Session 4

PENSION REFORM AND FISCAL POLICY

CHOOSING A PENSION REFORM: A FRAMEWORK FOR THE SOCIAL PLANNER

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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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The author is indebted to Pierre Pestieau, Philippe Mongin, Florence Legros, David de la Croix, Bertrand Wigniolle, Didier Blanchet and Boris Cournède for their comments and useful inputs in this study. Remaining errors and/or omissions are mine. The views expressed here are mine.

[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%	

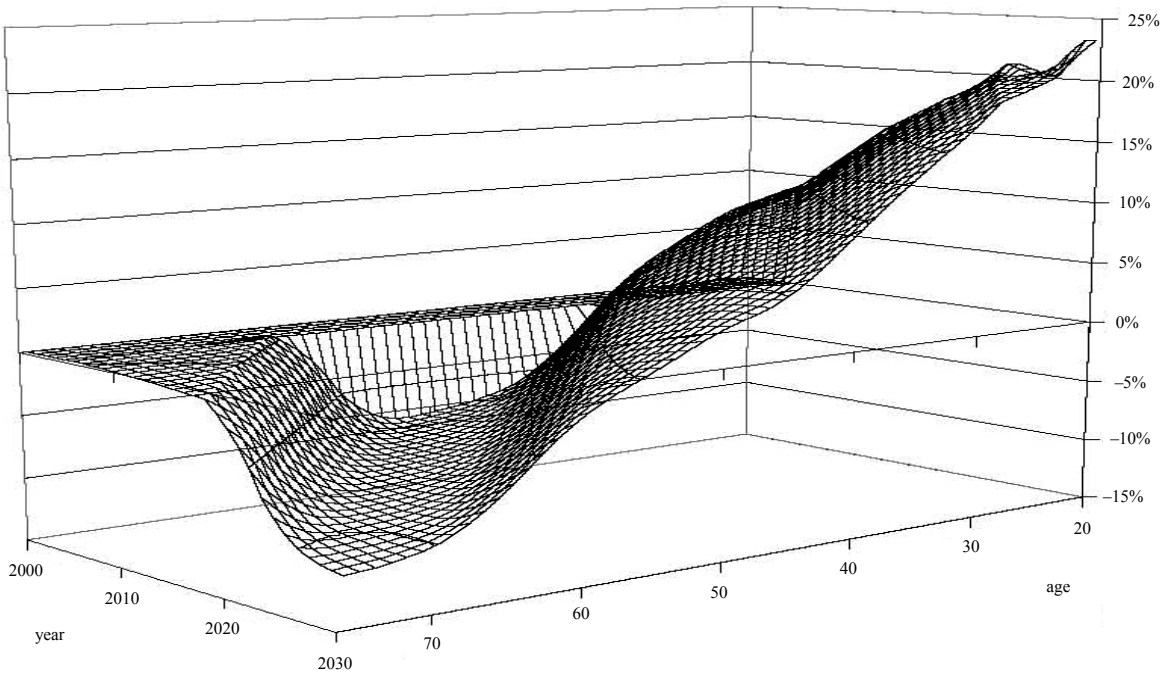
Germany

(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)

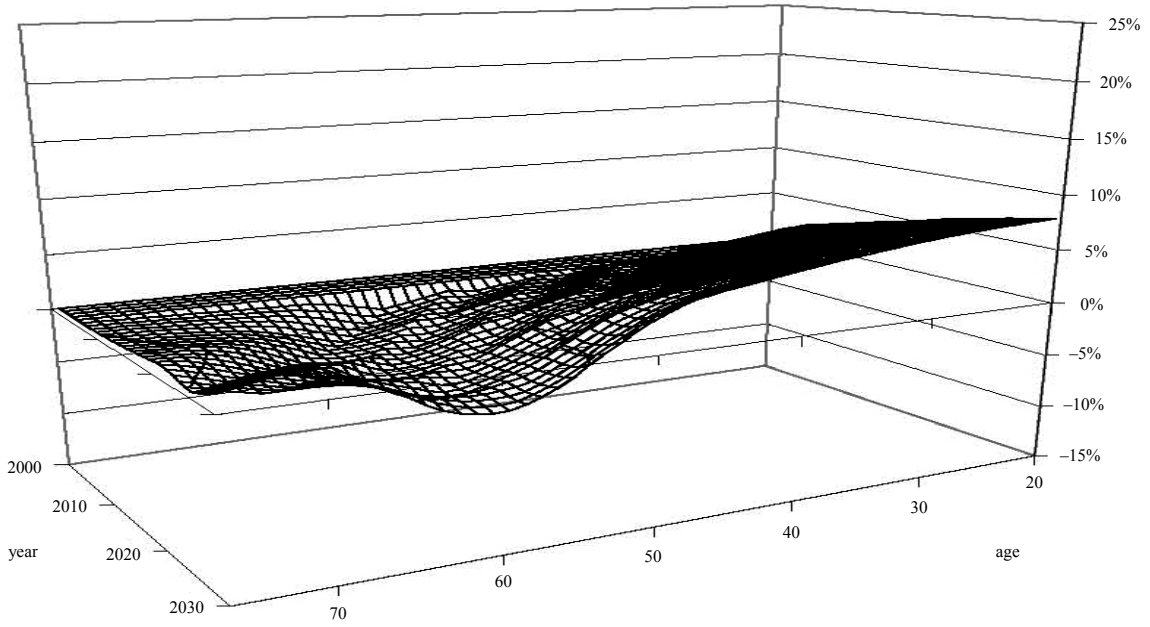
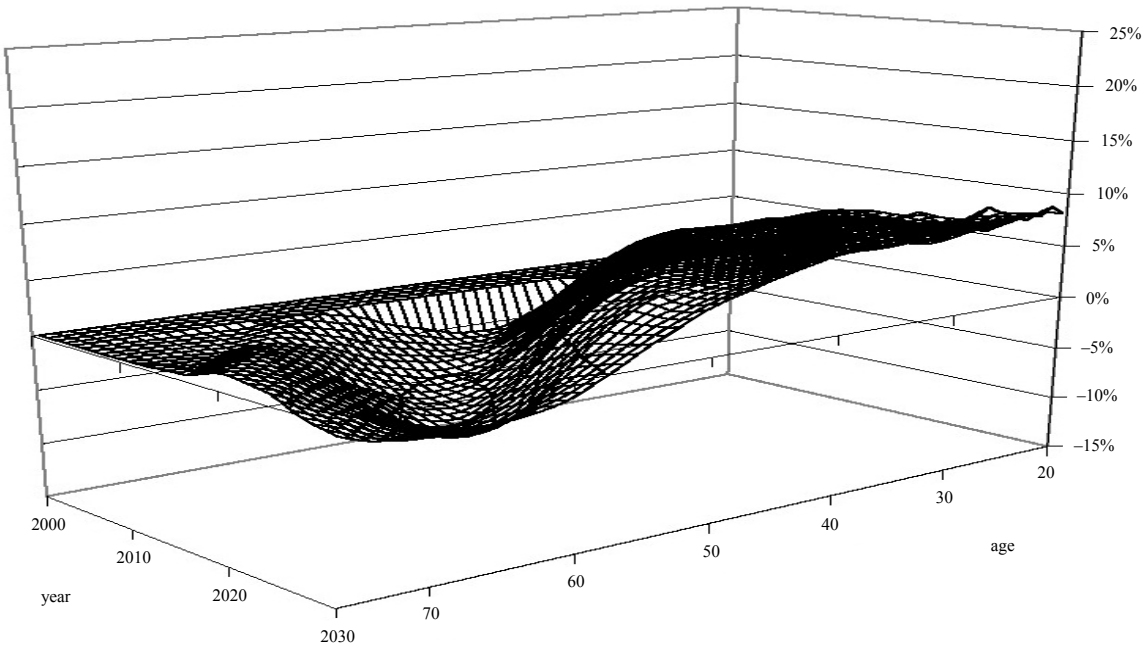


Figure 3

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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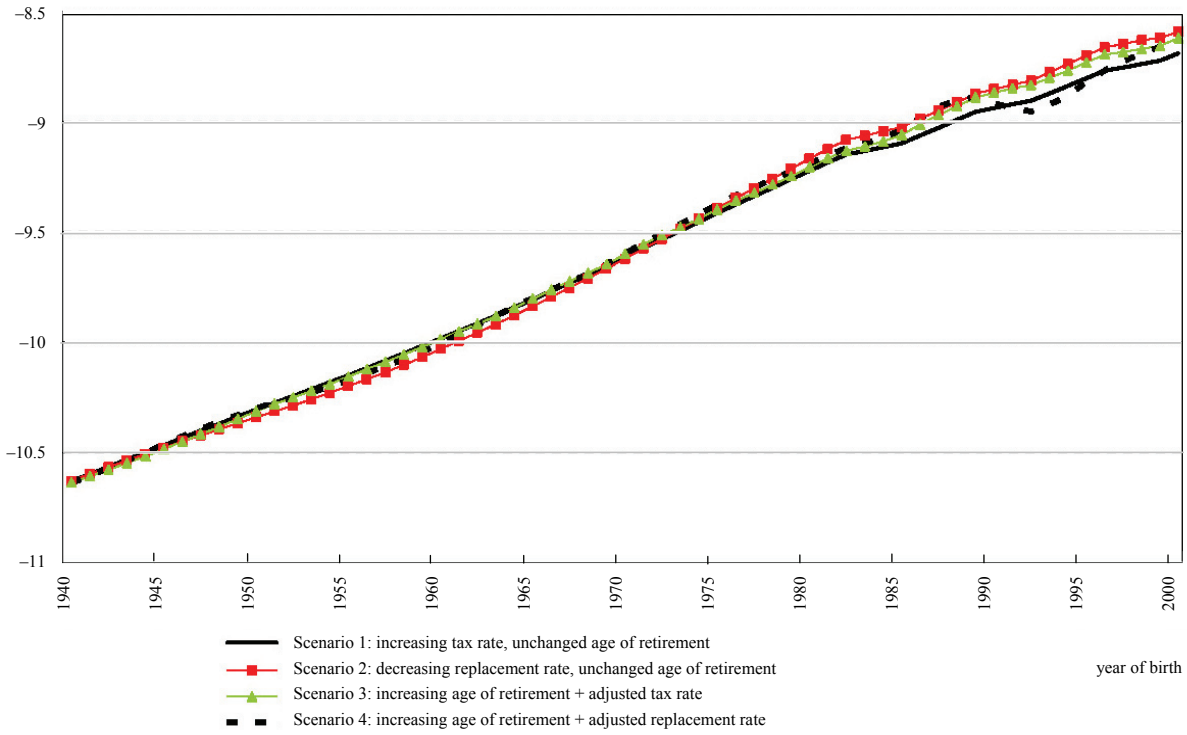
[8] In some exceptional cases, the intertemporal utility of a cohort is slightly lower than the one of the immediately preceding cohort, due to the influence on welfare of pension reforms which depends on age.

Figure 4

Intertemporal Utilities of the Representative Individuals of the Cohorts Born Between 1940 and 2000

United States



Japan

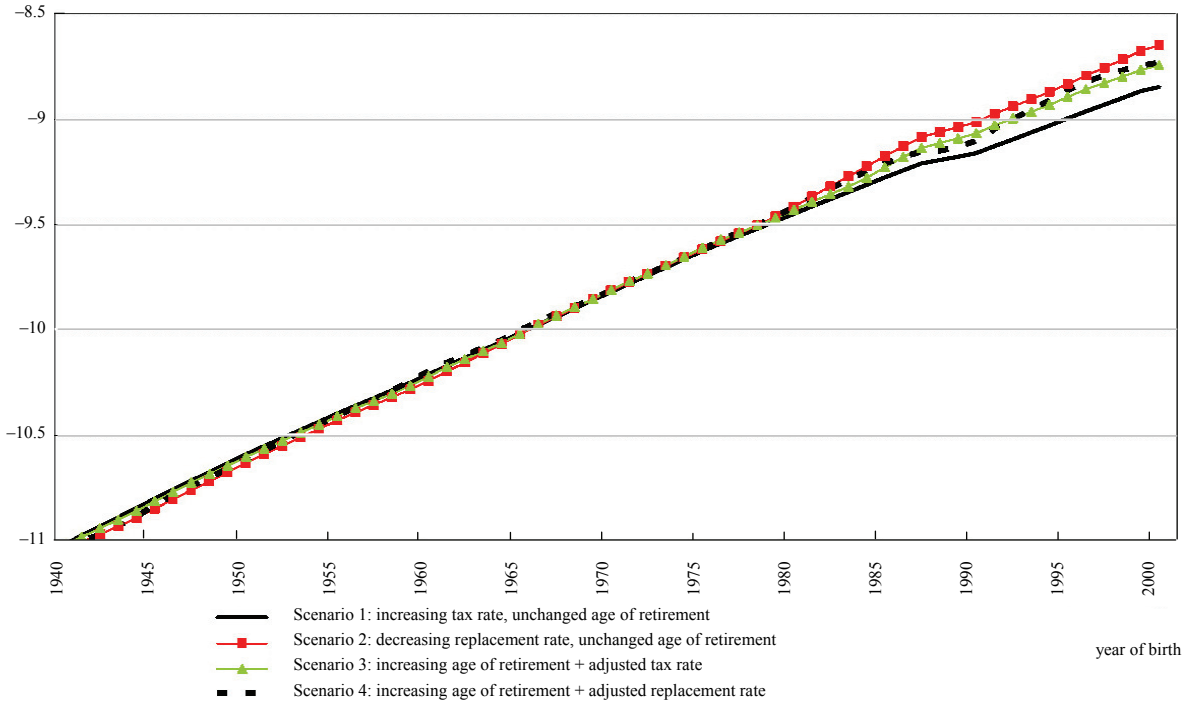
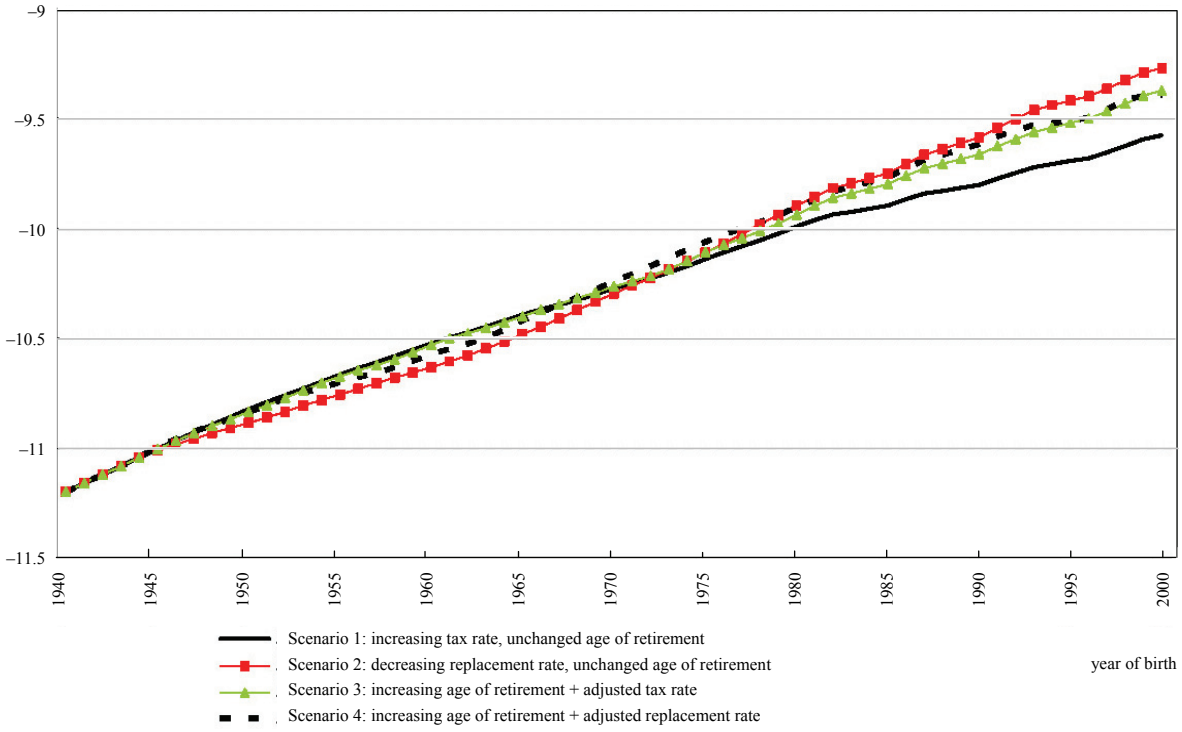


