weeks, the Council conducted an extensive round of hearings, including all major workers and business organizations, researchers, international experts, etc. After that, the Council submitted to the government a comprehensive report that enjoyed high legitimacy and very strong technical support. This report was the basis for the project of law sent to Congress by the government at the end of 2006 and approved in early 2008. One major virtue of this process is that provided technical and political legitimacy to the new reforms.

Table 1 compares the main elements of the diagnosis, shared by the Council and analysts, as well as the law 20.255 enacted in March 2008. The main conclusion was that the system was sound, was working fine, but required upgrades. As the Council report states, "the individual capitalization system has not failed as a financing mechanism. Even more, it will generate pensions with replacement ratios close to 100 per cent for those workers with formal jobs and a regular history of contributions over their work lives".[8] The Council also concluded that the system has been beneficial for the country in terms of economic growth and the development of financial markets.

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[7] See www.consejoreformaprevisional.cl

[8] Consejo Asesor Presidencial para la Reforma Previsional (2006), Vol. I, chapter II, p.31. The translation is ours. This figure is in line with the OECD standards, where the theoretical replacement ratio for an average worker is 57 per cent. See Figure 17 in the Annex.

However, they emphasized the need to act promptly, before the bulk of those who transferred from the old system to the new one reached the retirement age. The most pressing problems to be addressed, according to the Council, were strengthening the first pillar (minimum pensions), raising the coverage of the system and the density of contributions, increasing gender equality, improving competition and reducing costs, generating better conditions for investment and several other points of a more general nature (better financial education or expanding voluntary pension savings).[9]

The first challenge ("strengthening the first pillar") was considered the priority and the government went for a very ambitious reform, establishing a new redistributive pillar, *Sistema de Pensiones Solidarias* (SPS).[10] This pillar will be gradually implemented between 2008 and 2012, funded out from general revenues of the government budget. For this objective, a reserve fund is created, and will be evaluated every three years. The main goal of the SPS is to cover every pensioner (old-age over 65 years and disabled) with incomes in the lowest 60 per cent of the population according to national census (starting from 40 per cent in 2008). The SPS would not require any contribution at all to the pension system, and would completely replace the existing PASIS and MPG by 2023.

The minimum value of the social benefit for retirees is set by law (75 000 Chilean pesos per month in 2009, around 100 euros), the so-called *Pensión Básica Solidaria* (PBS) for those with no contributions to the pension system. As represented in Figure 8, the benefit would decrease gradually with the size of the self-financed pension, reaching zero from PMAS (255 000 Chilean pesos in 2012, 340 euros per month).[11] In this alternative case, the benefit is labelled *Aporte Previsional Solidario* (APS), as it is a public complementary benefit. In order to maintain the incentives of workers to contribute to the system, the pension "reference" (the black line in Figure 8) increases with the level of accumulated contributions. By contrast, since this kind of strategic behaviour is not supposed to be possible for disability pensioners, all of the pensioners below the PBS would receive just the difference (Figure 9).

As we highlighted in the previous section, the timing for the adjustment was, fiscally speaking, right. Pension related fiscal outlays have remained close to 5 per cent of GDP in the last decade, with a changing composition: while the expenses derived from the obligations with pensioners in the old system have been gradually falling in GDP terms, recognition bonds redemptions have been rising fast as those who switched to the new system are reaching retirement age. Therefore, Chile is close to the peak of RB expenses and they should fall fast in the next decade. This provided a unique opportunity, which is further supported by the fact that the Chilean government has accumulated major surpluses during the last years, thanks to the rigorous fiscal policy. As long as the new solidarity pillar is introduced gradually, and its parameters (PBS and PMAS basically) are set in a conservative way, the government may be able to fund this improvement maintaining the current tax burden.

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9 Rofman *et al.* (2009), in this volume, highlight both the parallelisms on the challenges faced by the Argentinean and the Chilean systems, and the contrasting political approaches. As a result, the outcome and the expected effects will be different.

10 Favre *et al.* (2006) concluded that the problem of coverage was due to low density of contributions and too strict eligibility MPG requirements. In order to increase density, the new law makes contributions gradually mandatory for independent workers. They also improve incentives for these workers to contribute (similar tax treatment, extension of other social security benefits), and mobilizes the tax system as a tool for improving collection. With respect to the second issue, several analysts and the pension funds administration association proposed the gradation of requisites to get access to a fraction of the value of the MPG. Simulations showed that this was powerful enough to cover most unprotected workers, while those who do not make it under this scheme, could still apply and obtain a PASIS, once they deplete their savings. The reform has been much more far-reaching.

11 For comparison, the average contributory minimum pension guarantee amounted in December 2008 around 115,000 pesos per month (slightly over 150 euros), and the non-contributory one around 55,000 pesos (75 euros). The average monthly wage in Chile stands around 350,000 pesos (470 euros) and the minimum wage 159,000 pesos (210 euros).

In order to make a preliminary evaluation of the fiscal impact of this new pillar in the short and medium term, we have performed a simple exercise based on public information. We define two scenarios, one which follows the historical trends (Scenario A), and a second one which incorporates the negative effects of the current crisis (Scenario B). Affiliates are classified as regular or informal contributors, according to public information referred for June 2008, published by the supervisor (*Superintendencia de Administradoras de Fondos de Pensiones*, SAFP). Regular contributors exhibit a density of contributions of 100 per cent in Scenario A and 90 per cent in Scenario B; while informal contribute 20 per cent of the time in Scenario A and 10 per cent in Scenario B.[12] This dataset also allows identifying gender, age, salary and accumulated savings in the individual capital account. Mortality evolves according to United Nations demographic projections, while disability is determined as a fixed percentage of mortality rates

**Figure 8**

**Reformed Old-age Pension System in Chile**

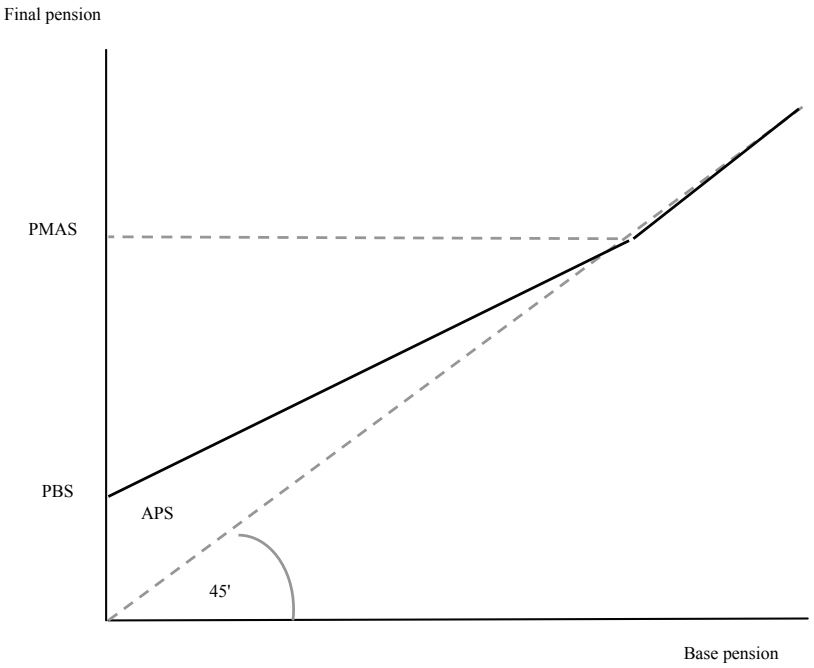
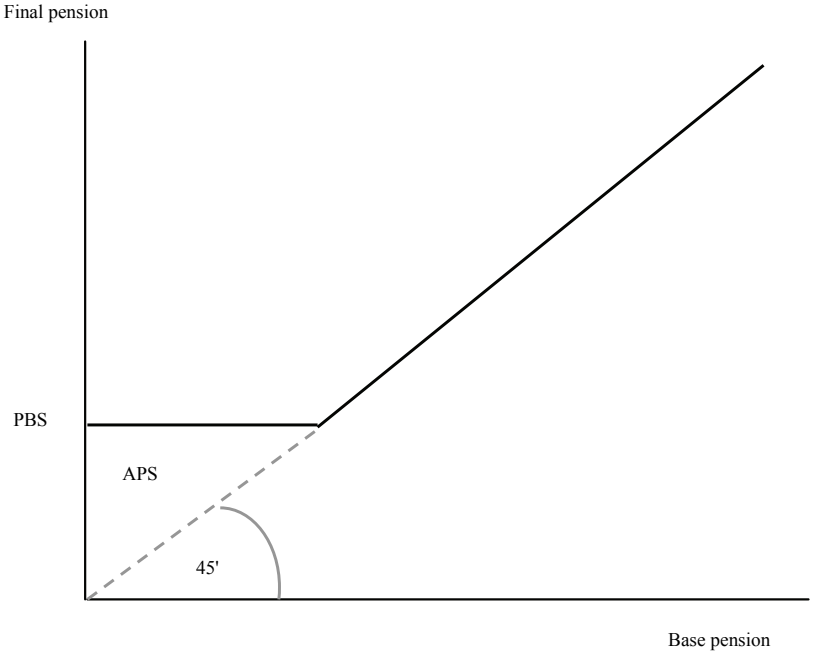



**Figure 9**

**Reformed Disability Pension System in Chile**




[12] In the whole period, in Scenario A the overall density is 60.4 per cent. According to Arenas *et al.* (2008), the density of contributions may increase 12 percentage points, up to 66.8 per cent from 2025 from 54.8 per cent in 2006, due to the mandatory contributions for independent workers. In Scenario B, the density is below the reported current level (around 50 per cent).

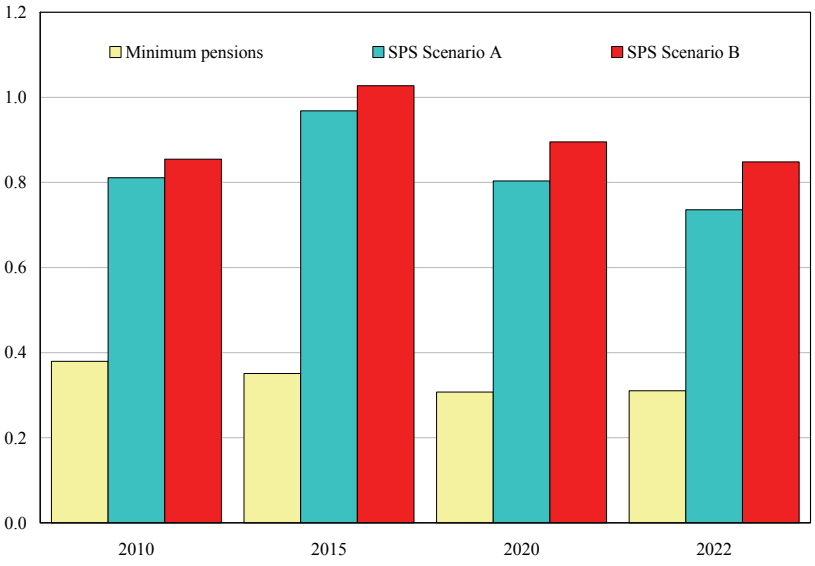
(10 per cent). Data on the recognition bond (key to calculate the amount of APS) comes from the information provided by pension funds administrators in the bidding process for disability and survivors insurance (referred to June 2002 to June 2008). All of the disability benefits are computed as PBS. Real GDP growth in Scenario A (2.5 per cent in 2009 and 2010, and 3.8 per cent from 2011 onwards) is taken from Arenas *et al.* (2008), while Scenario B is based in the short-term on BBVA Economic Research Department latest projections, as of May 2009 (–1.2 per cent in 2009 and 2.1 per cent in 2010). Annual real return of pension portfolio is 5 per cent in Scenario A and 3 per cent in B, real wages increase 2 per cent paper year in Scenario A and 1 per sent in B, and inflation is 3 per cent (the Central Bank target) during the whole period in both scenarios. Annuities are calculated using the mortality table RV 2004, and with a technical real interest rate of 4 per cent in Scenario A and 2.8 per cent in B.

Based on this methodology, annual public expenditure of the solidarity pillar would reach between 0.8 per cent and 0.9 per cent of GDP in 2010 (Scenarios A and B respectively), peak at 1.0 per cent in 2016, and gradually go down to 0.7-0.8 per cent in 2022 (see Figure 10).[13] This would imply a permanent increase in expenditure of around 0.7-0.8 per cent of GDP per year with respect to the previous solidarity pillar (the aggregate of MPG and PASIS schemes).

This projection is basically driven by the increasing number and share of pensioners of the private system (in comparison to those still in the INP), and by the increase in the affiliation and density of contributions (due to higher per capita income and mandatory contributions for self-employed). These trends are represented in Figure 11, common for both scenarios.[14]

**Figure 10**

**Projection of the Expenditure of the Solidarity Pillar in Chile**
*(reform scenarios vs. no-reform scenario, percent of GDP)*




Source: Favre *et al.* (2006) and own elaboration.

Beneficiaries of the solidarity pillar would increase from one million people in 2010, to over 1.8 million in 2022, with an increasing share of those receiving the old-age APS. By comparaison, Favre *et al.* (2006) projected that beneficiaries of the old solidarity pillar will range between 450 and 600 thousand people, mostly receiving non-contributory PASIS.

Official figures are lower in the short run and higher in the long run. However, a precise comparability is not feasible due to the lack of published information on key assumptions

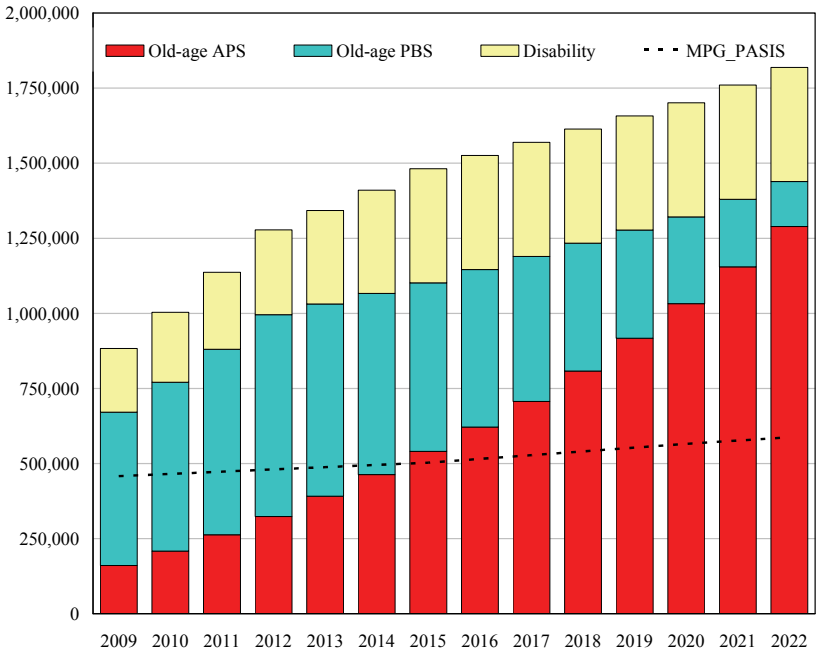
[13] Projection period (up to 2022) is limited due to the lack of disaggregated data of affiliates by sex and age, at earlier years.

[14] Although APS beneficiaries coincide in both scenarios by assumption, accumulated contributions are higher Scenario A, so the percentage of the pension funded by the government is lower.

(distribution of APS and PBS among old-age pensioners, or pension returns, for instance). Arenas *et al.* (2008), from the Budget Office, estimate that expenditure would increase in the whole projection period, up to 1.2 per cent of GDP in 2025 (from 0.5 per cent in 2009), with a permanent increase of 1.0 percentage point of output. According to these authors, the overall fiscal impact of pension reform would be even higher (0.2 per cent additional since 2015) if the subsidies for younger workers, the child bond, or the contributions for disability and survivors insurance of civil servants and independents, are added.

**Figure 11**

**Projection of Beneficiaries of the New Solidarity Pillar in Chile**
*(persons)*




Source: Favre *et al.* (2006) and own elaboration.

All in all, the reform greatly improves the social protection network in Chile, reaching full coverage for poor-middle income workers. The fiscal cost would be not negligible, and the pillar and may be vulnerable to political pressures, but from a social and a financial sustainability perspective, the Chilean reform is a sensible step forward.

## 4 Reforms in Colombia, Peru and Mexico: work in progress

In Colombia and Peru, reforms took place in the mid-Nineties. In both cases, the design allowed workers to choose between the public PAYG scheme and the private scheme, generating some kind of competition between both, especially for the new workers. For affiliates of the old PAYG scheme who decided to migrate to the private system, the public sector recognizes their contributions with bonds to be paid when they receive a pension. In contrast, in the case of Mexico, the reform of 1997 "closed" the PAYG scheme for new workers who have to contribute to their individual private capitalization account for pensions. However those who belonged to the old PAYG system and decided to move to the private scheme keep the right to retire under the old PAYG rules, which are much more generous. Consequently, the Mexican government decided not to introduce a recognizing bond, and choosing that path, left the PAYG system *de facto* open.

Another important point to take into account is how these governments decided to face the implicit debt of their public systems. Depending on their respective institutional frameworks, some of them implement strong parametric reforms in order to reduce their fiscal burdens, while others established mild changes. So, each pension systems face different fiscal and socio-economic

constraints in order to get more extensive pension coverage and to implement a sound solidarity pillar *à la Chilean*. In what follows, we will highlight the impact of some of these constraints, with a special reference to ones faced by the minimum pension's pillar.[15]

### *4.1 Colombia*

Between 1993 and 1994, Colombia implemented its present dual system. The existing PAYG system, known as RPM (*Régimen de Prima Media* in Spanish) comprises all the various entities such as the old Instituto de Seguridad Social, Cajanal and other minor pension schemes. In parallel, an individual pension scheme known as RAIS (*Régimen de Ahorro Individual con Solidaridad*) was introduced with the participation of eight pension funds companies. Since 1994, important parametric adjustments were implemented to the RPM scheme that reduced the implicit debt from 191 per cent of GDP to 148 per cent. However, significant differences persist with respect of the private scheme, representing one of the most important complexities of the Colombian pension system.

The combination of the characteristics of the Colombian labour market with this fiscal burden constitutes a clear constraint for implementing improvements for low income families as well as to extend the coverage of the system. According to the *Encuesta Continua de Hogares* (Colombian Household Survey), more than 50 per cent of the total workers belong to the informal sector, over 70 per cent of total affiliates declare incomes below two minimum salaries, and more than 50 per cent of total affiliates have a density of contributions below 30 per cent. In order to access minimum pension benefits, 23 years of contribution to the private scheme or between 22 and 23 years to the public scheme are required. Besides, affiliates must be 57 years old (women) or 62 years old (men) in the private system, or 55 and 60 years respectively in public one.

The combination of the aforementioned elements explains the very limited minimum pension's coverage in Colombia. As shown in Figure 12, Muñoz *et al.* (2009) project that in 2015 less than 8.0 per cent of the retirees will access to the solidarity benefits (adding the beneficiaries of the public and private pillars). By contrast, nearly 70 per cent of pensioners will retire with accumulated pension savings below the minimum pension, but will not qualify for it (represented by the grey area in the figure; the nearly remaining 20 per cent will have accumulated "sufficient" pension rights). According to the assumptions considered in this study (especially in terms of potential growth and productivity, informality and longevity), in absence of further reforms, access to the benefit could increase slightly up to less than 10 per cent, so the "uncoverage rate" would remain around 70 per cent. In other words, only one out of ten Colombian retirees who would need this benefit, due to insufficient savings at retirement age, actually gets it (vs. one out of five in Chile).

Another interesting perspective to analyze the access to this benefit is by looking the percentage of minimum pension benefit beneficiaries segmented by income level. It is clear from the data that low income people (who at the same time tend to be low density affiliates) find it very difficult to receive this benefit. Figure 13 represents the projected distribution of minimum pensioners according to their income level in Colombia and Peru in 2015. Only one third of Colombian beneficiaries are actually low incomers (defined as those earning up to one minimum wage), whereas nearly 50 per cent earn around two minimum wages, and 20 per cent even earn on average three minimum wages.