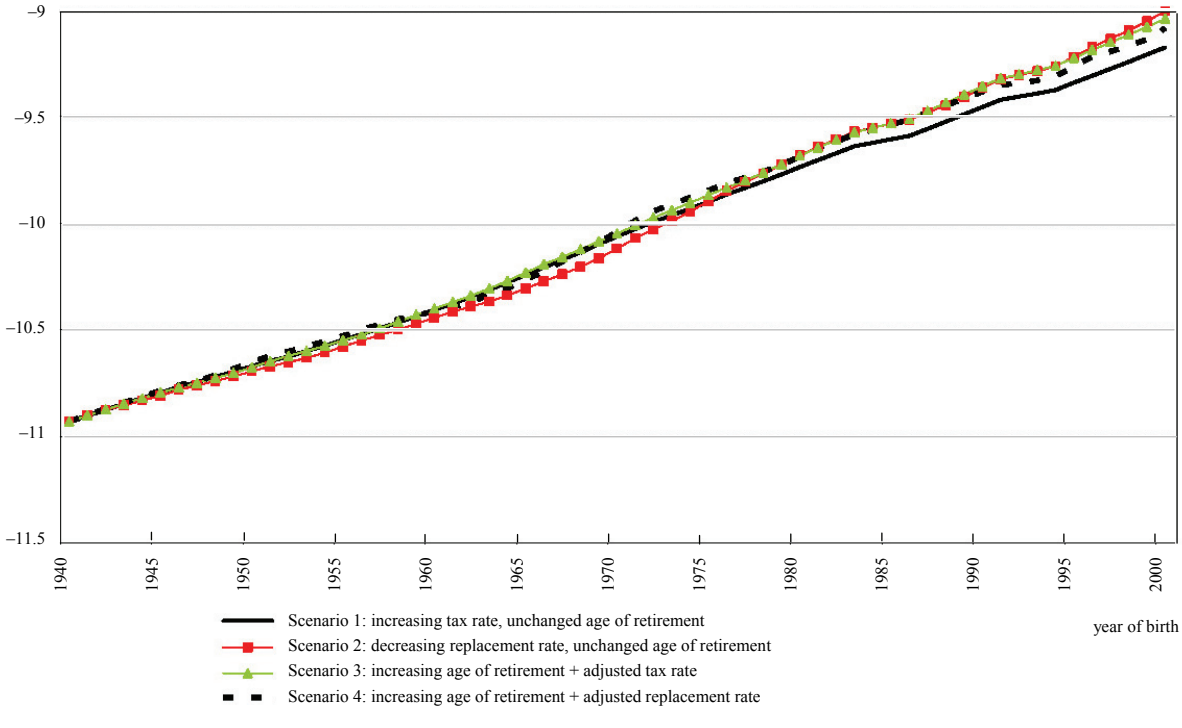
Figure 4 (continued)

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 Δ^{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 Δ^{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 Δ^{Gini} corresponds to the utilitarism of the mean. For $\theta \rightarrow \infty$, Δ^{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 Δ^{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 γ 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).

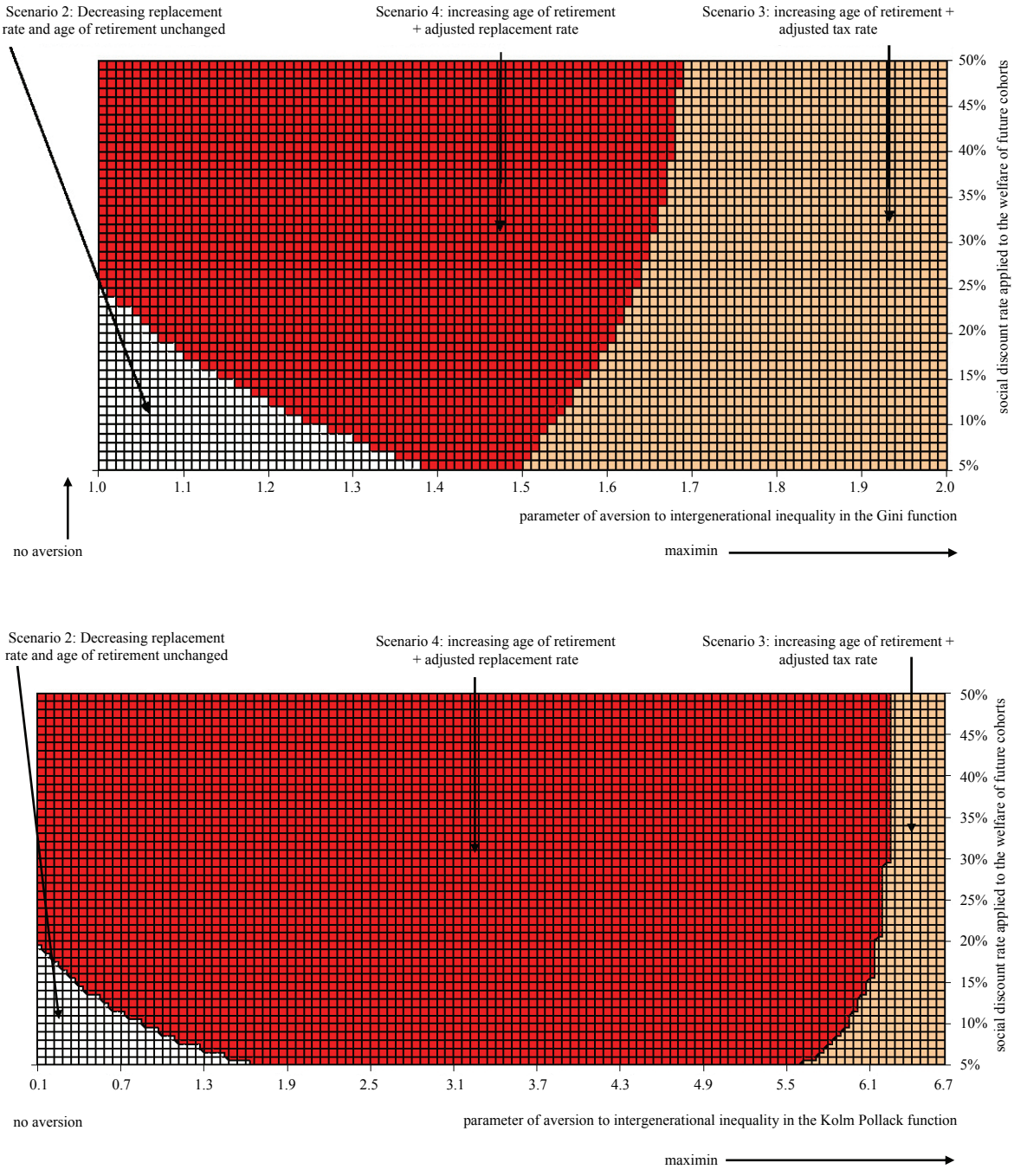
50 From an empirical point of view, the social planner can reasonably be thought of as being relatively averse to intergenerational inequality but not taking much care for the welfare of future cohorts. Different cases can be distinguished here. For increasing values of $\theta \geq 1$ (or $\gamma > 1$), 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 θ and γ 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 (θ, ρ_s) (or (γ, ρ_s)), can be defined:

- a utilitarist social planner with moderate aversion to intergenerational inequality and *not* caring about future cohorts (θ = 1.6 or γ = 2.6 and ρ_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 (θ = 1.6 or γ = 2.6 and ρ_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 (θ = 2.0 or γ = 4.4 and ρ_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 (θ = 2.0 or γ = 4.4 and ρ_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.

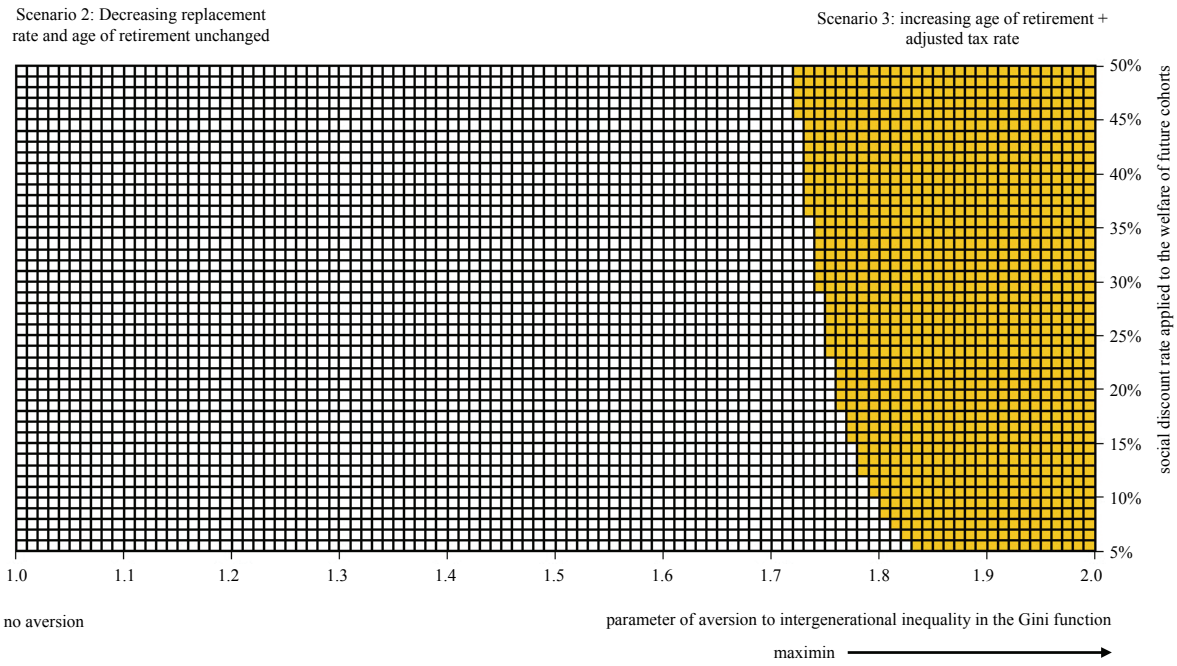
55 The normative results as concerns the United States, Japan and Germany confirm and complement the results obtained in Section 2 in a positive fashion:

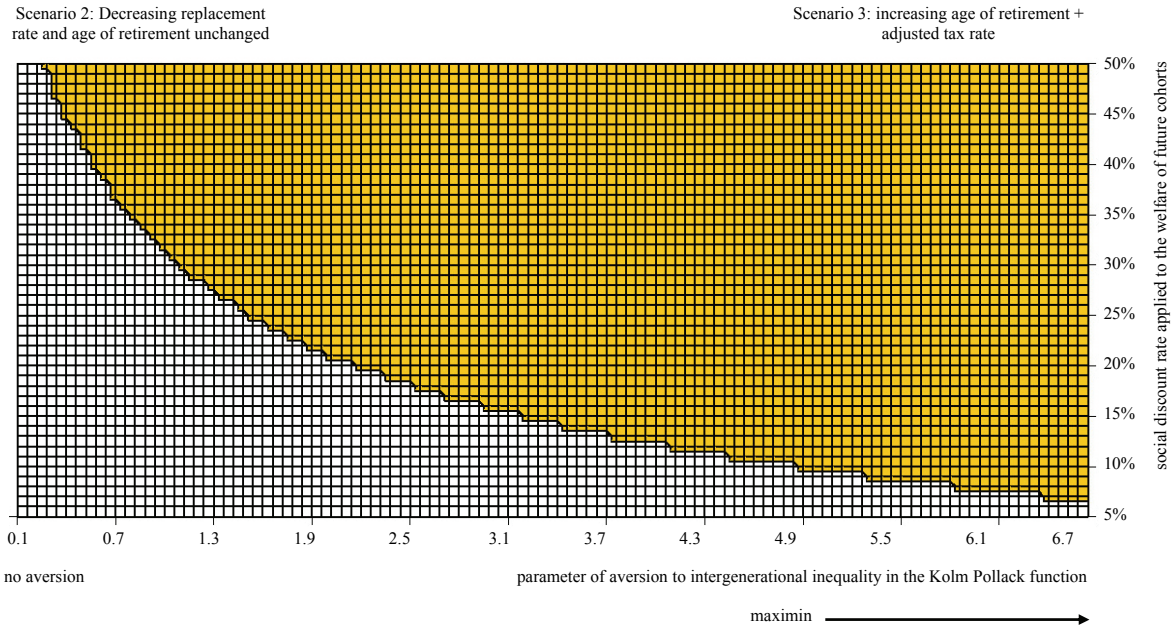
- in the United States and Japan, the social planner chooses to implement, in most cases, the reform scenario 2 where the replacement rate is diminished and the age of retirement unchanged. If its aversion to intergenerational inequality is strong, the social planner selects scenario 3 in the US and 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)



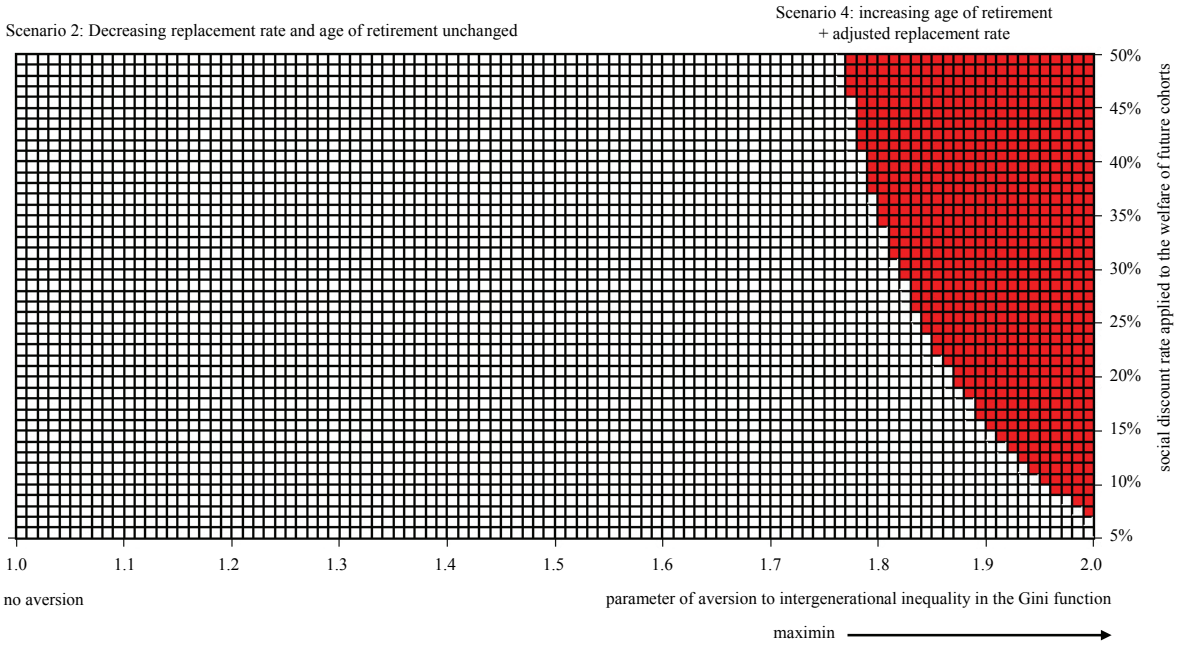


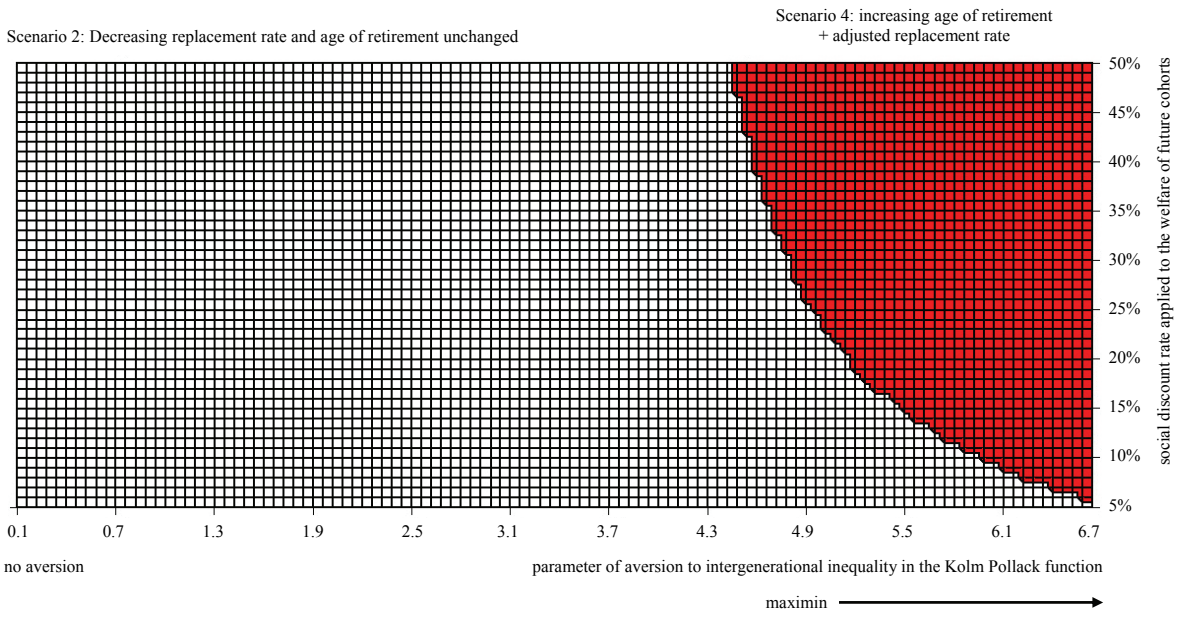
5 Conclusion

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)

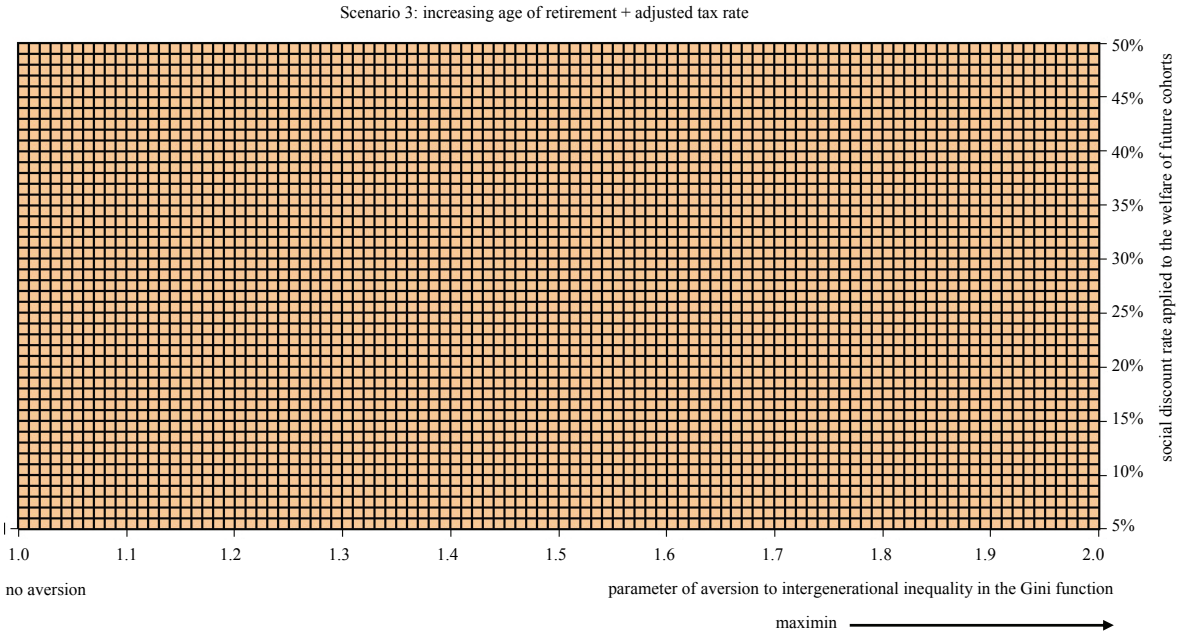


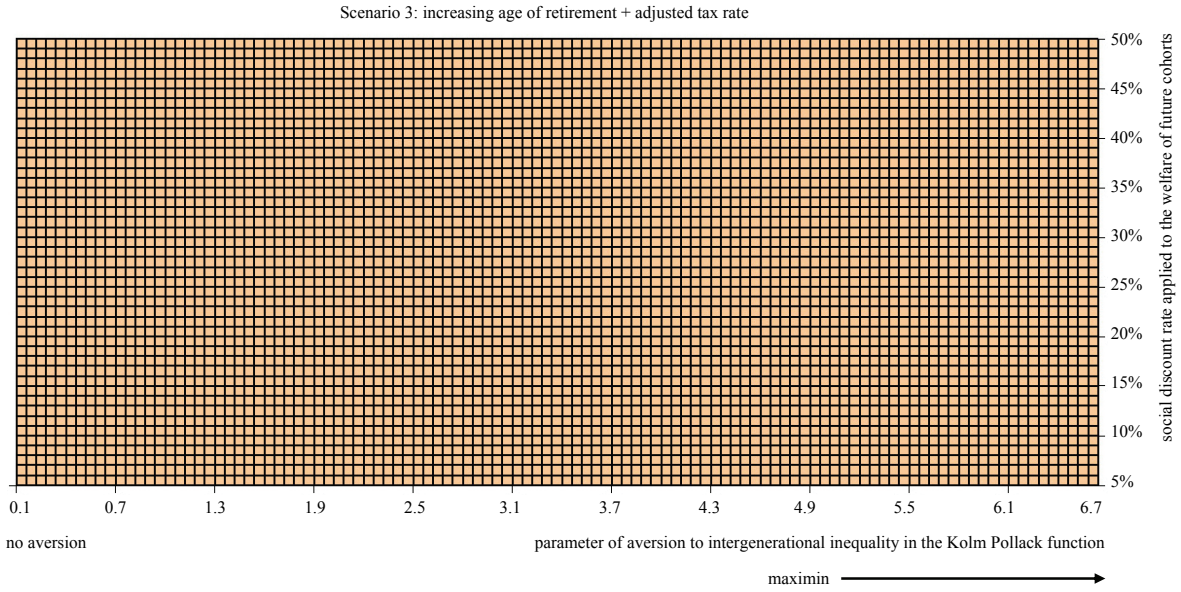


58 Four scenarios of PAYG pension reforms have been considered. The average retirement age is unchanged in a first pair of scenarios where the pension system remains balanced each year during the next decades thanks to either higher tax rates (scenario 1) or lower replacement rates for future retirees (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

Giuseppe Carone[*] *and Per Eckefeldt*[*]

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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They would like to thank Nuria Diez Guardia, Kamil Dybczak, Bartosz Przywara, Etienne Sail and other DG ECFIN colleagues for valuable input, suggestions and comments.

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)

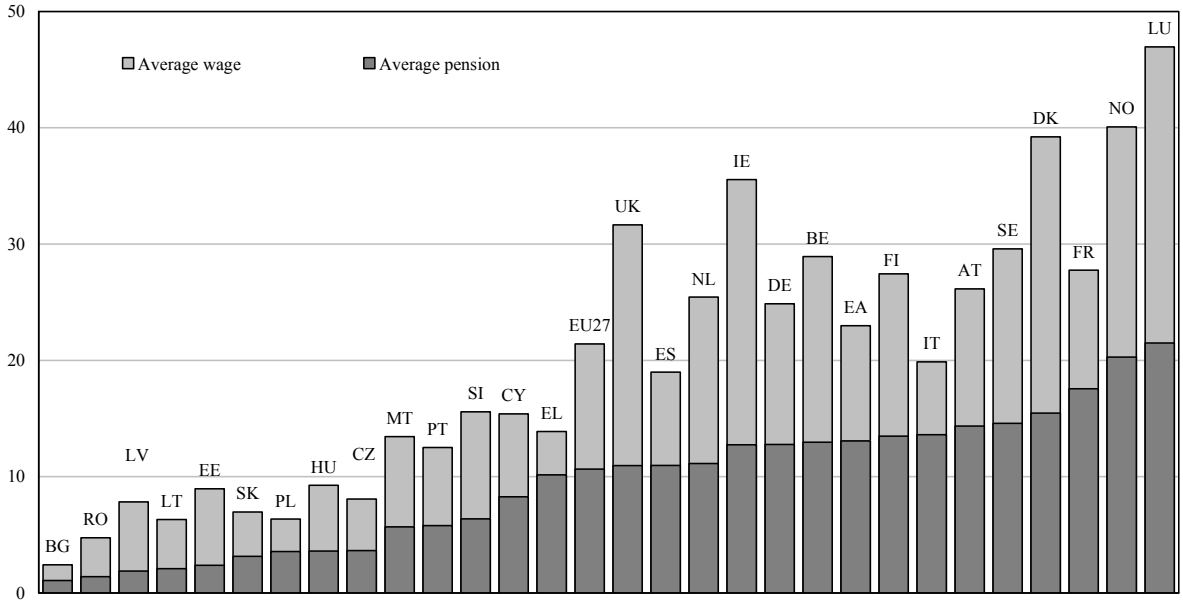


Table 1 shows the statutory retirement age in 2008 and the effective exit age from the labour market in 2001 and in 2007. In the large majority of countries, the average exit age is lower than the statutory retirement age. In many cases, this is due to the existence of early retirement schemes and/or 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.

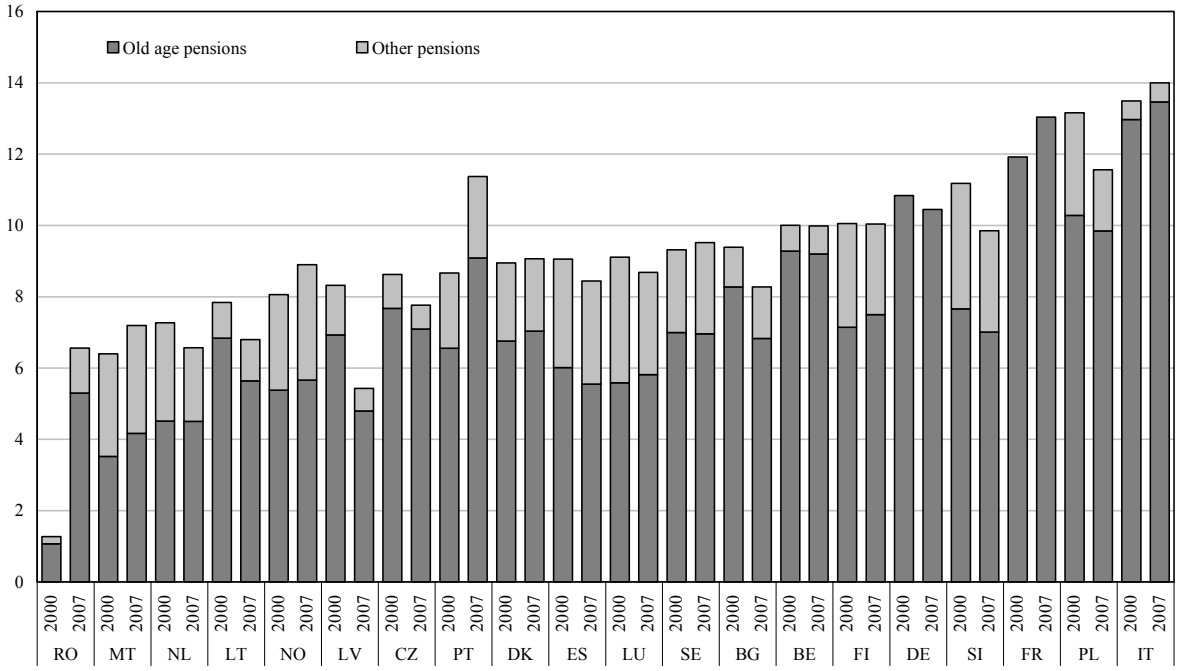
In 2007, there was a wide difference in the average public pension benefit, ranging from less than 3,000 euros or less per year (BG, RO, LV, LT and EE) to 14,000 euros or more per year (AT, SE, DK, FR, NO and LU). These wide differences reflect that average wage income levels are very different, ranging 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).

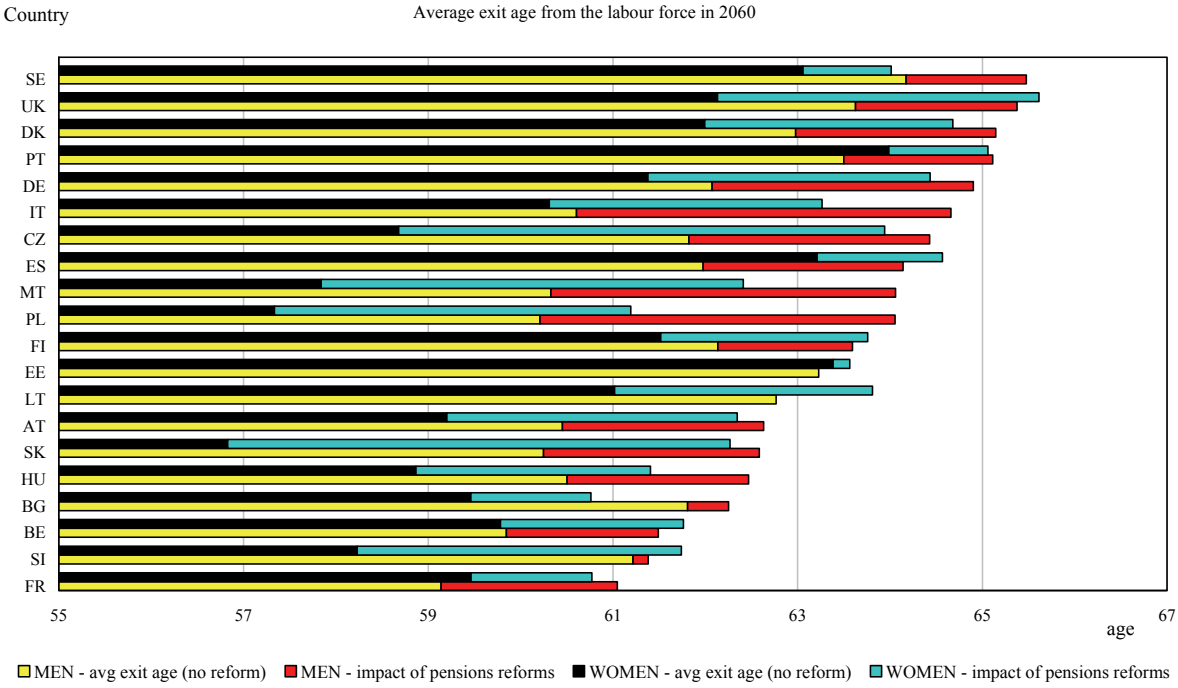
[6] See Börsch-Supan (2003), Duval (2003), Gruber and Wise (2005).