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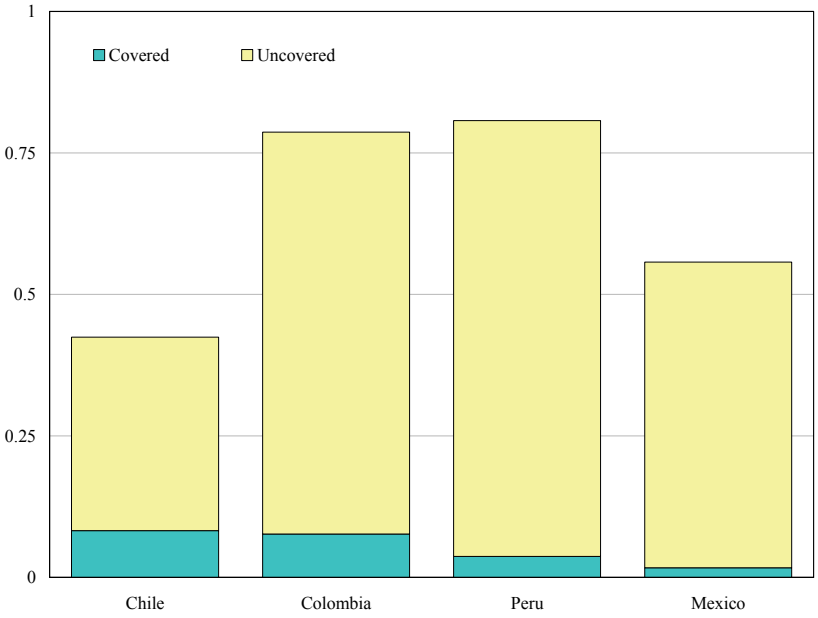
[15] For a deeper discussion of the pension system regulation and their main challenges, see Albo *et al.* (2007) for Mexico, Bernal *et al.* (2008) for Peru, and Muñoz *et al.* (2009) for Colombia.

These limitations led successive governments to consider some solidarity schemes. The private regime has a special fund, named *Fondo de Garantía de Pensión Mínima* (Minimum Pension Guaranty Fund) that helps to complement the minimum pensions for those who acquire 1,150 weeks of contribution, but are not able to accumulate enough capital to finance their own minimum pension. Affiliates to the private regime make payments to this fund every time they make a contribution to the pension scheme. However, it is very likely that this scheme could be regressive; those who have low income usually exhibit too low densities to access minimum benefits, and their contribution fees will be used to finance the minimum pension of others affiliates with better labour stability and probably with higher income).

In addition there is a very limited scheme named *Fondo de Solidaridad Pensional* (Solidarity Pension Fund), a pension scheme fed by contributors with income over four minimum salaries. This fund has two sub-accounts; the *Subcuenta de Solidaridad* (Solidarity

**Figure 12**

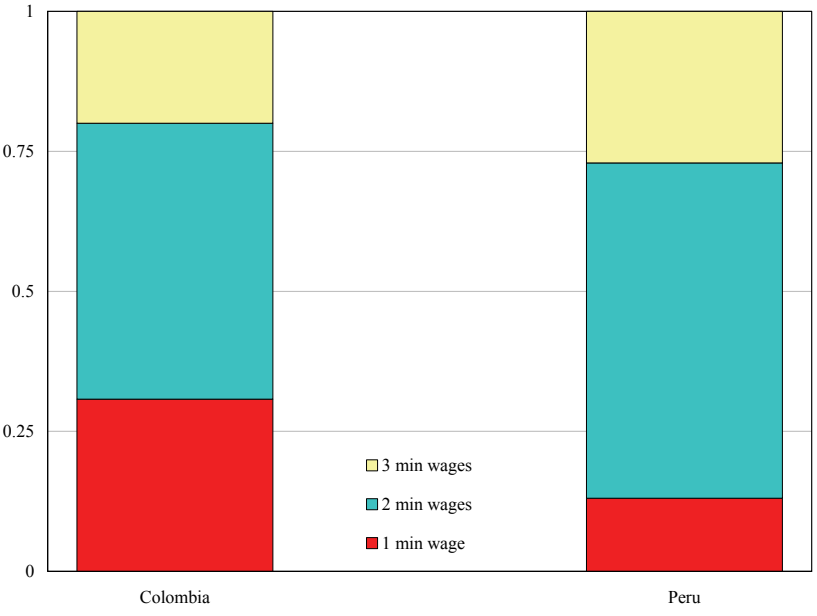
**Projection of Minimum Pension Beneficiaries in Latin America**
*(percentage of pensioners, 2015 except 2035 for Mexico)*




Source: Own elaboration, based on Favre *et al.* (2006), Albo *et al.* (2007), Bernal *et al.* (2008) and Muñoz *et al.* (2009).

**Figure 13**

**Beneficiaries of Minimum Pensions by Income Level, 2015**
*(percentage of total minimum pension beneficiaries)*




Source: Own elaboration, based on Bernal *et al.* (2008) and Muñoz *et al.* (2009).

sub-account) complements the contribution of some workers with low income from rural and urban areas. Unfortunately, in order to access to this benefit, 500 weeks of contribution are required, which could be considered a demanding requirement. Besides, the data shows that it is losing beneficiaries, so accumulating resources may not accomplish their purposes. The other sub account is the *Subcuenta de Subsistencia* (Subsistence sub account) which basically allocates either monetary transfers or services to poor people over 70 years.

### *4.2 Peru*

After the pension reform that took place between 1992 and 1994, the system is integrated by two regimes that work in parallel. On the one hand, the National Pensions System (*Sistema Nacional de Pensiones*, SNP), managed by the public sector, operates under a PAYG financial regime. On the other, the Private Pension System (*Sistema Privado de Pensiones*, SPP), managed by private specialized institutions, operates under a financial regime of individual capitalization, in which each affiliate makes a direct contribution to a personal account until he retires.

SNP is in deficit, and increasing Public Treasury transfers have been necessary over the last few years to make up for the difference. Aggregating the "operational deficit" in SNP (the difference between contribution income minus pension-related expenses), the deficit in the special regime Law 20.530 (similar to the public one, but extinguishing by constitutional order), the recognition bonds, and the minimum pension subsidies, supplementary bonds and disaffiliation to SPP, deficit reaches 58 per cent of the GDP in 2006 (Bernal *et al.*, 2008). Being this figure significant indeed, it is significantly lower than the one before the reform (the fiscal cost of keeping a PAYG system would have been close to 100 per cent of GDP) and, to obligations in Colombia or Mexico.

The current SPP situation also presents aspects that could be improved. Indicators show that, currently, the coverage of the SPP labour force is at slightly less than 30 per cent, one of the lowest levels in Latin America, even when compared with younger systems. At the same time, data shows there is an important group of workers that does not have a regular contribution pattern. Three structural problems in the Peruvian economy help to explain the difficulties to extend the coverage of the system: a large informal sector, a high level of poverty, and the wide dispersion of wealth distribution. 60 per cent of the economic activity in Peru is informal, with 40 per cent of the labour force self-employed in informal micro-firms (although, even counting those people that work for larger firms, only 20 per cent of the labour force contributes to a formal pension plan). Poverty in Peruvian rural areas (nearly 70 per cent in 2006) is significantly higher than that in urban areas (slightly over 30 per cent). This fact is line with coverage distribution, which is largely lower in rural areas (3 per cent in 2006, vs. 20 per cent in urban areas). Finally, although income inequality has apparently decreased (the main household survey *Encuesta Nacional de Hogares*-ENAHO shows that the Gini coefficient reached 0.43 per cent in 2006, from 0.46 in 1997), still reflects an unequal distribution.

The access to the minimum pension benefit has been very restricted. Bernal *et al.* (2008) show that less than 4 per cent of pensioners in 2015 will have access to minimum pensions, considering the affiliates of the public and the private systems (Figure 12). By contrast, nearly 80 per cent of pensioners would need it, but do not qualify for them (*i.e.*, one out of thirty). This dismal result stems from the combination of low densities with quite strict eligibility criteria. In order to get it, affiliates must have contributed to the system for at least 20 years and have 65 years old. Projections up to 2050, based on relatively favourable socio-economic trends, do not change significantly the picture.

Besides, low income population in Peru shares with the Colombians the difficulty to access to this benefit. As represented in Figure 13, in 2015, less than 15 per cent of minimum pension beneficiaries earns up to one minimum wage, while 60 per cent earn two minimum wages, and almost one third earn three minimum wages. So it seems that, in absence of reforms, minimum pension pillars end up being a social benefit for middle income population, and not to the lower income segments.

Despite this situation, there is not a formal solidarity pillar reform in progress. Nonetheless, law 28015 (enacted in 2008) promotes and formalizes micro and small enterprises, offering workers in these firms, social security and pensions. With this new law, workers of small enterprises may access a public subsidy to cover 50 per cent of pension and health costs. Taking into account that in Peru micro and small enterprises represent 54 per cent of GDP and 62 per cent of the labour force, this reform could be an important window opportunity to tackle the problem of low coverage in Peru.

### *4.3 Mexico*

In 1997, a defined contribution pension scheme at the Mexican Social Security Institute (*Instituto Mexicano de Segurodad Social*, IMSS) was established. This scheme transformed the institutional design of retirement arrangements in Mexico by "closing" the PAYG scheme. The worker saves to an individual pension account with the support of the government and the employer (the system is known as SAR, *Sistema de Ahorro para el Retiro*), but its specific rules have many implications First, total contribution from the worker, the government and the employer to the individual account is around 8 per cent, so the pension generated from the capitalization scheme will be modest for many affiliates. Second, the system allows workers in the private capitalization system before 1997 choosing between the pension obtained under this scheme and the one obtained under the most favourable rules of the "previous" PAYG scheme, generating an imbalance that is to be financed by the Mexican treasury.

In fact, this fiscal burden constitutes one of the main problems for broad the benefits of the pension system to more Mexicans. The pension deficit still depends on the characteristics of the different pension regimes that existed during its history. According to Albo *et al.* (2007), the pure cost of transition implies an implicit debt of 56 per cent of GDP. Adding to this figure to the other fiscal burdens, including the pension scheme for public workers (known as ISSTE, *Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado*) and the government contributions to the individual worker account, the implicit debt of pension systems in Mexico reaches 92 per cent of GDP.

In addition to this fiscal problem it is important to add the difficulties faced in the Mexican labour market. Although individuals with a formal salaried job in the private sector should by law be affiliated to the IMSS, in practice, a large number of affiliates do not make the required contributions to obtain the system's protection. Evidence so far indicates that within SAR affiliates' contribution densities are not uniform and that, at the same time, a high percentage of the total number of individual accounts registered in the SAR become "inactive" for failing to receive the contribution payments (this is the case, for example, of temporary workers and those whose labour situation changes frequently, passing from being employed to unemployed or to independent workers and vice versa).

The Mexican pension system considers a minimum pension benefit for workers that belong to the new private scheme and retiring from 2035 onwards, approximately (retirees before that year, will receive the benefits of the old PAYG scheme, significantly more favourable). In order to get it, affiliates must have contributed to the system for at least 1250 weeks. In their baseline

scenario Albo *et al.* (2007) project that in 2035, less than 2 per cent of pensioners would receive the minimum pension benefit (see Figure 12). Meanwhile, more than half of the pensioners would accrue pension rights below this level, but will not qualify for it due to the low density of contributions. Although it is projected an important increase in the next decades, based on various assumptions on productivity and formality growth, a significant part of pensioners will remain uncovered.