[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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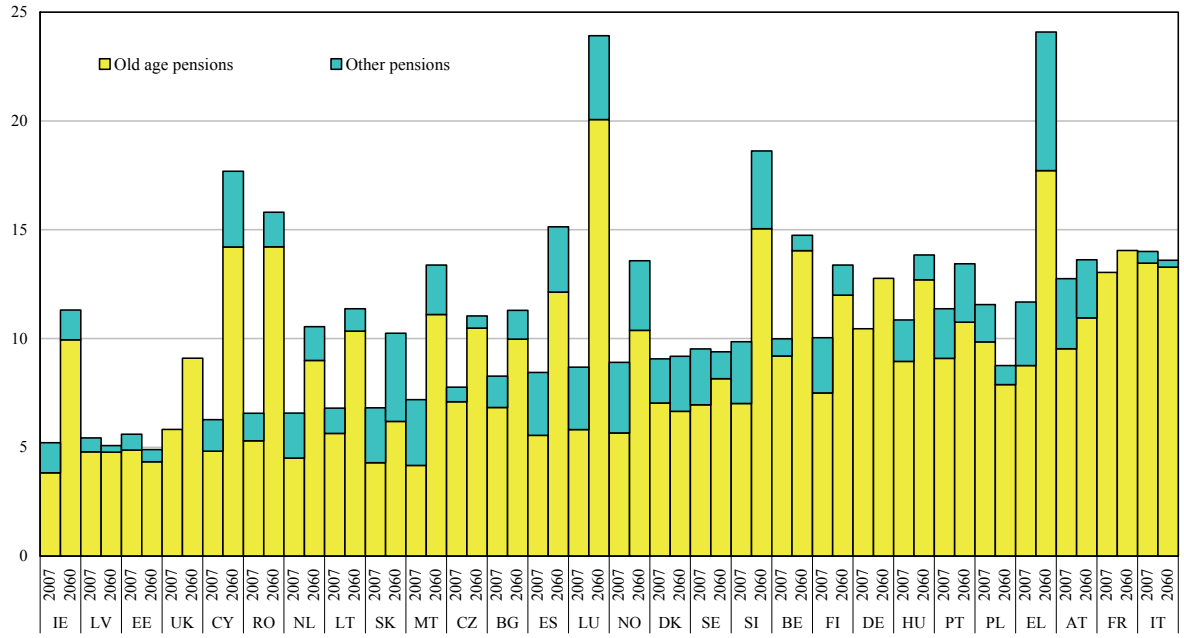
[9] For an empirical analysis on the retirement decision of Italian employees see Brugiavini and Peracchi (2003). According to their prediction of retirement probabilities under alternative policies that change social security wealth and derived incentive measures, the male employment rate at age 55 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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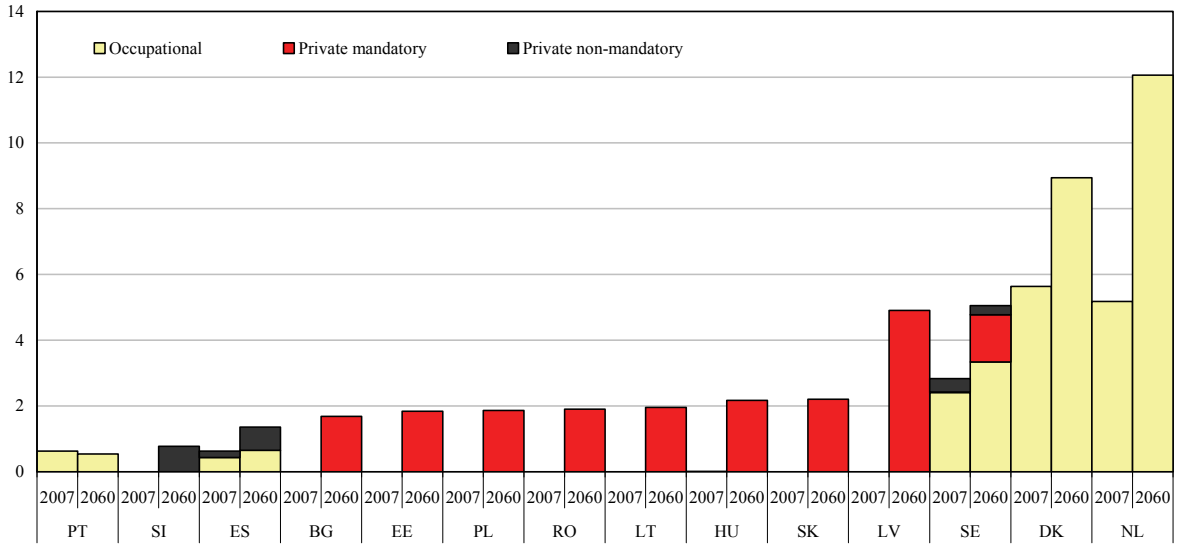
[11] In the case of LU, the pension projection is affected by the considerable number of cross border workers who will in the future years receive a pension from the LU social security scheme, but at the same time will not be registered as LU inhabitants. Due to this peculiar circumstance, LU can not 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:

$$\frac{Pension\ Expenditure}{GDP} = \frac{\overbrace{Population\ 65+}^{Dependency\ Ratio\ Effect}}{Population\ 15-64} \times \frac{\overbrace{Number\ of\ Pensioners}^{Coverage\ Ratio\ Effect}}{Population\ 65+} \times \frac{\overbrace{Population\ 15-64}^{Employment\ Rate\ Effect}}{Working\ People\ 15-64} \times \frac{\overbrace{\frac{Average\ Pension}{GDP}}^{Benefit\ Ratio\ Effect}}{Hours\ Worked\ 15-71} \times \underbrace{\frac{Working\ People\ 15-64}{Hours\ Worked\ 15-71} \times Interaction\ Effect}_{residual}$$

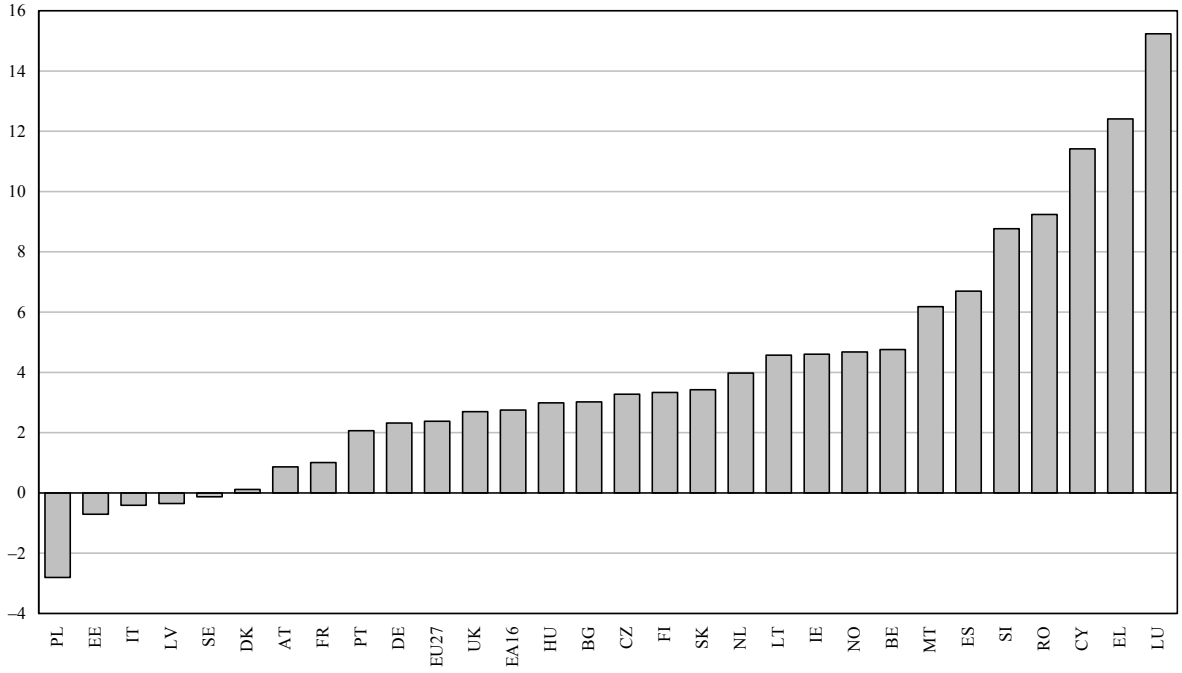
In particular, we analyse the percentage change in the public pension expenditure-to-GDP ratio. The overall percentage change can be expressed as a sum of the contribution of the four main factors, *i.e.* the dependency ratio contribution, the coverage ratio contribution, the employment rate contribution 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 2nd and 3rd 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.

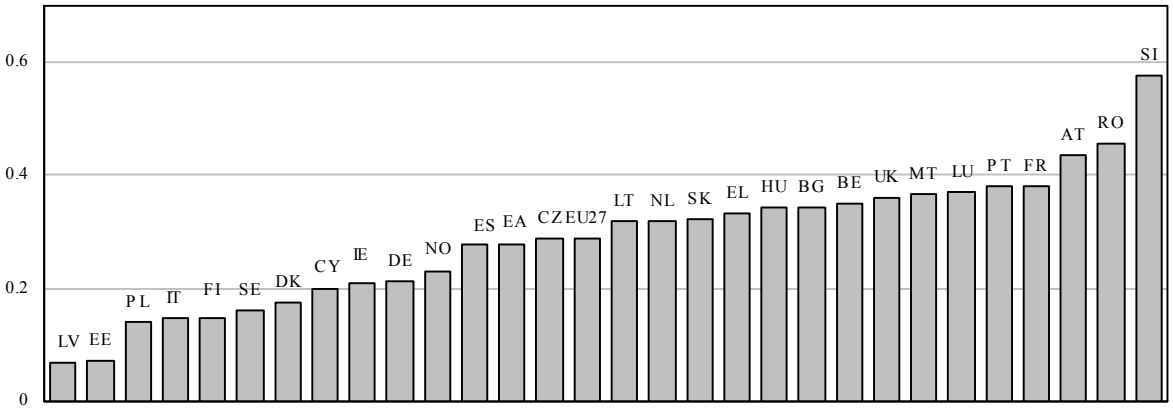
6.1.6 Zero migration

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

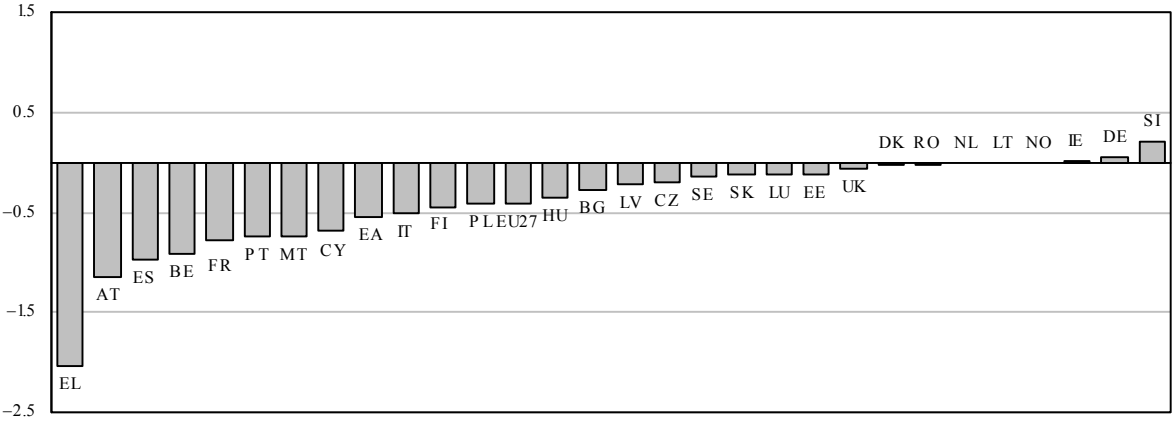
Figure 7

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

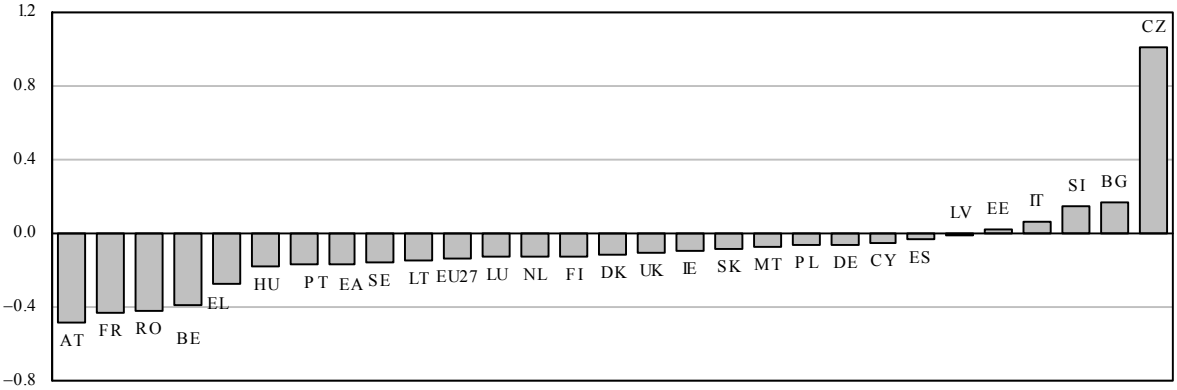
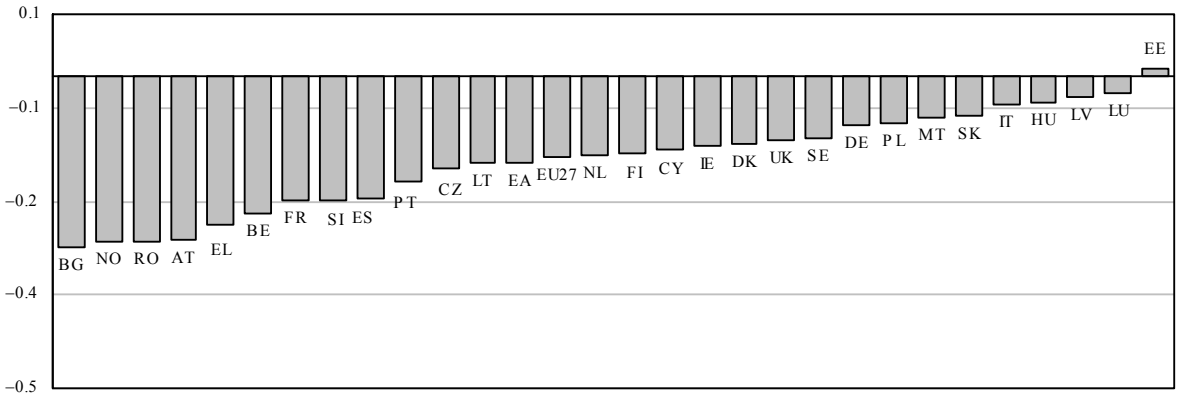


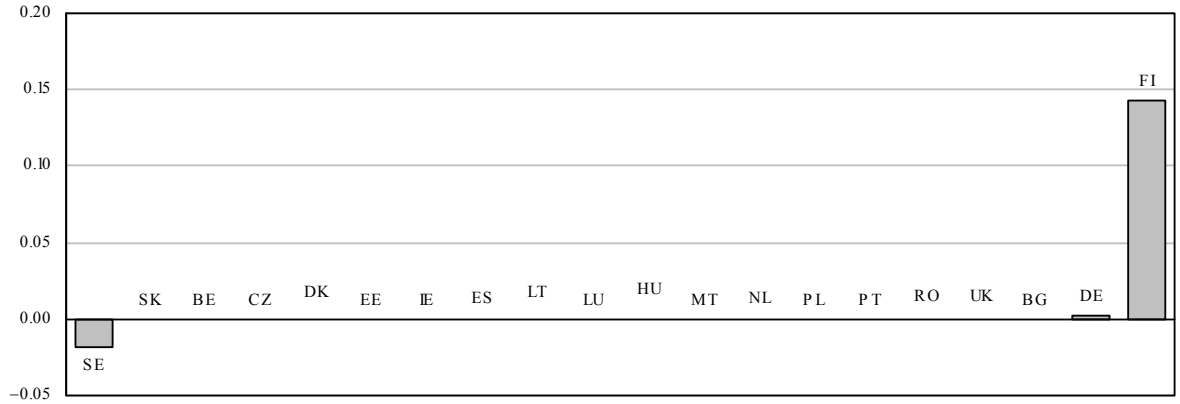
Figure 7 (continued)

Sensitivity Tests:
Difference between Pension Spending in the Alternative and the Baseline Scenarios
(percent of GDP)

Higher Employment



Higher Interest Rate



Zero Migration

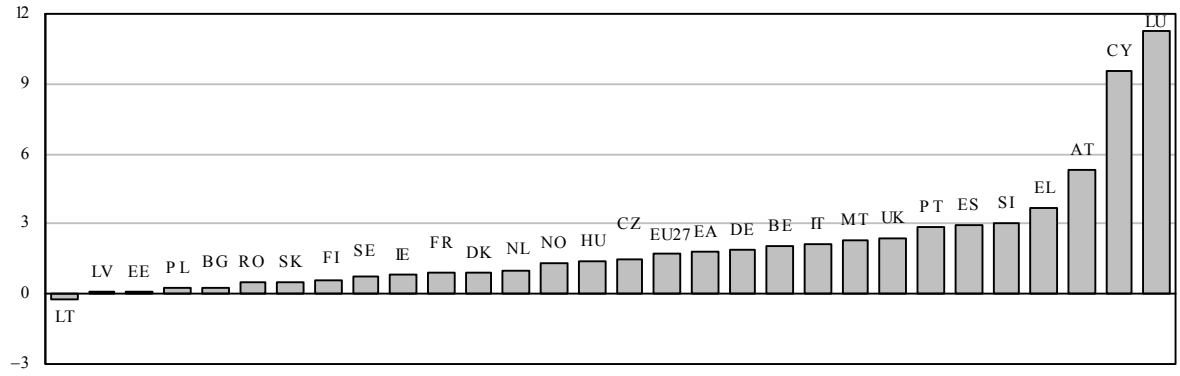
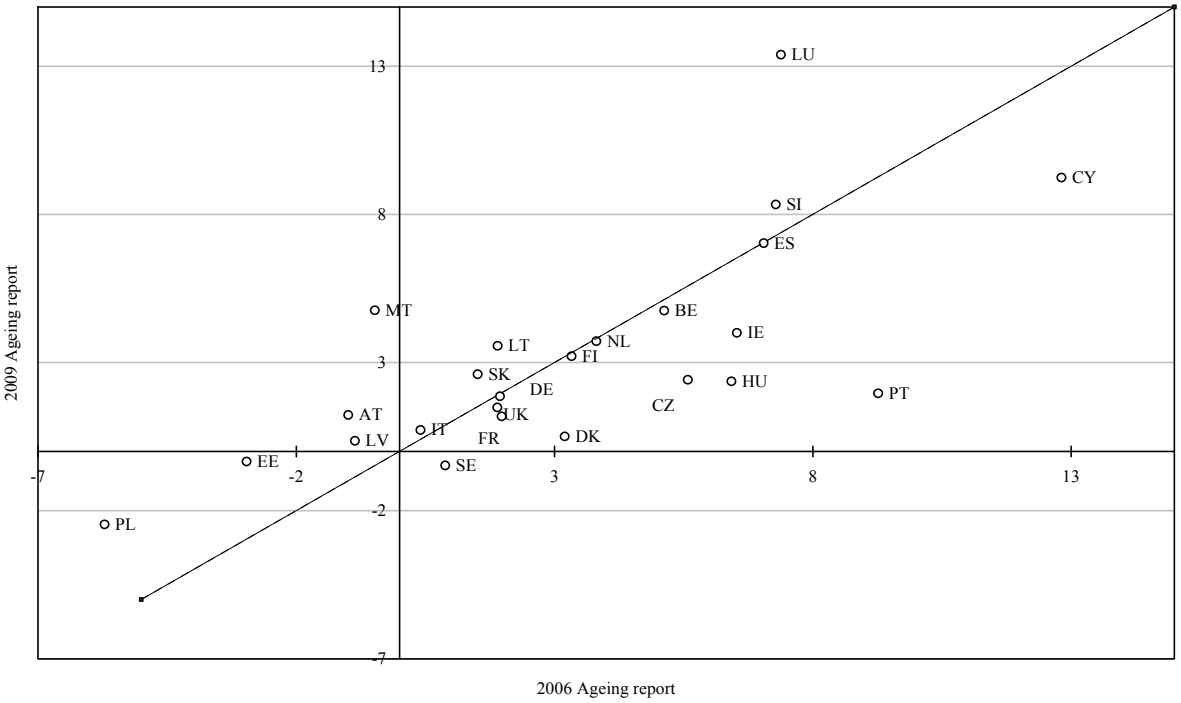


Figure 8

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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This paper was produced while working as a visiting scholar in the Western Hemisphere Department of the IMF in early 2009. The author wishes to thank Benedict Clements, Maria I. Agudelo, Jorge H. Botero, Robert Rennhack, and staff of the IMF's Fiscal Affairs Department for comments, as well as participants at the Banca D'Italia Fiscal Workshop (Perugia, April 2008). In particular, comments from Teresa Ter-Minassian, as a discussant, opened avenues for future research. The author also wishes to thank Camila Torrente, Olga Pena, and Alejandro Gonzales for support in data collection and model computations.

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

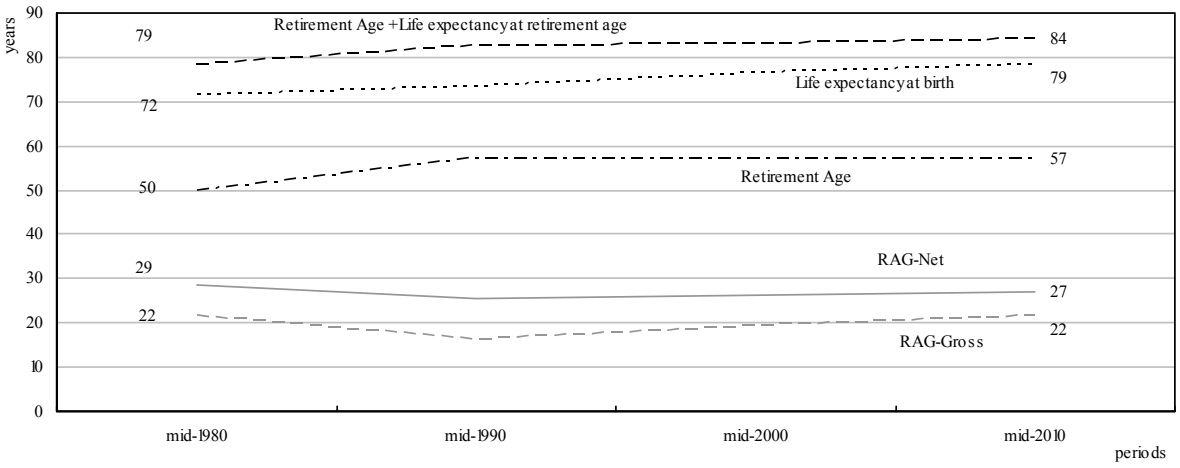
Before Law 100 of 1993, the bulk of public sector workers were covered by Law 33 of 1985

[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.

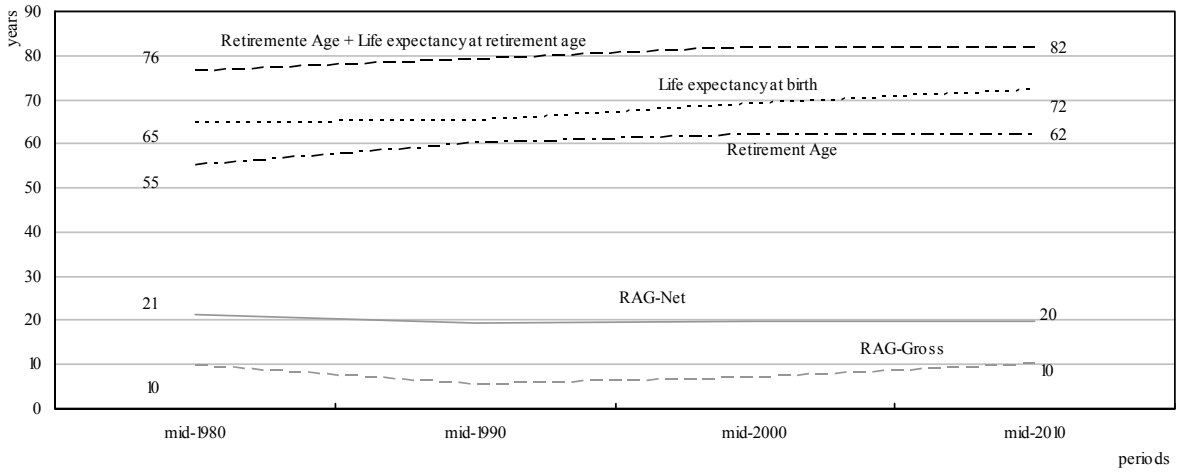
Figure 1

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*.

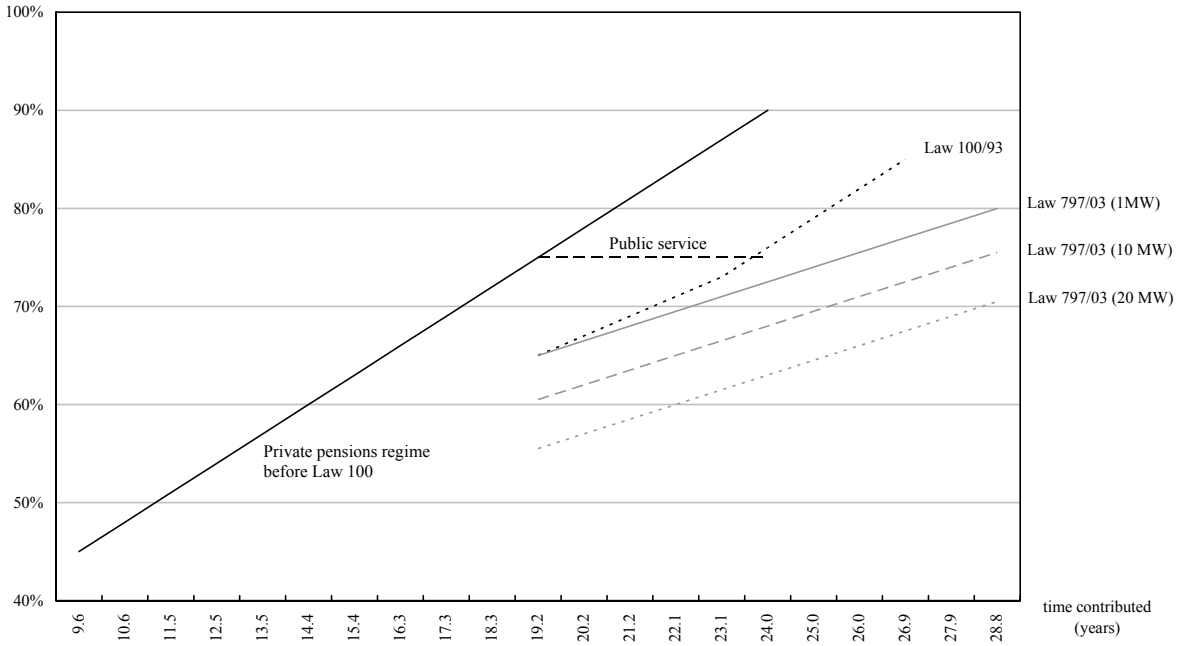
2.2 Replacement rates

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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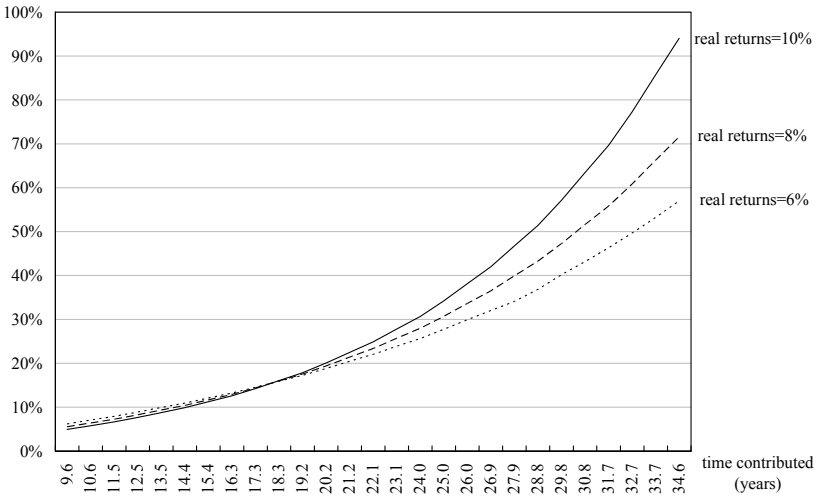
[2] Legal wages in Colombia amount to 13 monthly payments, including a one-month obligatory bonus payment. An additional monthly payment (called "Mesada 14") had been ordered by Art. 142 of Law 100 of 1993, seeking to level off wages and pensions among public workers. However, the "Mesada 14" continued 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.

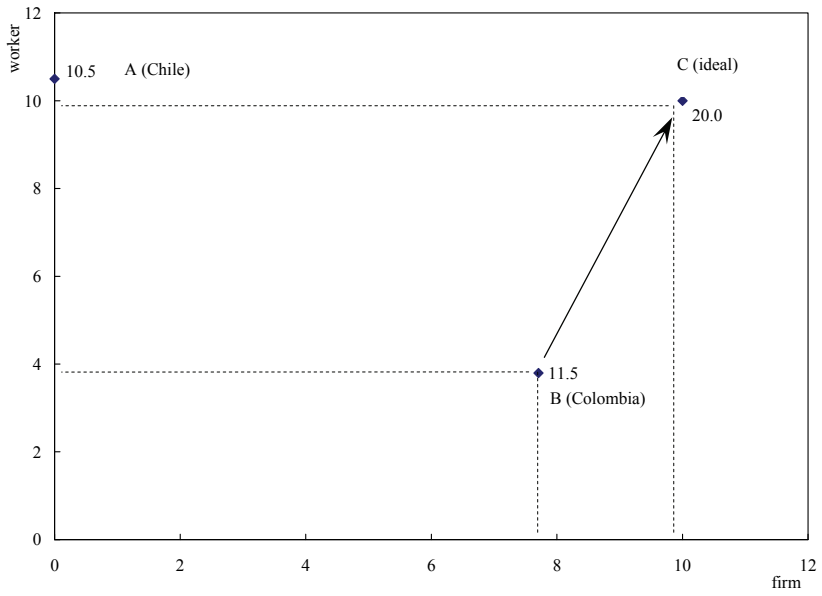
Regarding payroll taxes paid by firms, there is a need for substituting the "pure tax" components through increases in the VAT rate from 16 per cent to 17 per cent. Hence, social expenditures related to child-support programs (ICBF) and labor-training programs (*Sena*), which currently represent 3 and 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).