In order to ease the access of low income population to this pillar, the Mexican pension scheme considers a monthly contribution by the federal government to the individual account of the affiliate for each working day. This contribution known as *social quota* is the same for all accounts regardless of the income level of the affiliate, and its value is kept constant in real terms. Precisely, this scheme has been recently reinforced in May 2009, when the Congress approved a governmental initiative to reform the Social Security Law to strengthen its redistributive role. Under this new legislation, public spending through the social quota will be increased by 5 per cent, and to reallocate such spending from high to low and medium income earners. Workers with an income level higher than 15 minimum wages will stop receiving it. Meanwhile, the rest of workers will obtain increases in their social quota inversely related to their income level: 15 per cent for those with an income level between 1 and 4 minimum wages; 10 per cent for those with an income level between 4 and 7 minimum wages; 5 per cent for those with income levels up to 10 minimum wages and between 5 and 0 per cent increase for those with income levels between 10 and 15 minimum wages.

## 5 To conclude: on the exportability of the Chilean model

Economic institutions and reform processes are by definition one-time shocks. As Barr and Diamond (2006) explain, in a world full of market imperfections formulating pension policy in a first-best framework is not advisable. Therefore, it is difficult to export the Chilean experience to other countries in the region or overseas, with different political and economic structures and institutions (as highlighted in Rofman *et al.*, 2009). In spite of it, the Chilean reform has been a model not only for many emerging economies, notably in Latin America, but also has been at the heart of debates in industrialized ones (for instance in the US). Some key elements that facilitated or dampened outcomes of pension reform in Chile can be identified, so that local policy makers elsewhere can evaluate them and act accordingly.[16]

### *5.1 Market and public institutions*

One key element for the success of a system based on individual retirement accounts is the good functioning of market institutions, especially financial markets. The protection of property rights and minority shareholders is crucial for pension funds that have to invest across a wide range of debt instruments and shares of listed companies. When capital markets are not fully developed, pension funds will have to invest in banking deposits, so a sound and well regulated banking system is another key factor of success.

In the Chilean case, private property rights have strong backing in the Constitution and have been reinforced by a legalistic tradition. International indexes on the quality of market and public institutions tend to rank Chile very high, even when compared with OECD countries (see Figure 14). The biggest challenge to the new system arose very early, when, as a result of a major

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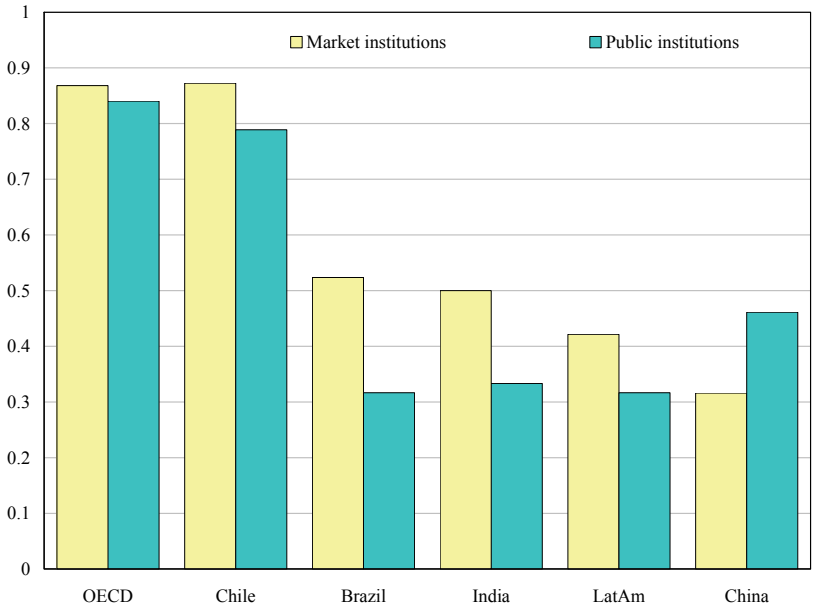
[16] This section relies heavily on Melguizo and Vial (2009). For an economic-theory oriented approach of the issue, see also Barr and Diamond (2006).

economic crisis, many major banks and other financial intermediaries failed in 1983-84. The government opted to protect deposits, allowing the pension funds to preserve their value and the system to survive (although at a significant fiscal cost).

**Figure 14**

**Market and Public Institutions Rankings**
*(Doing Business 2009, Governance 2007, Best = 1.0)*




Note: LatAm is the simple average of Colombia, Mexico and Peru.
Source: World Bank and own elaboration.

### 5.2 *Gradual development of financial markets*

The Chilean experience shows is that it is not necessary to have all the regulations and financial instruments in place to launch the system. There is a learning-by-doing process involving managers of pension funds, regulators, central banks and policy makers. Some authors have highlighted the benefits of the pragmatism in the Chilean regulation, especially in pension markets, as one of its main institutional assets, thanks to a "political economy of the possible" approach (Santiso, 2006).

If financial markets are not well developed at the onset of the pension reforms, it might be desirable to establish a conservative regulation, and gradually proceed to reform it introducing more flexibility. Nevertheless, being too conservative at the beginning has some risks, such as limiting too much the investment options and forcing too much concentration into government debt. The costs of excessive limitations could be substantial, as Berstein and Chumacero (2005) point for Chile. So, low risk international investments might be a good option if not enough good domestic alternatives exist, provided the introduction of some macroeconomic safeguards to avoid excessive foreign exchange rate volatility.

### 5.3 *Fiscal policy and transition design*

As we have analyzed in some depth, fiscal policy is extremely relevant. On the one hand, the move from PAYG to individual capitalization accounts will have a positive impact on economic growth if there is a net addition to domestic savings. Given that the transition process entails major fiscal disbursements, the increase in private savings may be offset by a reduction in government savings. Fiscal consolidation, mostly through current expenditure reallocations is needed in order to have a positive effect on savings and capital accumulation. According to Corbo and Schmidt-Hebbel (2003), fiscal consolidation in Chile may explain an increase in the domestic saving rate of 2.9 per cent of GDP, financing a hike in the investment rate of 1.5 per cent of GDP.

On the other hand, fiscal policy is relevant for risks to the pension fund portfolio. Traditionally, public debt is considered the safest asset, because the government has the ability to tax the citizens. However, governments can also elude its obligations through inflation, or even default. In many developing countries, especially in Latin America, governments had found politically expedient to take the inflationary way, instead of raising taxes or cutting expenses. Data shows that Chile is an outlier when compared to other reformers in the region: pension funds tend to have a lower share of government debt and a much higher proportion of foreign assets. Given the experience of pension funds in countries that have defaulted or liquated their public debt, it seems important to evaluate the safety of pension funds investments taking into account fiscal sustainability. These arguments are further compounded by lower financial credit risks of reformers if they exhibit a sound fiscal position.

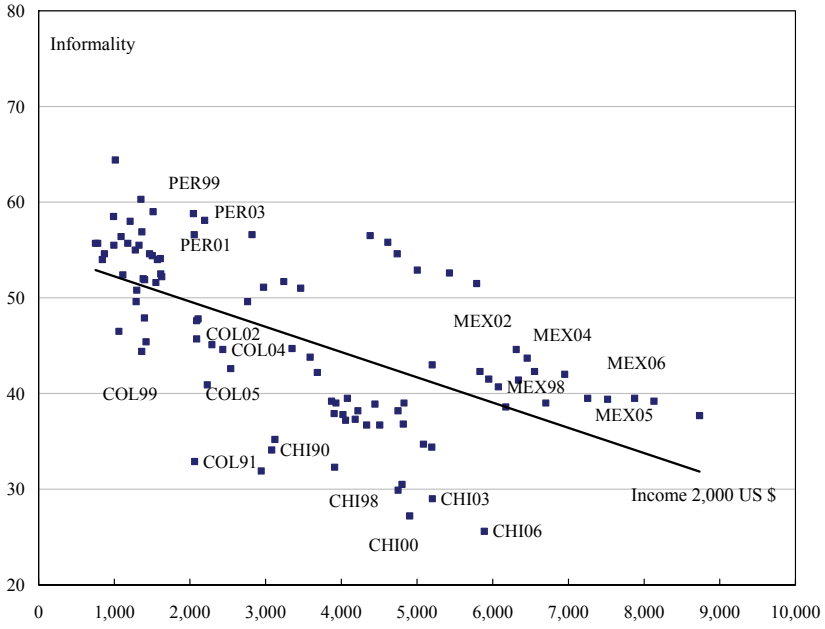
### *5.4 Informal labour market and solidarity pillar*

The experience of Latin America shows that labour market informality severely limits coverage of pension systems, even in the case of individual capitalization accounts where incentives to contribute are theoretically the greatest. If informality is pervasive at the onset of the reforms, it seems almost inevitable to establish a large solidarity pillar. Unfortunately, a large fiscal commitment to a basic pension, not subject to contributions, can act as an important disincentive to formalization, so the design must be very precise.

Informality in Chile is the lowest in Latin America, even below the regional pattern, as can be seen in Figure 15. The country had a non-contributory means-tested pension (PASIS) targeted to the poor of a value close to 80 euros per month, covering more than 400 thousand retirees, and did not seem to have had a significant impact in labour market informality. The new protection scheme with a significantly higher basic pension poses a risk of a drop in contributions at the low-income level, although the increasing "reference pension" may offset it. For other countries, the reinforcement of the first pillar does not need to be introduced from the verybeginning, since in any change of this sort there is a transition period – with high fiscal costs – in which those who enter into the new system accumulate resources in their accounts, well before they begin to retire. Only after that transition the protection mechanism are necessary.

**Figure 15**

**Informality and GDP per capita in LAC, 1990-2007**
*(percentage of urban workers)*




Source: ECLAC.

## ANNEX

**Table 2**

**Fiscal Expenditure in Pensions in Chile**
*(percent of GDP)*

| Year | Old System Deficit | | Recognition Bonds | Minimum Pensions | PASIS (Non-contributory) | Total |
|---|---|---|---|---|---|---|
| | Civil | Military | | | | |
| 1981 | 1.6 | 2.0 | 0.0 | 0.0 | 0.2 | 3.8 |
| 1984 | 4.7 | 2.2 | 0.2 | 0.0 | 0.5 | 7.6 |
| 1990 | 3.2 | 1.3 | 0.5 | 0.0 | 0.4 | 5.4 |
| 1995 | 2.7 | 1.2 | 0.7 | 0.0 | 0.3 | 4.9 |
| 2000 | 3.1 | 1.3 | 1.1 | 0.1 | 0.4 | 6.0 |
| 2005 | 2.2 | 1.3 | 1.2 | 0.1 | 0.4 | 5.2 |
| 2008 | 1.9 | 1.3 | 1.2 | 0.1 | 0.4 | 4.9 |

Note: The figure for the civilian deficit in the old system includes 0.3 percentage points in minimum pensions, Valdés (2006).
Source: National Budget Office.