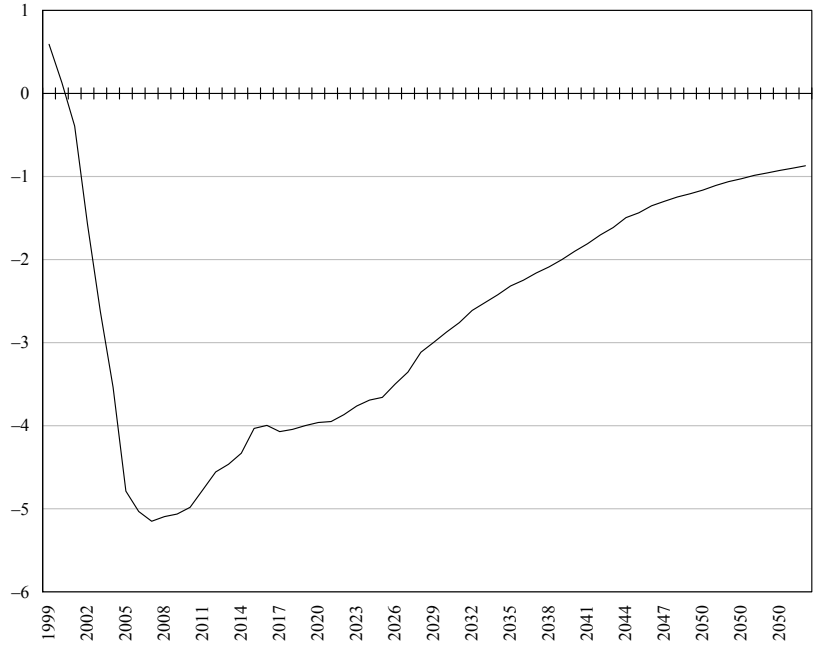
About 40 per cent of the GDP reduction in the NPV of pension liabilities can be attributed to Law 100 of 1993, which focused on reducing replacement rates and raising retirement ages. The remaining 60 per cent of the GDP reduction stems from Laws 797 and 860 of 2003, by further reducing replacement rates, 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

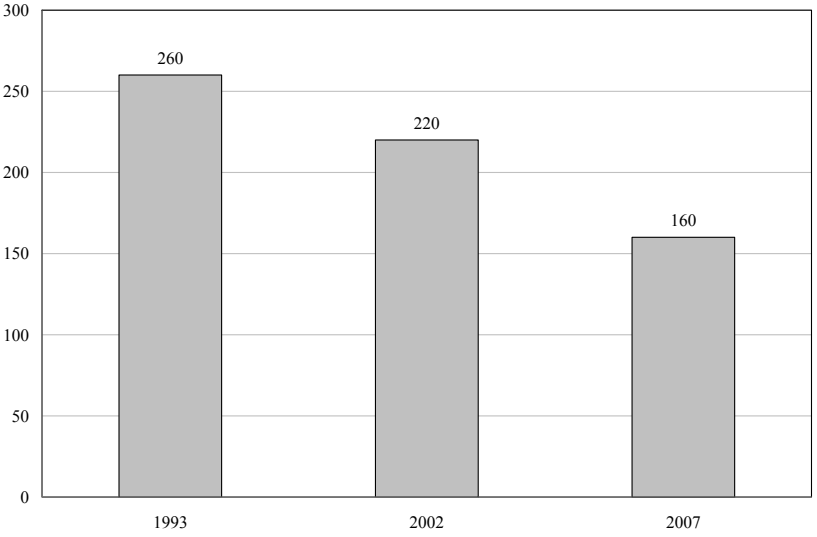
Projected Cash Payments to Support Paygo
(percent of GDP)



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.

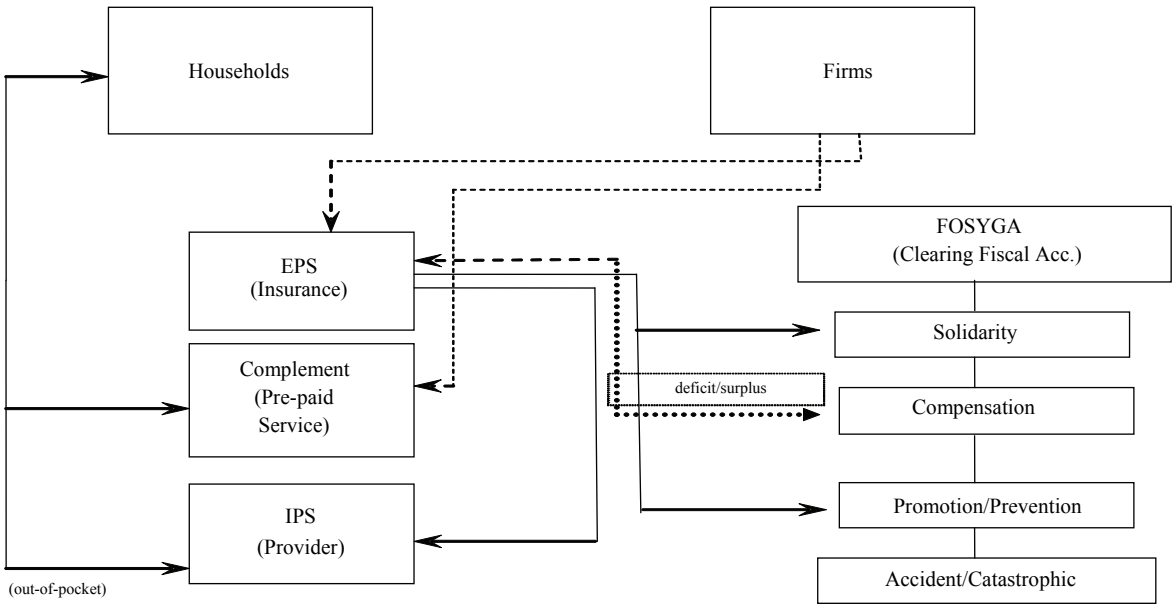
The insurance component of the health care system is based on the *Empresas Promotoras de Salud* (EPS), offering the mandatory basic health care plan known as *Plan Obligatorio de Salud* (POS). The service component is provided through the *Instituciones Prestadoras de Salud* (IPS). The EPS were permitted 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.

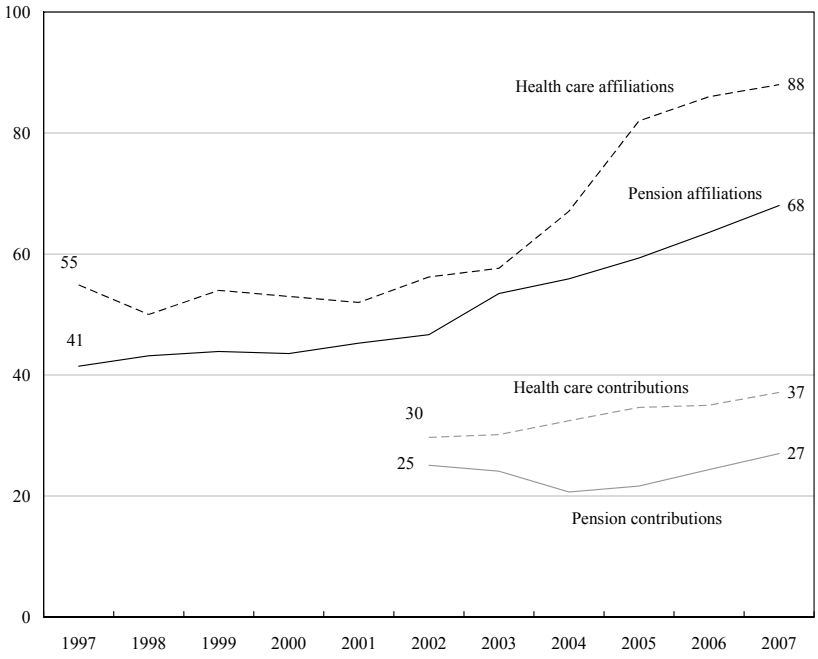
The regional public health care entities have faced difficulties in learning new billing procedures, resulting in a slow transition from the "supply" into the "demand" system. By contrast, the private sector has been relatively successful in adopting the demand-driven system and has gained efficiency 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.

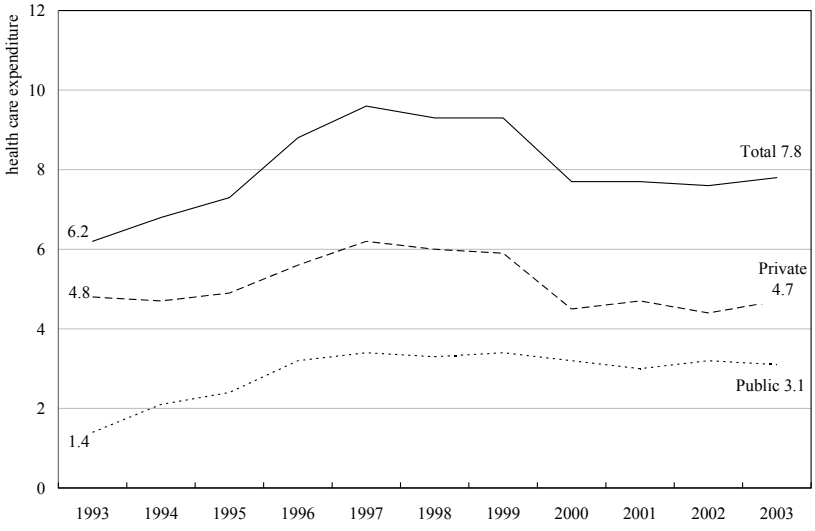
In 2003, Colombia spent the equivalent of 7.7 per cent of GDP on health care after averaging 8.5 per cent of GDP from 1998-2002. According to Baron (2007), Colombia has recently witnessed one of the most pronounced increases in health care spending, going from 6.2 to 7.7 per cent of GDP between 1993 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.

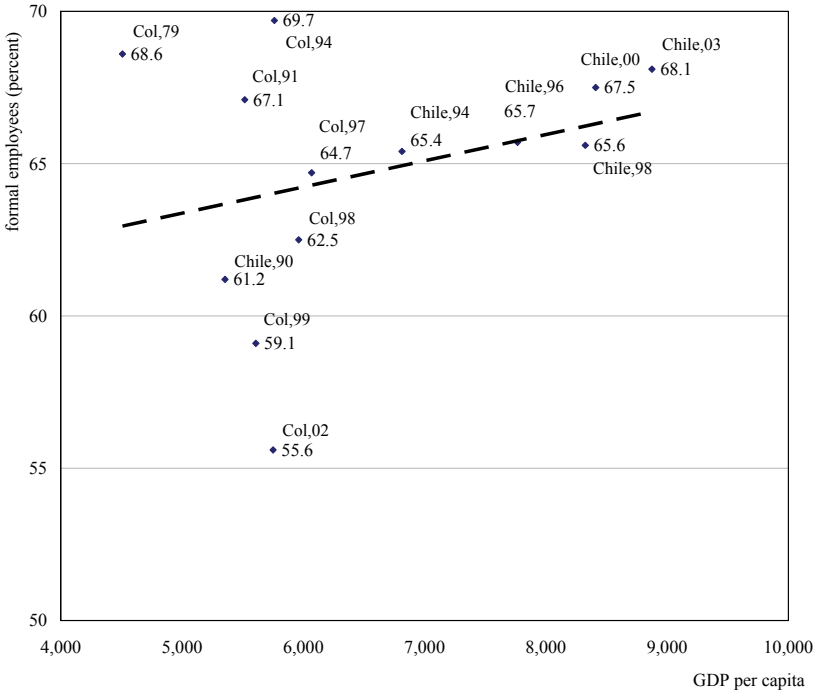
3.3.2 The fiscal impact of the health care sector in 2006 (base-year)

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.

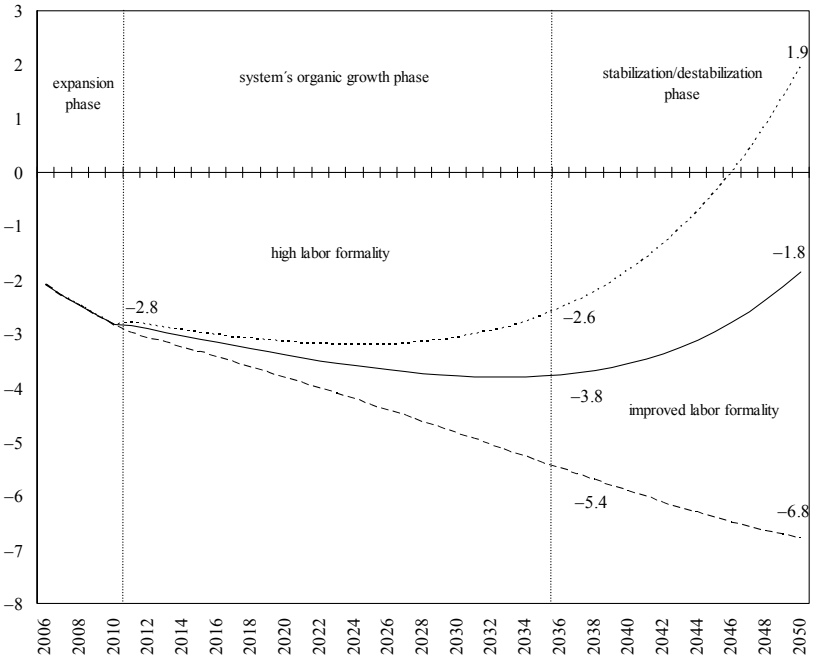
3.3.4 Scenario 2: status quo in labor formality

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

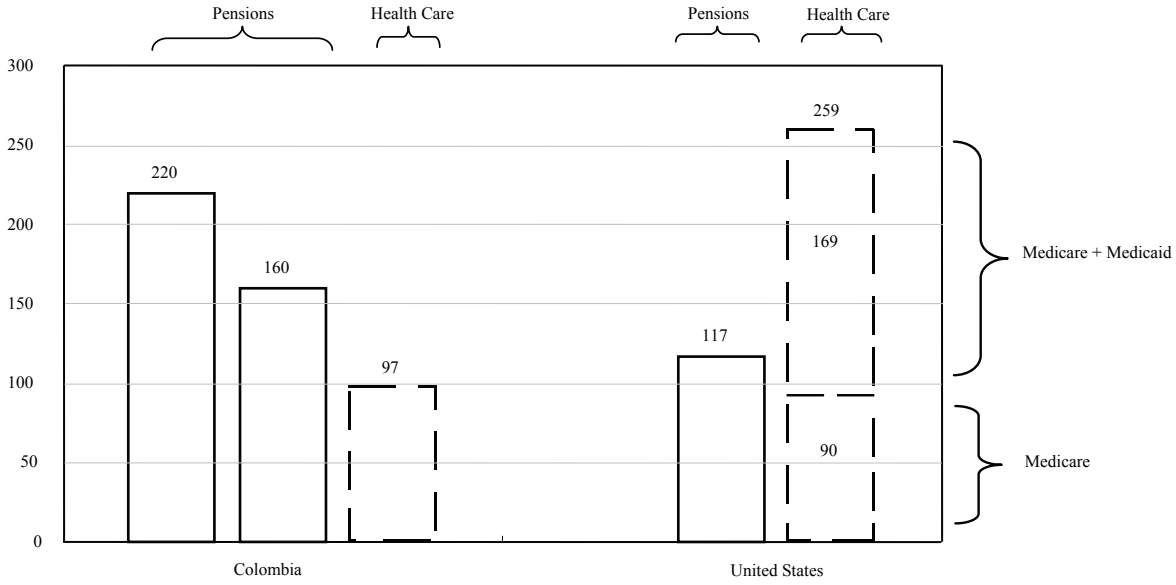
Health Care NPV by Type of Obligation
(percent of GDP of 2007; surplus (+) or deficit (–))

	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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The authors are grateful to CGA and MTSS, in particular to Cristina Milhano and Manuela Paixão, respectively, for the data and explanations provided and to Inês Drumond, Per Eckerfeldt, José Carlos Pereira, Álvaro Pina and Maximiano Pinheiro for their helpful comments.