**Table 3**

**Projection of Replacement Rates of Chilean Pension System**
*(percentage over last 10 salaries, by cohorts, densities, salaries and sex)*

| | 2010 | | 2025 | | 2050 | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| A | 111.7 | 78.0 | 69.9 | 36.5 | 67.8 | 50.3 |
| A1 | 106.5 | 72.2 | 89.6 | 46.9 | 128.5 | 79.8 |
| A2 | 112.6 | 78.2 | 62.7 | 35.3 | 102.9 | 67.5 |
| A3 | 112.6 | 74.7 | 68.9 | 36.4 | 67.6 | 44.7 |
| A4 | 112.6 | 76.5 | 67.3 | 35.5 | 66.4 | 44.4 |
| A5 | 112.6 | 82.9 | 66.8 | 35.8 | 63.1 | 44.4 |
| B | 52.7 | 36.7 | 39.5 | 16.4 | 39.3 | 23.6 |
| C | 46.3 | 30.0 | 25.7 | 9.0 | 29.2 | 17.8 |
| D | 4.8 | 3.4 | 15.5 | 5.2 | 12.1 | 7.0 |
| E1 | | | | | 69.4 | 42.8 |
| E2 | | | | | 59.6 | 38.9 |
| E3 | | | | | 40.0 | 26.5 |
| E4 | | | | | 39.0 | 26.2 |
| E5 | | | | | 37.5 | 26.2 |
| F | | | | | 32.7 | 17.0 |
| Average | 54.9 | 38.6 | 45.8 | 17.9 | 44.3 | 26.7 |
| Total average | | 44.9 | | 29.0 | | 33.8 |

Source: Favre *et al.* (2006).

**Table 4**

**Projection of the Pension Level in Chile**
*(monthly pension, 2004 Chilean pesos)*

| | 2010 | | 2025 | | 2050 | |
|---|---|---|---|---|---|---|
| | **Men** | **Women** | **Men** | **Women** | **Men** | **Women** |
| A1 | 1,107 | 750 | 930 | 487 | 1,336 | 829 |
| A2 | 768 | 515 | 652 | 337 | 1,070 | 701 |
| A3 | 365 | 250 | 323 | 176 | 588 | 401 |
| A4 | 210 | 143 | 182 | 96 | 333 | 222 |
| A5 | 121 | 79 | 104 | 50 | 182 | 114 |
| B | 198 | 140 | 214 | 91 | 408 | 245 |
| C | 173 | 115 | 140 | 50 | 303 | 185 |
| D | 18 | 13 | 84 | 29 | 126 | 73 |
| E1 | | | | | 721 | 445 |
| E2 | | | | | 619 | 404 |
| E3 | | | | | 348 | 238 |
| E4 | | | | | 196 | 131 |
| E5 | | | | | 108 | 67 |
| F | | | | | 339 | 176 |
| Average | 206 | 146 | 244 | 83 | 320 | 204 |
| Minimum pension | | 77 | | 94 | | 121 |

Source: Favre *et al.* (2006).

**Table 5**

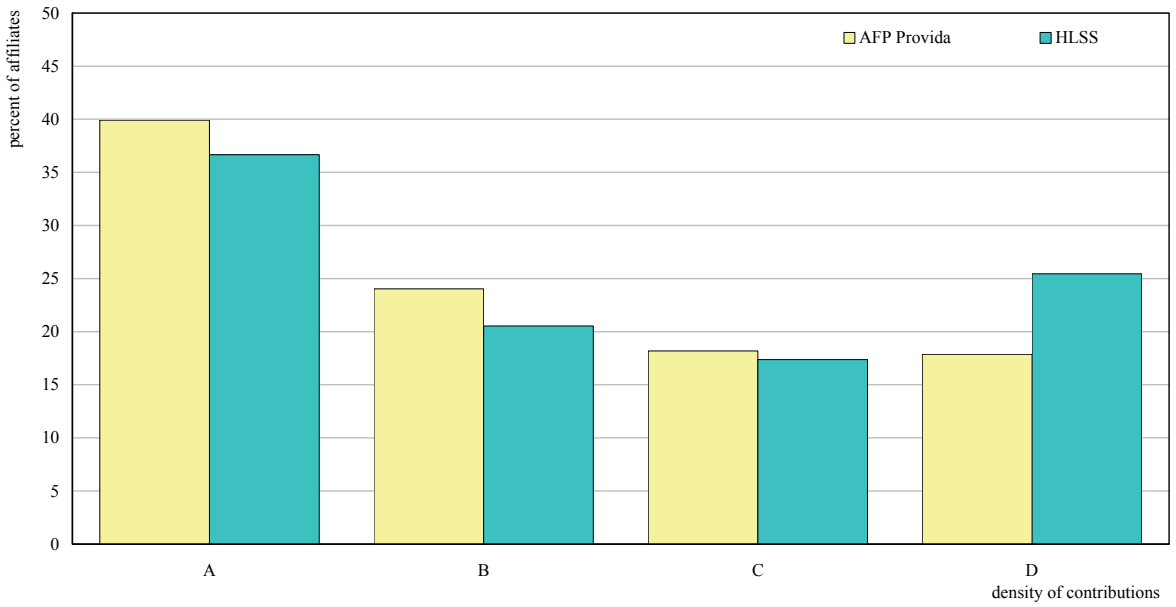
**Projection of Fiscal Expenditure in Civil Pensions in Chile**
*(no-reform scenario, percent of GDP)*

| **Year** | **Old system Deficit** | **Recognition Bonds** | **Minimum Pensions** | **PASIS (Non-contributory)** | **Total** |
|---|---|---|---|---|---|
| 2010 | 1.7 | 1.4 | 0.1 | 0.3 | 3.4 |
| 2015 | 1.3 | 1.4 | 0.1 | 0.3 | 3.1 |
| 2020 | 1.2 | 0.7 | 0.0 | 0.3 | 2.3 |
| 2025 | 1.0 | 0.2 | 0.1 | 0.3 | 1.5 |
| 2030 | 0.8 | - | 0.1 | 0.3 | 1.1 |
| 2035 | 0.6 | - | 0.1 | 0.3 | 1.0 |
| 2040 | 0.5 | - | 0.1 | 0.3 | 0.9 |
| 2045 | 0.4 | - | 0.1 | 0.3 | 0.8 |
| 2050 | 0.3 | - | 0.1 | 0.3 | 0.7 |

Source: Favre *et al.* (2006).

**Figure 16**

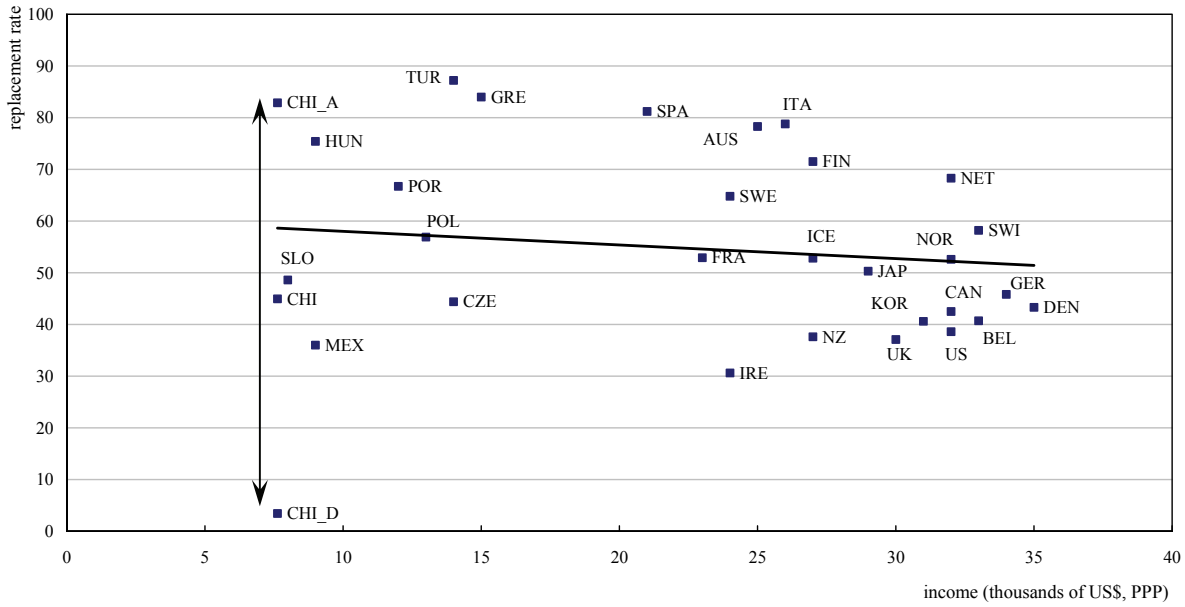
**Categories of Affiliates by Density of Contributions in Chile**




Note: "A" affiliate contribute over 80 per cent of the time, "B" between 60 and 80 per cent, "C" between 40 and 60 per cent, and "D" under 40 per cent.
Source: 2002 Social Protection Survey and AFP Provida (data up to 2004).

**Figure 17**

**Replacement Rate and GDP per capita in OECD and Chile**
*(percent of pre-retirement gross earnings)*




Source: Favre *et al.* (2006).

**Table 6**

**A) Projection of Fiscal Expenditure in Civil Pensions in Chile, Reform Scenario A**
*(percent of GDP)*

| Year | Old System Deficit | Recognition Bonds | SPS Total | Old-age PBS | Old-age APS | Disability | Total |
|---|---|---|---|---|---|---|---|
| 2010 | 1.7 | 1.4 | 0.8 | 0.5 | 0.1 | 0.2 | 3.9 |
| 2011 | 1.6 | 1.4 | 0.9 | 0.5 | 0.1 | 0.2 | 3.9 |
| 2012 | 1.5 | 1.4 | 1.0 | 0.6 | 0.2 | 0.2 | 3.9 |
| 2013 | 1.5 | 1.4 | 1.0 | 0.5 | 0.2 | 0.3 | 3.9 |
| 2014 | 1.4 | 1.4 | 1.0 | 0.5 | 0.2 | 0.3 | 3.8 |
| 2015 | 1.3 | 1.4 | 1.0 | 0.4 | 0.3 | 0.3 | 3.7 |
| 2016 | 1.3 | 1.3 | 0.9 | 0.4 | 0.3 | 0.3 | 3.5 |
| 2017 | 1.3 | 1.1 | 0.9 | 0.3 | 0.3 | 0.3 | 3.3 |
| 2018 | 1.3 | 1.0 | 0.9 | 0.3 | 0.3 | 0.3 | 3.2 |
| 2019 | 1.2 | 0.9 | 0.8 | 0.2 | 0.4 | 0.2 | 3.0 |
| 2020 | 1.2 | 0.7 | 0.8 | 0.2 | 0.4 | 0.2 | 2.8 |
| 2021 | 1.2 | 0.6 | 0.8 | 0.1 | 0.4 | 0.2 | 2.6 |
| 2022 | 1.1 | 0.5 | 0.7 | 0.1 | 0.4 | 0.2 | 2.4 |

Source: Favre *et al.* (2006) and own elaboration.

**B) Projection of Fiscal Expenditure in Civil Pensions in Chile, Reform Scenario B**
*(percent of GDP)*

| Year | Old system Deficit | Recognition Bonds | SPS Total | Old-age PBS | Old-age APS | Disability | Total |
|---|---|---|---|---|---|---|---|
| 2010 | 1.7 | 1.4 | 0.9 | 0.5 | 0.1 | 0.2 | 3.9 |
| 2011 | 1.6 | 1.4 | 0.9 | 0.6 | 0.2 | 0.2 | 3.9 |
| 2012 | 1.5 | 1.4 | 1.0 | 0.6 | 0.2 | 0.2 | 4.0 |
| 2013 | 1.5 | 1.4 | 1.0 | 0.5 | 0.2 | 0.3 | 3.9 |
| 2014 | 1.4 | 1.4 | 1.0 | 0.5 | 0.3 | 0.3 | 3.8 |
| 2015 | 1.3 | 1.4 | 1.0 | 0.4 | 0.3 | 0.3 | 3.8 |
| 2016 | 1.3 | 1.3 | 1.0 | 0.4 | 0.3 | 0.3 | 3.6 |
| 2017 | 1.3 | 1.1 | 1.0 | 0.3 | 0.4 | 0.3 | 3.4 |
| 2018 | 1.3 | 1.0 | 0.9 | 0.3 | 0.4 | 0.3 | 3.2 |
| 2019 | 1.2 | 0.9 | 0.9 | 0.2 | 0.4 | 0.3 | 3.0 |
| 2020 | 1.2 | 0.7 | 0.9 | 0.2 | 0.5 | 0.2 | 2.9 |
| 2021 | 1.2 | 0.6 | 0.9 | 0.1 | 0.5 | 0.2 | 2.7 |
| 2022 | 1.1 | 0.5 | 0.8 | 0.1 | 0.6 | 0.2 | 2.5 |

Source: Favre *et al.* (2006) and own elaboration.

**Table 7**

**Projection of Beneficiaries of the New Solidarity Pillar**
*(persons)*

| Year | Old-age | | Disability | Total |
|---|---|---|---|---|
| | APS | PBS | | |
| 2009 | 160,676 | 510,474 | 211,769 | 882,919 |
| 2010 | 208,737 | 562,142 | 232,909 | 1,003,789 |
| 2011 | 263,102 | 617,292 | 256,380 | 1,136,773 |
| 2012 | 323,876 | 671,926 | 282,470 | 1,278,272 |
| 2013 | 391,562 | 639,614 | 311,509 | 1,342,685 |
| 2014 | 463,523 | 603,027 | 343,873 | 1,410,422 |
| 2015 | 540,616 | 561,307 | 379,990 | 1,481,913 |
| 2016 | 621,676 | 524,169 | 379,994 | 1,525,839 |
| 2017 | 706,550 | 483,218 | 379,997 | 1,569,765 |
| 2018 | 807,783 | 425,907 | 380,000 | 1,613,691 |
| 2019 | 917,376 | 360,237 | 380,004 | 1,657,617 |
| 2020 | 1,032,257 | 289,278 | 380,007 | 1,701,543 |
| 2021 | 1,155,115 | 225,093 | 380,011 | 1,760,219 |
| 2022 | 1,289,472 | 149,409 | 380,014 | 1,818,896 |

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# COMMENTS ON SESSION 4
# PENSION REFORM AND FISCAL POLICY

*Geert Langenus*[*]

As for the previous sessions, the three discussants for Session 4 have engaged in some market segmentation and I will focus in particular on the first two papers, the one by Carone and Eckefeldt and the one by Gonand. I have to say that I am quite happy with my share of the work: both papers are very interesting in my view and I enjoyed reading them. They are also complementary in a way: the Carone and Eckefeldt paper provides a detailed analysis of the problem while the Gonand one assesses possible solutions. If you do not mind, I will treat them in this order.

## 1 Comments on "Economic and Budgetary Effects of Pension Reforms in EU Member States" by Giuseppe Carone and Per Eckefeldt

Let me start with the paper by Giuseppe Carone and Per Eckefeldt. The Working group on Ageing Populations (henceforth: AWG) was created within the EU's Economic Policy Committee to analyse the macroeconomic and budgetary impact of population ageing and is currently updating its 2006 projections of the ageing costs. The paper gives us a sneak preview of the new projections concerning pension expenditure. The authors show that the ratio of pension expenditure to GDP in the EU will rise by some 2¼ percentage points by 2050/2060 but this is an average; the increase is somewhat bigger in the euro area and there is quite a lot of country dispersion. The paper then analyses the driving forces and shows that the increase can be traced back to a higher dependency ratio, which is only partly offset by higher employment and lower coverage and benefit ratios. The authors also assess the impact of reforms, that mainly work through a delayed exit of older workers from the labour market but also favourably affect benefit ratios. They also perform a number of sensitivity analyses and I was personally particularly struck by the importance of the assumptions concerning migration: using an alternative assumption of zero net migration would almost double the increase in pension expenditure! Finally, the authors compare the current projections with the 2006 vintage and it is safe to say that the picture is quite similar on average but there are a few outliers; in this connection, pension projections were revised substantially downwards for Portugal and significantly upwards for Malta and Luxembourg for example.

I would like to structure my thoughts on this paper on the basis of a few general comments and questions. The first issue to highlight is probably that the people who thought that ageing is less of a problem if one takes into account new demographic assumptions (e.g., regarding fertility and migration) and recent structural reforms were too optimistic: the projected increase in pension expenditure in the coming decades has not disappeared or become significantly smaller since the 2006 AWG update. This suggests that greater reform ambition is required and, in this respect, lessons can certainly be drawn from "successful reformers". More generally, it may also illustrate the need for greater fiscal prudence as, for a lot of countries, finding structural solutions for the impact of population ageing on future budgets does not seem to be that straightforward. We should not be overly confident that this will be much easier in the following years.

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The views expressed here are those of the author and not necessarily those of the National Bank of Belgium.

My second comment pertains to the impact of reforms. The paper clearly highlights that a large group of countries have at least succeeded in shoring up the participation rate of older workers, mainly through downsizing early retirement schemes. However, an increased participation rate is only part of the story, as it was stressed in the paper by Ahuja and Paserman in the first session. What ultimately matters is whether the overall employment rate increases and if increased participation of older workers does not lead to higher unemployment. We would need to have the full set of AWG projections (including the macroeconomic projections and those for unemployment expenditure) to assess this. At any rate, it should be stressed that the employment rate of older workers is typically also influenced by parameters that are outside the pension system. One of those is the wage structure: many countries have wage structures that rise with age or seniority. This may give employers an incentive to lay off older workers if higher wages are not fully matched by higher productivity. Partly to compensate this phenomenon, some countries are already experimenting with targeted reductions in social contributions – or specific subsidies – for companies employing older workers. Finally, there is the issue of the availability of adequate jobs for older workers that is highlighted by Giuseppe and Per in the conclusion of their paper. All in all, it may not be sufficient to simply eradicate all kinds of early retirement schemes or, for that matter, increase the legal retirement age, a more comprehensive policy – also focusing on labour market institutions – may be needed to successfully raise the employment rate by delaying the exit of older workers. Turning to the projection models, if one assumes that the structural employment rate is unaffected by these reforms – and I am not sure if the new AWG projections are based upon more pessimistic assumptions concerning structural unemployment than the previous ones –, then obviously increased participation of older workers is entirely passed through to higher employment and, hence, automatically reduces the ageing costs. However, it is unclear to me at least if the policy environment is supportive enough for that to happen in all EU countries.

I now turn to the issue of the adequacy of pensions that is also touched upon in the paper. The authors show, in particular, that the benefit and replacement ratios are set to decline (strongly) in most EU countries. This may signal potential problems in the future as the social sustainability of the reforms – especially taking into account the increased voting power of the elderly – may not be guaranteed in the longer term. However, to my mind there is also an issue of cross-country comparability of the pension projections. As those projections tend to be based upon current policies, assumptions concerning the future indexation of individual pension entitlements are not necessarily harmonised. In this connection, one can however raise the question whether current policies can be prolonged until 2060. More generally, falling benefit and replacement ratios may be an indicator of inequity in the pension system. Hence, it is important that we carefully assess intergenerational implications of structural reforms to pension and care systems. For this a broader approach is needed and this may include generational accounting exercises or methods assessing the welfare of different cohorts such as in the paper by Gonand.

One of the other interesting issues in the paper is the comparison with the 2006 AWG projections. A systematic analysis of the revisions of the AWG projections is certainly very helpful. However, if I have one small quibble with the paper, it pertains to the fact that the reader actually wants more than what the paper provides. Ideally, one would want to disentangle the impact of reforms, revised assumptions and changes in projection models but the current format based upon the expenditure drivers does not allow that. It shows that countries are moving in different directions – with respect to benefit and coverage ratios, but also as regards dependency ratios – and it is not always easy to understand why if one is not very familiar with the detailed country projections. I assume that, at least in some cases, trends may be somewhat blurred by changes in projection models. As pension expenditure is the only expenditure item for which national projection models are used by the AWG, full transparency of those projections is a key issue. Despite all the detailed information given by the AWG, many people – and some of them are even in the room today – indeed still consider the national pension projections as “black boxes”. Hence,

it would be particularly helpful if the authors could (roughly) quantify the impact of changes in individual assumptions and projection models but I realise that this is quite an uphill task.