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.

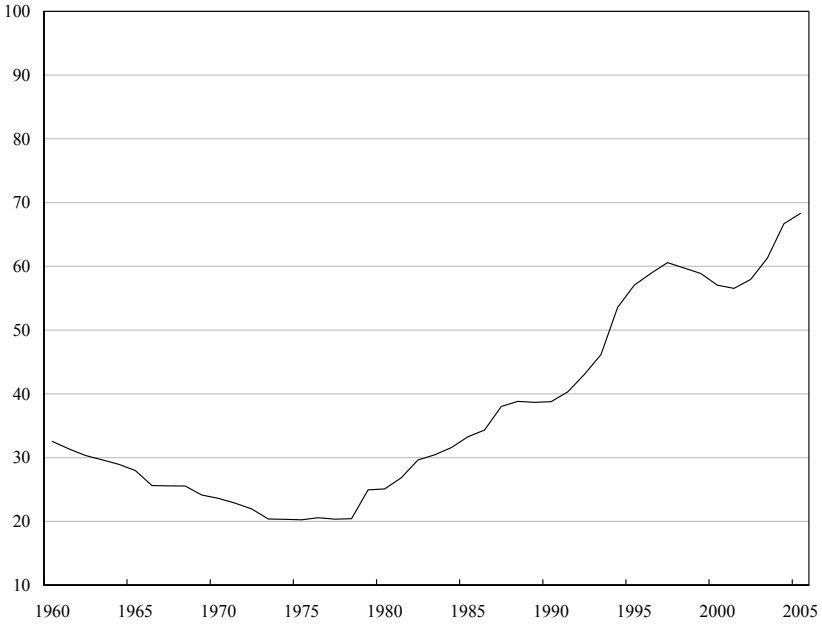
As regards the private sector social security scheme, it was enlarged in the '70s to agricultural workers, the self-employed and homemakers. A social pension for those above 65 years old and a 13th month of a pension were also given to retirees. Nevertheless, in 1984, when the first Social Security Framework 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

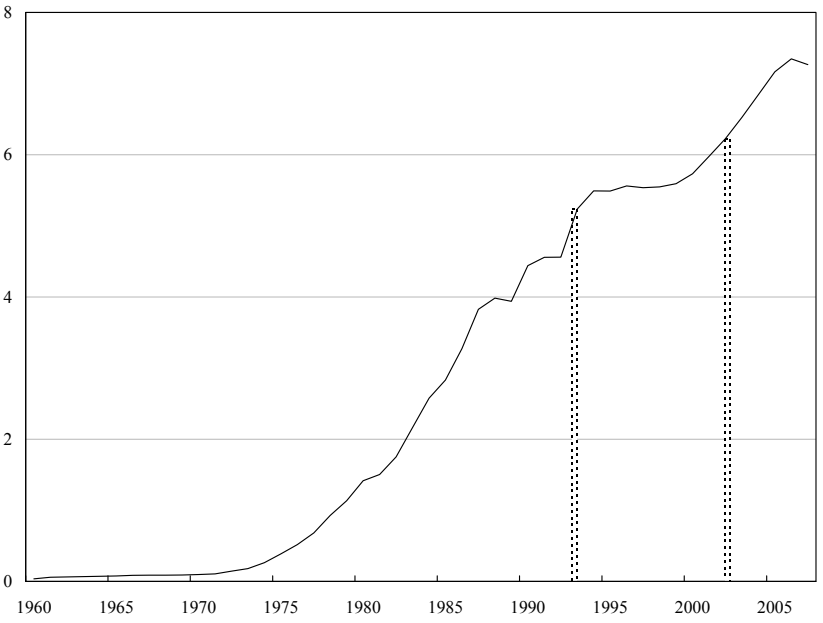
Number of Pensions over Contributors – CGA
(percent)



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.

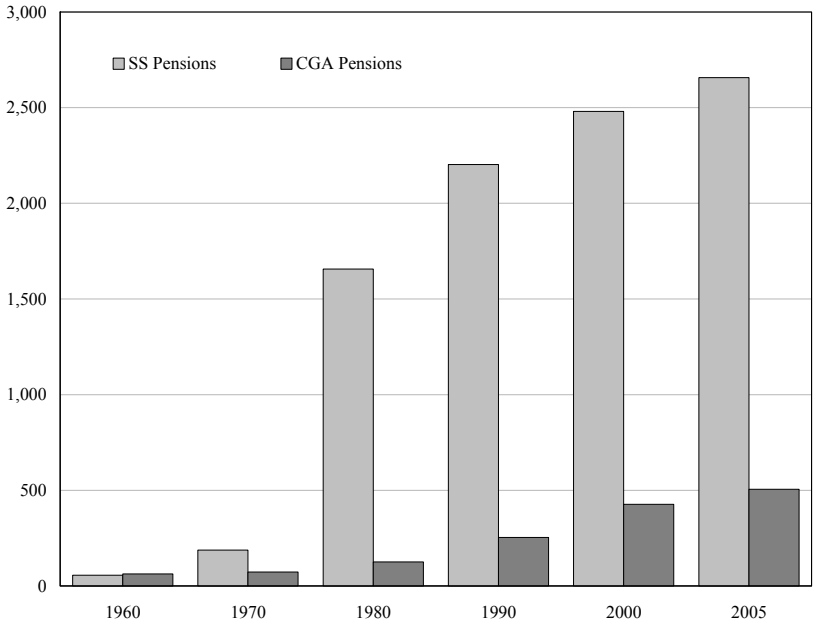
In this context, a new Framework Law for Social Security was established in 2002, which revised the rules for the pension value. These rules took into

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

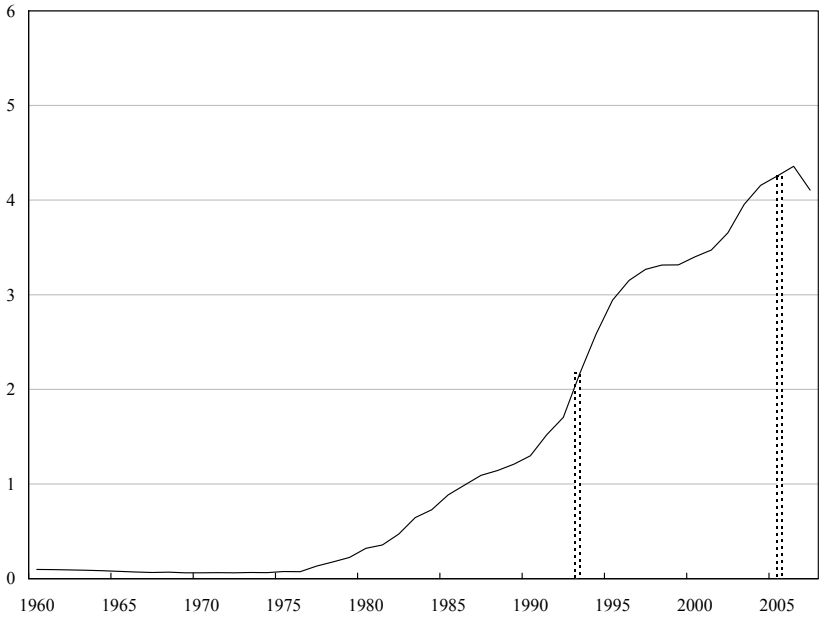
Number of Pensions (Social Security and CGA)
(10^3)



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

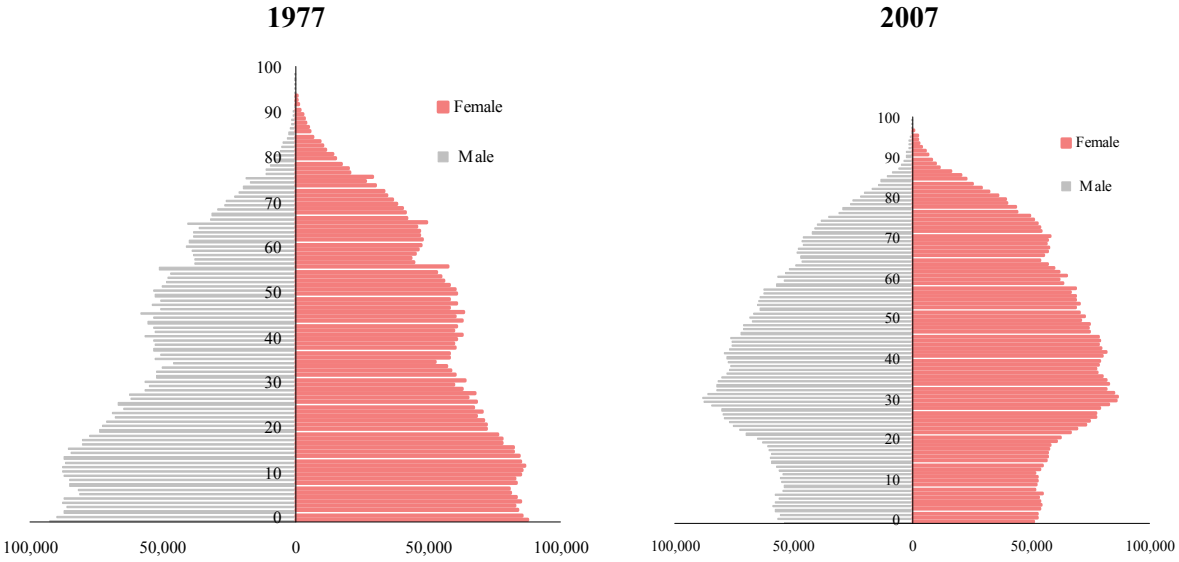
1929	Creation of the public employees old-age pension scheme (Decree No. 16669 of 27 March)
1972	Creation of *Estatuto da Aposentação* (Decree-Law No. 498/72 of 9 December): integrated legal framework of public employees retirement regime
1984	First Social Security Framework Law (Law No. 28/84 of 14 August) 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.

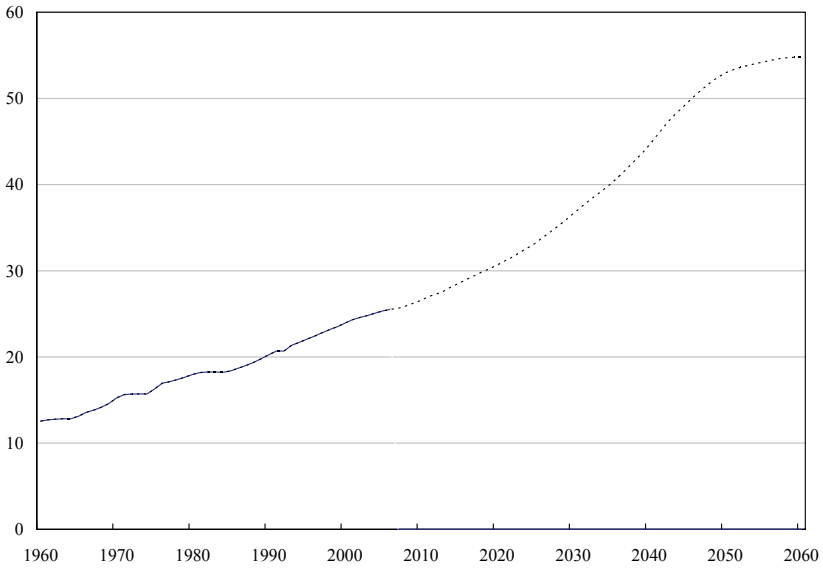
The change in the demographic pyramids yields an increasing old-age dependency ratio, which has duplicated between 1960 and 2007, while life expectancy at 65 grew around 4 years in the same period (Figure 6).

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)

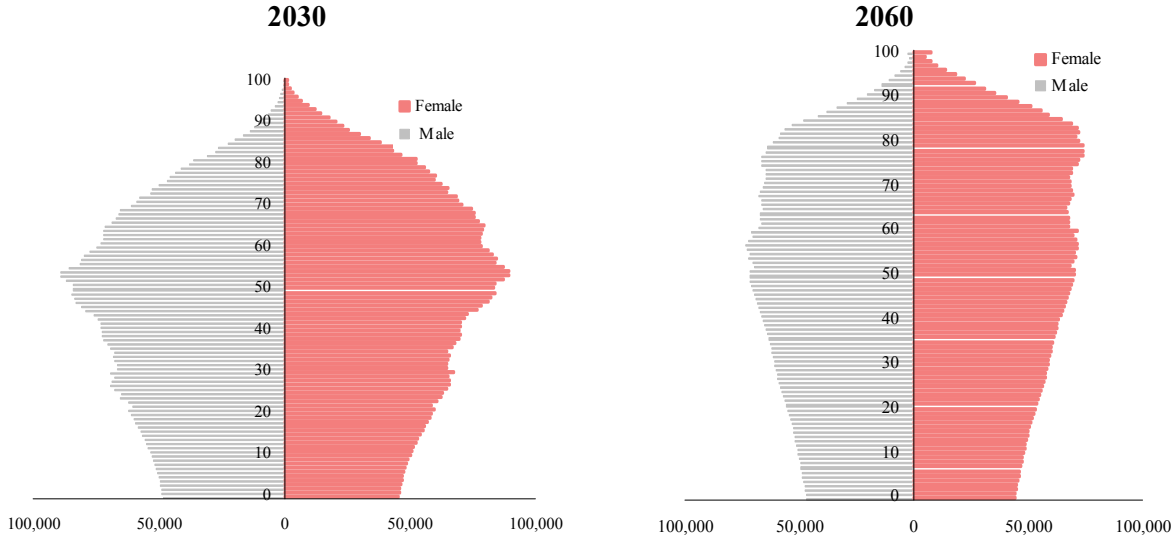


* Ratio of individuals aged 65 and older over individuals aged between 15 and 64.
Source: EUROSTAT and INE.

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).

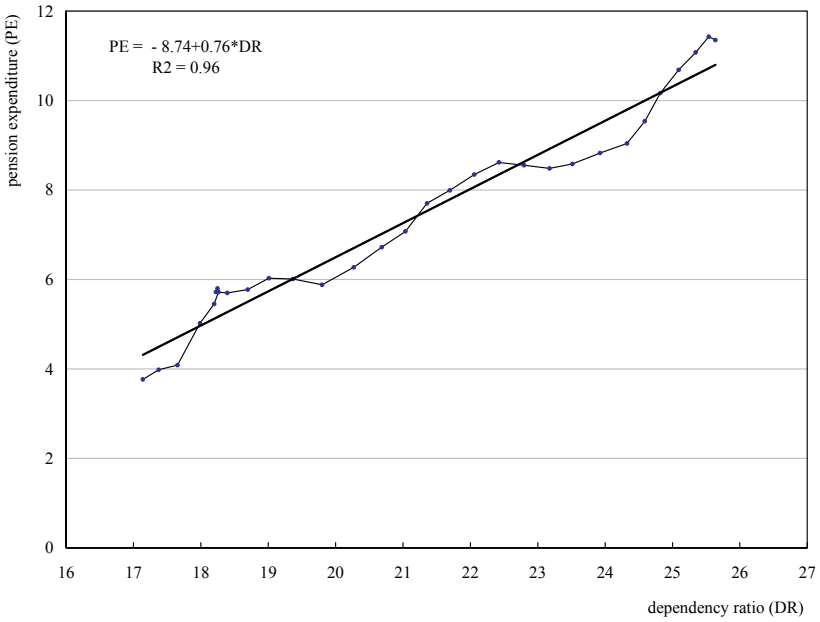
These projections revealed the measures implemented until 2005 insufficient to ensure the financial sustainability of the social security systems and, therefore, justify the need for the additional pension reform measures taken between 2006 and 2008.