Let me now switch to the issue of migration. The paper shows that for most countries, but not for all, the dependency ratio effect is now lower – and in some cases significantly so – than in the 2006 AWG exercise. I presume that this is due to the fact that higher life expectancy is more than offset by higher fertility and increased net migration. It is safe to say that all three of these projections are surrounded with significant uncertainty. With respect to the first element, for instance, Ray Barrell reminded us yesterday that people tend to underestimate their life expectancy. Let me just add to that that recent projection exercises have amply shown that demographers are indeed also people and have been known to sometimes run behind the life expectancy curve. However, I would like to focus on net migration because I know that the issue is very important for the projections in the case of some countries. First, I was wondering if the authors could elaborate on the procedure that makes these assumptions on net migration at least consistent across EU countries. My second point relates to the fact that the positive impact of net migration requires a certain policy environment. There is the basic issue of opening the borders to legal migrants but other issues such as diploma recognition and the type of migrants that countries attract are important as well. In the sensitivity analyses the importance of the assumption on net migration is highlighted very clearly. Hence, if we have doubts that the required policies are in place – and will be in place throughout the projection period – it is quite tricky to assume that a large part of the ageing cost will simply be wiped out by net migration.

The final issue relates to the macroeconomic projections. For many countries, the current and the following five years were supposed to be the last period of relatively strong growth before the decline in the population of working age starts weighing on trend growth. How is that picture changed because of the current crisis? Is the current downturn assumed to have a lasting effect on trend growth and, hence, on the ageing costs?

## 2 Comments on "Choosing a Pension Reform: A Framework for the Social Planner" by Frédéric Gonand

Let me now turn to the equally interesting paper by Frédéric Gonand. The paper is written against the background of unsustainable public finances in many industrialised countries, as it was illustrated for the EU Member States in the paper by Carone and Eckefeldt. Clearly, population ageing will make structural reforms desirable and the Gonand paper looks into the different options. It focuses on pension systems and compares different reform strategies to a "no reform"-scenario, although the latter is actually a "rising tax burden"-scenario. Gonand argues that the choice for a specific reform should be based upon social welfare considerations but shows that, of the reforms studied in the paper, none are Pareto-improving. Hence, the "optimal" reform crucially depends on the aggregation procedure for individuals' welfare and two parameters in particular, the society's aversion to intergenerational inequality and the extent to which welfare of future generations is discounted. As for the previous paper, I would like to make a few general and one or two more specific points.

First, Gonand shows that structural reforms typically have winners and losers. Hence, approaches illustrating the micro-implications of these reforms for different groups in the current and future population should always complement the standard macroeconomic and budgetary projections in my view. This can also shed some light on the sustainability of the reforms (as the reforms may be undone if the losers succeed in winning political support). Many governments face(d) delicate choices in the coming (past) years. Intergenerational equity would seem to be an appropriate criterion to assess different policy responses to the budgetary challenge created by population ageing. This can be analysed in different ways, including approaches using social

welfare functions such as in the paper by Gonand but also on the basis of generational accounting and, e.g., the evolution of the net tax burden over different cohorts. However, any concrete operationalisation will include a normative judgment on what is equitable. In this context, it may be difficult to translate analytical results into clear policy recommendations.

Second, the comparison of utility, welfare, income and consumption levels of different cohorts is quite complicated. How do you account for economic progress? On the basis of Arrow's critique, some discounting would seem necessary. There may be a link with the choice between absolute or relative poverty measures, an issue that was already heavily debated in this workshop. While I share many of the views expressed by Carlo Cottarelli and Laurent Paul, who qualified the appropriateness of relative poverty indicators, it still is the case that all papers that look into poverty issues in this workshop, use a relative poverty definition. I would argue that, if we seem to be relatively comfortable with country-specific poverty lines, it would also be natural to opt for "cohort-specific" welfare assessments. The application of such a relative approach to the welfare of different cohorts may then be consistent with linking the discount factor to, say, per capita GDP growth or average wage growth. There is a similar issue in generational accounting exercises that look into intergenerational equity: what is more relevant, the net tax burden or the after-tax income of different cohorts? I would personally not think that young and future and generations should be punished with a higher net tax burden because they have MP3 players and flat-screen TVs while their grandfathers and grandmothers had record players and black-and-white TVs. In addition, equalising after-tax income across generations would imply a continuously rising tax rate. Hence, I would by and large support the view that the welfare of future generations should be discounted to an appropriate extent.

This brings me to a third, more technical point. In the paper a very specific procedure is followed to avoid the "old-cohort bias". The social welfare function is based upon changes in utility generated by reforms (the difference between utility levels in the different reform scenarios and under the "no reform" option). Can the author elaborate on the reasons why this is necessary? I may be illustrating my general ignorance here but, when reading through the paper, I was wondering why the bias could not be dealt with via appropriate discounting (also in the ranking of the cohorts). The specific procedure followed in the paper at least makes the interpretation of intergenerational equity rather difficult as the aversion parameter is not linked anymore to differences in absolute levels of utility. I would argue that counter-intuitive results would then be possible: most people would look differently onto a unit of utility depending on whether it is taken away from – or given to –, say, Mr. Roman Abramovich or from – or to – a single mother that has to get by on welfare cheques.

Fourth, the set-up of the model is also somewhat specific: taxes are only levied on labour income and are increased only if deficits in the pension system would otherwise occur. It may be worthwhile to consider possible extensions of the model including the introduction of a tax on consumption and a pre-funding strategy to finance the ageing costs. This may point to alternative options to make the baby-boom generations contribute more to the funding of the ageing costs.

Fifth, the empirical results presented in the paper reveal different reform preferences for different countries. In Japan, for example, a decrease in the replacement rates seems to be by and large the optimal scenario while this is much less the case for the other countries studied in the paper. Can these different preferences or model outcomes be traced back to the calibration of the country models or to characteristics of the current pension systems?

Finally, let me end with a quote from the Gonand paper: "*democratic government usually does not care much about the welfare of future generations*". I am afraid that that statement, while somewhat provocative, is not fully inaccurate. In this connection, the question can be raised whether fiscal rules can help. This is particularly relevant in the context of the medium-term

objectives (MTOs) for fiscal policy that are defined for individual EU Member States in accordance with the Stability and Growth Pact. These MTOs will be revised in the course of 2009 in order to better reflect the governments' implicit liabilities against the background of population ageing. However, the current proposals imply only a very partial pre-funding of the ageing costs. This may be a missed opportunity as more ambitious MTOs than those which are currently envisaged could serve as a powerful reminder of the need to take policy action, either via more upfront fiscal consolidation or via (deeper) structural reforms. In addition, the international institutions could strongly contribute to the policy debate with further work on the intergenerational implications of different policy options. In this connection, the EC is already routinely publishing sustainability indicators. These indicators are just one – admittedly, big – methodological step away from indicators of generational imbalances. Even if the latter would require an additional set of assumptions, it would be very helpful in my view if such indicators could also be produced by international institutions in order to assess the impact of different policy responses to ageing (including the absence of any policy response).

# COMMENTS ON SESSION 4
# PENSION REFORM AND FISCAL POLICY

*Per Eckefeldt*[*]

## 1 Comments on "The Reform of the Portuguese Public Employees' Pension System: Reasons and Results" by Vanda Cunha, Helder Reis, Ariana Paulo and Nuno Sousa Pereira

In their paper, Cunha, Reis, Paulo and Pereira analysed the 2007 reform of the Portuguese public employees' pension system. In doing so, they described the reasons behind the reform and notably the underlying demographic trends, the main aspects of the 2007 reform and its implications for fiscal sustainability. As a result of the reform, they estimate that the reform measures taken in 2007 significantly reduce the projected increase in pension expenditure as a share of GDP, by 4 percentage points of GDP by 2060. Consequently, the risks to public finance sustainability are markedly reduced.

A reform of the public pension system in Portugal was motivated by the demographic change in the coming decades, which is shared by the other EU Member States. The demographic trends in Portugal are close to the EU average, as measured by the development of the old-age dependency ratio. However, the long-term budgetary impact of ageing was somewhat higher than on average in the EU. The 2007 reforms have reduced significantly the projected increase in pension expenditure in Portugal.

The main channel through which the lower increase in pension expenditure over the long-term materialises is the introduction of the sustainability factor. The sustainability factor automatically adjusts new pensions to changes in life expectancy. Another interesting feature of the pension reforms is the introduction of a new pension indexation rule. The new rule depends on the level of the benefit as well as on economic growth (see Table 1). Relatively small pensions (from the beneficiaries' point of view) are indexed in part to GDP, while relatively large pensions are indexed on prices, and the top pension income bracket in fact is not indexed at all. This will decrease the inequality in income distribution of pensioners as far as public pensions are concerned. It would be interesting to see what effect this feature would have on the total pension expenditure ratio as compared to a more standard type of indexation rule, like for instance 100 per cent price indexation, or 50 per cent wage and 50 per cent price indexation.

One aspect of the sustainability-enhancing reforms is a strong decline in the benefit ratio (*i.e.*, the average pension in relation to the average wage) over the long-term. In the assessment of long-term fiscal developments by the European Commission under its multilateral budgetary surveillance, this introduces a risk element. Looking at pension for public employees (CGA pensions), the decline in the benefit ratio is even more pronounced than for the general social security pensions. But it is worthwhile noting that despite the 2007 reforms, the benefit ratio remains high at 66 per cent in 2040 for CGA pensions, compared with 39 per cent for general social security pensions. The relative generosity of the CGA pension system is also evident from higher replacement rates as compared with the general social security pensions. In addressing possible risks related to reductions over item of pensions in relation to wages, a key aspect will be expanding labour supply and the number of contributors. For this to materialize, the incentive to postpone retirement needs to be in place. It would be interesting to see further analysis of labour force participation.

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**Table 1**

**Rule for Updating Pensions**

| | GDP real variation rate less than 2% | GDP real variation rate from 2% to 3% | GDP real variation rate equal or greater than 3% |
|---|---|---|---|
| **Pensions under 1.5 IAS** | CPI change rate | CPI change rate + 20% GDP real variation rate (minimum: CPI change rate + 0.5 percentage points) | CPI change rate + 20% GDP real variation rate |
| **Pensions 1.5 to 6 IAS** | CPI change rate – 0.5 percentage points | CPI change rate | CPI change rate + 12.5% GDP real variation rate |
| **Pensions 6 to 12 IAS** | CPI change rate – 0.75 percentage points | CPI change rate – 0.25 percentage points | CPI change rate |
| **Pensions above 12 IAS** | no update | no update | no update |

In conclusion, the large pension reforms Portugal goes a long way towards enhancing fiscal sustainability. It includes some aspects that are likely to contribute to the long-term stability of the pension system (e.g., the sustainability factor). Moreover, it adds some interesting and innovative features (e.g., the income level and GDP growth dependent indexation scheme post-retirement). However, as for several other countries, there are some potential risks present in Portugal related to the relative decline of pensions. To ensure the lasting success of these important reforms, further steps are likely needed. In particular measures that effectively will lead to longer working lives would appear as one route that will be need to be explored further in light of the projected continuous gains in life expectancy, hopefully in good health, in the coming decades.

## 1 Comments on "Pension Plan Revision and Fiscal Policy of Japan" by Monotobu Matsuo

In his presentation, Motonobu Matsuo analysed the prospects for the public finances in Japan in a long-term perspective, with particular emphasis on the fiscal consequences of the 2004 reform of the pension system. In doing so, he described the reasons behind the reform and notably the underlying demographic trends, the main aspects of the 2004 reform and its implications for fiscal sustainability. Moreover, a medium-term fiscal consolidation plan initiated by the government was foreseen to get the public finances on a more sustainable path. As a result of the reform, he concludes that the pension system will: (i) introduce certainty as regards pension contributions; (ii) better balance the intergenerational equity in view of demographic changes; (iii) secure a targeted benefit level (vs. the active working population), but this will require an increase in the governments contribution to public pensions. This latter aspect is crucial and it is planned to be financed by a major tax reform, including a consumption tax.

A reform of the public pension system in Japan was motivated by the demographic change in the coming decades, which is ageing much faster than in other parts of the world, including in Europe. The old-age dependency ratio is projected to rise from an already high level of 33 per cent today to as much as 83 per cent in 2050 (compared with the average in the EU, starting at 26 per cent and rising to 52 per cent by 2050). As regards the medium-term fiscal policy strategy aimed at supporting fiscal sustainability, a successful consolidation programme (pre-crisis up to

2008) contributed to a stabilisation of the debt level. The authorities were committed to further consolidation over the medium-term.

The pension reform of 2004 enhances the sustainability of the pension system and at the same time it safeguards pension remaining adequate in the future, which is a positive outcome in light of the already old and rapidly ageing Japan. The pension benefit is secured through the targeted basic pension replacement rate of no less than 50 per cent. It takes into account changes in life expectancy and changes in the labour force as a proportion of the population such that increases in public pension expenditure are curbed automatically. A cap is introduced on contribution rates by 2017, entailing an increase of some 5 percentage points as compared to 2005. Nonetheless, as pension post retirement are indexed (at the most) to prices, a relative decline of pension as compared to workers would materialize (assuming positive wage growth), which could raise concerns of pension adequacy over time for pensioners. It would be interesting to evaluate the pertinence of such political sustainability risks in the case of Japan. Another factor is the planned increase in the stares share of financing basic pension, rising from 33 to 50 per cent by FY2009. While state financing may be considered as well-founded for a social security insurance scheme without earnings requirements, there is still a potential political risk in the sustainability of this financing model and it would be interesting to highlight the extent to which such risks are present in the case of Japan.

In conclusion, the Japanese pension reform enhances sustainability and at the same time safeguards replacement rates. As it introduces more transparency and a more effective allocation of pension funds, the "political sustainability" could be enhanced. The improved information to workers on their accrued pensions will raise awareness of retirement incomes and could lead to increases in private savings. Moreover, the reform seeks to strengthen the reconciliation of work and family life, which could in fact have a positive impact on fertility rates, something that would a welcome development in rapidly ageing Japan. Nonetheless, there are challenges in Japan, including the financing of the pension expenditure under the 2004 reform as well as reducing the elevated debt level, being considerably above the OECD average even before the onset of the global economic crisis.

# COMMENTS ON SESSION 4
# PENSION REFORM AND FISCAL POLICY

*Teresa Ter-Minassian*[*]

## 1 Comments on "Social Security Reforms in Colombia: Striking Demographic and Fiscal Balances" by Sergio Clavijo

This paper presents an interesting analysis of reforms of the pension and health insurance systems in Colombia during the last fifteen years, and assesses their fiscal implications. As regards pensions, the paper finds that the introduction of a defined contribution system and parametric reforms of the public defined benefits system have contributed to a substantial reduction of the NPV of the implicit debt of the public system (equivalent to about 100 per cent of GDP), but the system remains heavily imbalanced, with a still relatively high implicit debt, and inadequate coverage of the population. The paper attributes this imbalance largely to still relatively generous provisions of the public system, both as regards the official retirement age and the replacement rate, which is well above corresponding rates in the private system, despite high historic rates of return on the portfolios of private pension funds. Accordingly, it recommends further reforms to link the official retirement age to the increasing life expectancy of the population (higher for females than males), and to align more closely the replacement rates of the public pillar to those of the private one. It also recommends a cut in employers' contributions, funded by an increase in the VAT rate and a more even distribution of the remaining burden of pension contributions between employers and employees.

I found the analysis generally careful and convincing, but have a few observations and suggestions on it.

- First, I would have welcomed some more detail on the methodology and assumptions used to project future liabilities of the public pension system, to be able to assess their realism. It would have been also interesting to see some sensitivity analysis of the assumptions.
- Second, it would be desirable to hear Mr. Clavijo's views on the political and social feasibility of his proposal to link the retirement age to life expectancy, which might imply a faster increase in the retirement age for women than men.
- Third, what further parametric changes would the author recommend to reduce the replacement rates for the public system? Would he also recommend altering the present progressivity of the system, which envisages significantly higher replacement rates for lower than for higher income groups? Also, how would he view the desirability and feasibility of moving to irrevocable choices of regimes, eliminating the current possibility of switching back and forth between them?
- Fourth, what assumption about the incidence of employers' contributions underlies his recommendation to shift a part of them to the employees? Also, could a shift in the burden of contributions (as opposed to their outright reduction) really be expected to reduce incentives to informality?
- Fifth, I am not sure whether in Colombia participation in one of the systems excludes participation in the other. If this is the case, would it be desirable, in Mr. Clavijo's opinion, to allow individuals to participate simultaneously in both systems? Would this facilitate acceptance of policies to reduce replacement rates under the public system?

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[*] IMF.

- Finally, the historic rates of return on pension portfolios appear relatively high, albeit declining, in an international perspective, and especially in the current global environment. It would be interesting to extend the simulations reported in Figure 3 to assess the impact of significantly lower rates of return on expected replacement rates under the private pillar. Also, are there any steps that can be taken, in the author's view, to significantly boost again the rate of return on the portfolios once the current crisis is over?

Since the focus of this seminar is on pensions, rather than health reforms, I will not comment in detail on the second part of the paper. In brief, I found its analysis and conclusions well spelled out and generally plausible. I certainly agree with its focus on steps to improve formality, and thereby the level and density of contributions. Incidentally this applies to the pension system as well. But I wonder to what extent the quantitative estimates of the medium to long term cost of the system are biased (probably downward) by the fact that the analysis does not allow for the impact of technological developments on the cost of and demand for health services. Available research on the drivers of health spending in more advanced countries suggest that the rising cost of health care is more important than the effects of demographic developments. If data on health care costs and their relation with technical progress are, or become soon available for Colombia, assessing their influence on health spending prospects would seem a very useful extension of the paper.

## 2 Comments on "Pension Reform and Fiscal Policy: Some (Tentative) Lessons from Chile" by Ángel Melguizo, Ángel Muñoz, David Tuesta and Joaquín Vial

This paper presents an interesting overview of pension reforms in Chile, a country which has become an international role model in this area, as well as some reflections on the applicability of this model in other countries, particularly in Latin America. I found the analysis of the Chilean case well researched and argued. In contrast, the discussion of the cases of Colombia, Mexico and Peru struck me as too cursory and unspecific. Personally, I would drop them, and only use references to those less radical reform experiences to illustrate by contrast how the comprehensiveness of the Chilean approach was key to ensuring a major reduction of the implicit debt of the system.

The paper illustrates well both the achievements and the shortcomings of the initial pension reform in Chile, explaining the various components of its initial fiscal cost, and the difficulty of ensuring an adequate coverage and replacement rate of the contributory system in an economy which, like those of most emerging markets or LICs, is still characterized by high degrees of informality or temporary work.

These characteristics pose difficult trade offs between the social objective of preventing old age poverty, on the one hand, and the economic objectives of preserving incentives to contribute to the pension system, and minimizing fiscal costs, on the other hand.

Clearly, the balance struck in the initial reform, which may have been appropriate in the context of the early 1980s, when Chile still suffered from severe fiscal and external imbalances, became less appropriate as the country consolidated its fiscal position, reducing its net public debt to a very low level, and gained strong international credibility through consistent cautious macroeconomic management under different political regimes. It is thus not surprising that a strong priority of the new administration of President Bachelet in 2006 would be an early reform of the pension system, aiming at a substantial improvement in coverage, and reduction of the gender bias inherent in it. The paper could discuss in more detail the process of this reform, which was exemplary, in starting with a sound and comprehensive technical analysis of the shortcomings of the existing system and of possible reform options, and following it up with a lengthy and inclusive process of consensus building in the political class and in society at large.

The paper presents an interesting projection of the fiscal cost of this reform, based on available published data. While the assumptions utilized in the projections do not seem unreasonable, some struck me as possibly optimistic in the current global environment, which is impacting severely the Chilean economy. In particular, how long will it take Chile to make up the significant decline in output expected for this year, and only slow recovery projected for the next one, to achieve an annual growth rate of 3.7 per cent between now and 2025. And how realistic is it to assume an average real rate of return on pension portfolios of 5 per cent a year over the same period. Given the uncertainty about the depth and length of the current crisis, I think that a sensitivity analysis of the main assumptions underlying the projections, or at least the preparation of an alternative, more pessimistic, scenario would enrich the paper.

Another issue that could be discussed in greater detail in the paper is the foreseeable impact of a more generous solidarity pillar on the incentive for workers to affiliate to the private contributory system and to increase the density of their contributions. As the paper recognizes, the assumption of an increase in the number of affiliates and in the density of contributions is a key driver of the projected decline in the fiscal cost of the solidarity pillar after 2015.

I found interesting, and basically agree with, the conclusion of the paper that, while a fully developed capital market is not a prerequisite for the introduction of a defined contribution pension system, a strong regulatory framework and supervisory capacity with respect to the pension funds are so. I also agree with the view that, if domestic capital markets are less developed, it is more desirable to allow early on pension funds to invest significant portions of their portfolios in external markets, to avoid excessive concentration on domestic public debt.

I also agree with the focus in the paper on upfront costs of Chilean style pension reforms. While such costs should not discourage governments from undertaking reforms that, if appropriately designed and implemented, can substantially reduce the implicit debt of public pension systems over the longer run, they can pose substantial challenges to fiscal management in the short to medium term, necessitating both early reforms of the remaining public pillar and other, country-specific steps to mobilize revenue or reduce other spending. In this respect, timing pension reforms to coincide with periods of cyclical expansion can facilitate a difficult political and social task.