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

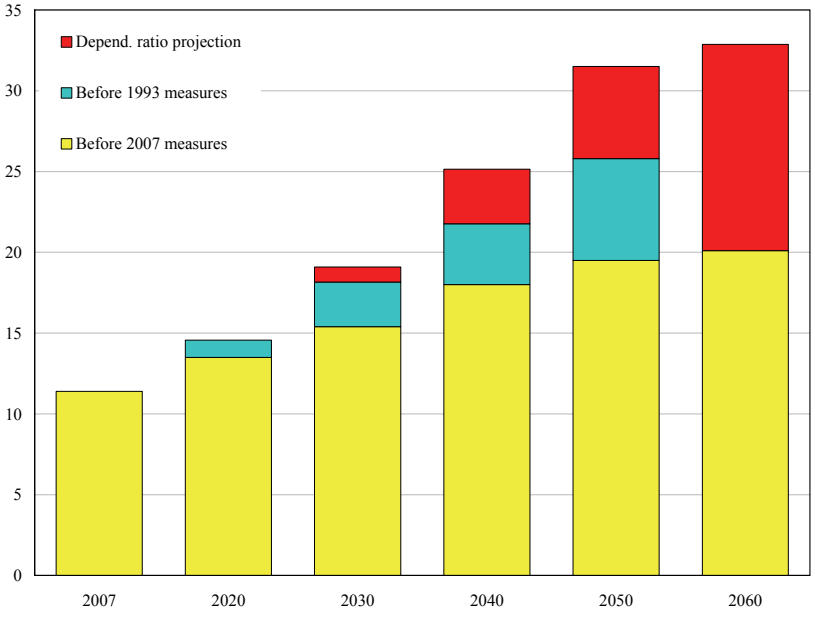
Pension Expenditure and Old-age Dependency Ratio



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.

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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 P1 = LW x C1 x R1 P2 = RE x C2 x R2 RE = all career reference earnings (of 2nd part) C1 = % career until 2005 C2 = % career since 2006 R1 = accrual rate 2.5% (variable with C from 36 to 40) R2 = accrual rate (2% until 2015 and 2 to 2.3% hereafter)		FP = P x SF SF = sustainability factor P = P1 + P2 P1 = LW x C1 x R1 P2 = RE x C2 x R2 R2 = accrual rate (2 to 2.3%)
Hired from September 1993 on	P = BE x 40 x 2% BE = best earnings 10 out of last 15 years				
until 2001		Best of A) or B)* A) $P_{2017\ on}$ = P1 + P2 P1 = BE x C1 x 2% P2 = RE x C2 x R2 C1 = % career until 2001 C2 = % career since 2002		$P_{2007\text{-}16}$ = P1 + P2 P1 = BE x C1 x 2% P2 = RE x C2 x R2 C1 = % career until 2006 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).

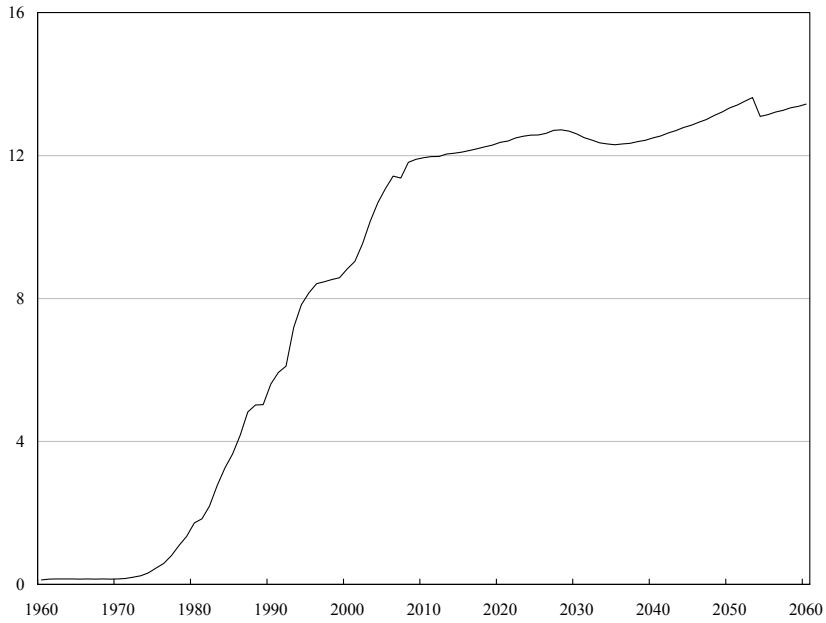
[12] These projections were made in the context of the Economic Policy Committee Working Group on Ageing Population and Sustainability and, therefore, used the common assumptions on demography and macroeconomic developments (EPC 2008). The main assumptions used in these projections are presented in Annex 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.

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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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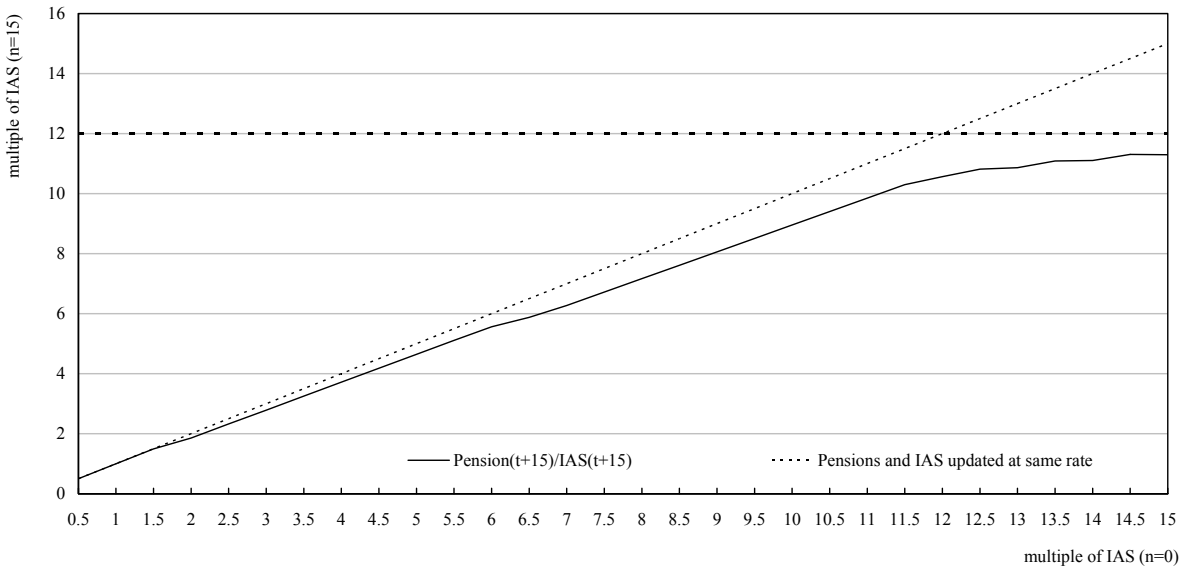
[15] Whitehouse (2009) discusses the effects of "progressive indexation" in four countries, including Portugal, and finds small redistributive effects on the pensioners' wealth in particular in the cases of Italy and Portugal.

Figure 11

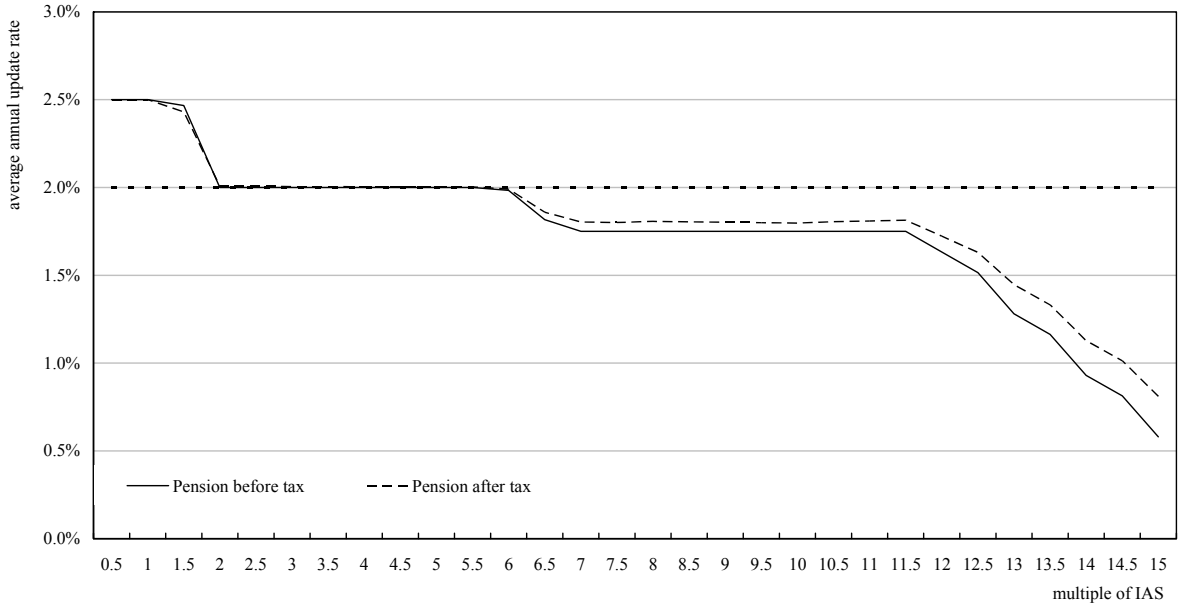
Pensions Evolution as a Proportion of IAS
(15-year horizon)



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: θ_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 (φ) and iii) the inflation rate (π). 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

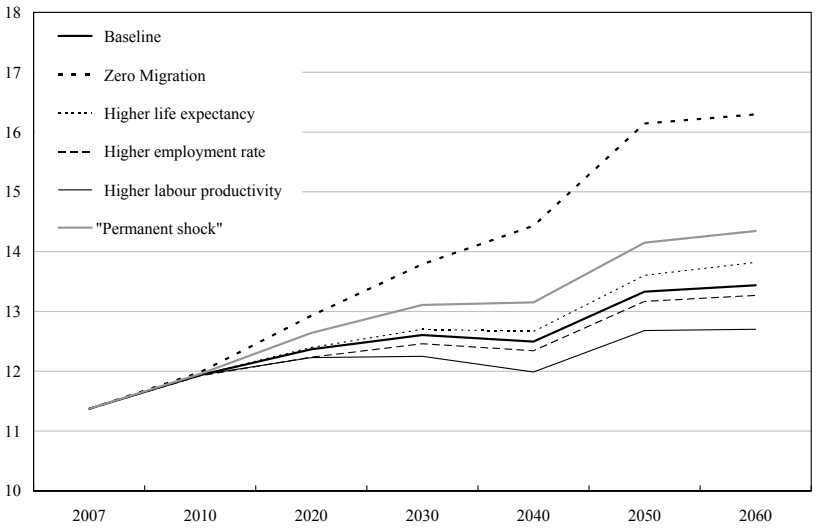
Pension Distribution Effects
(unit: average growth rates, percent)

	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)** **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 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:** **i) wider coverage of the scheme, including contributors aged 55 or older** **ii) pension entitlement with 15 years of contributions to public employees scheme or private employees** **iii) contributory rate: 6 per cent employees** **iv) retirement conditions: aged 60 and contributory career 40 years (full pension)** **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** **vi) more favourable conditions for military personnel** **vii) pensions update on a discretionary basis but in practice following public sector wages**
1973	Minimum entitlement contributory period: 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) Introduction of social pension for disabled (above 65) Introduction of 13th month for all pensioners

1975	First regulation of the State participation in the financing of the Social Security pensions system Introduction of survivors pensions for agricultural scheme
1977	New organics of Social Security (Decree-Law No. 549/77) Inclusion of self-employed and housewives (or -men) Introduction of means-tested social pension for all above 65 Reduction in the minimum entitlement contributory period: 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 (Decree-Law No. 160/80 of 27 May)
1982	Enlargement of the minimum entitlement contributory period: 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) System PAYG: contributive regime financed by employees and employers contributions and non-contributive regime financed by State transfers 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)** **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 14th month for all pensioners (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): Enlargement of the minimum entitlement contributory period: from 10 to 15 years for old age pensions Gradual increase of legal retirement age of women from 62 to 65 years (the same as men) 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) Convergence of earnings-related minimum pensions to national minimum wage 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:** **i) from 2006 on, new public employees are enrolled in Social Security System** **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)** **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: γ_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: τ_t is the CGA's contributory rate.

The average old-age pension is determined by:

$$Pens_{t,a,g} = \frac{\left[\left(Op_{t,a,g} - op_{t,a,g}\right) \times Pens_{t-1,a-1,g} \times \left(1+\alpha_t\right) + op_{t,a,g} \times npens_{t,a,g}\right]}{Op_{t,a,g}} \tag{14}$$

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[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: α_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 α_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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[*] At the time of writing, the author was Director for Social Security Budget, Minister's Secretariat, Ministry of Finance, Japan.

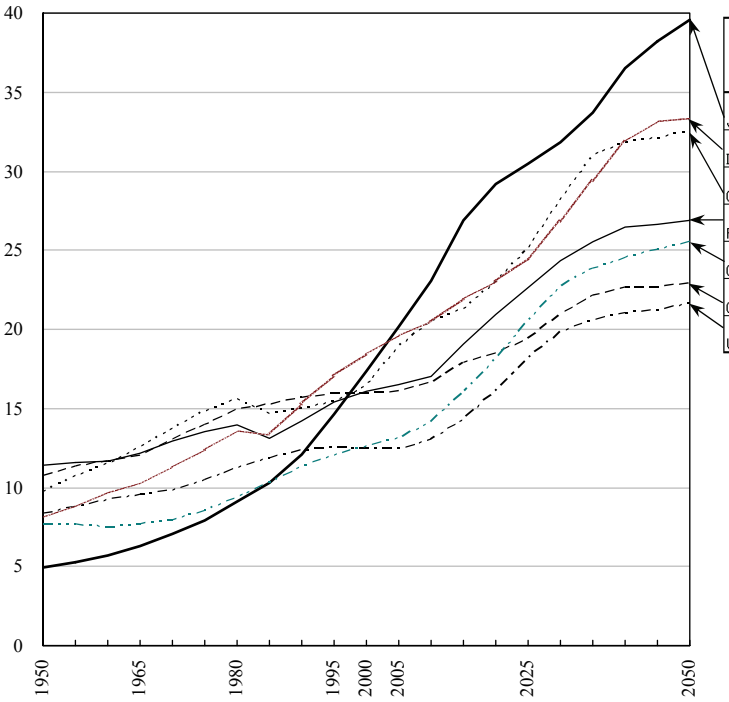
This paper is a compilation of the author's presentation at the workshop held in Perugia, Italy on March 25-27, 2009.

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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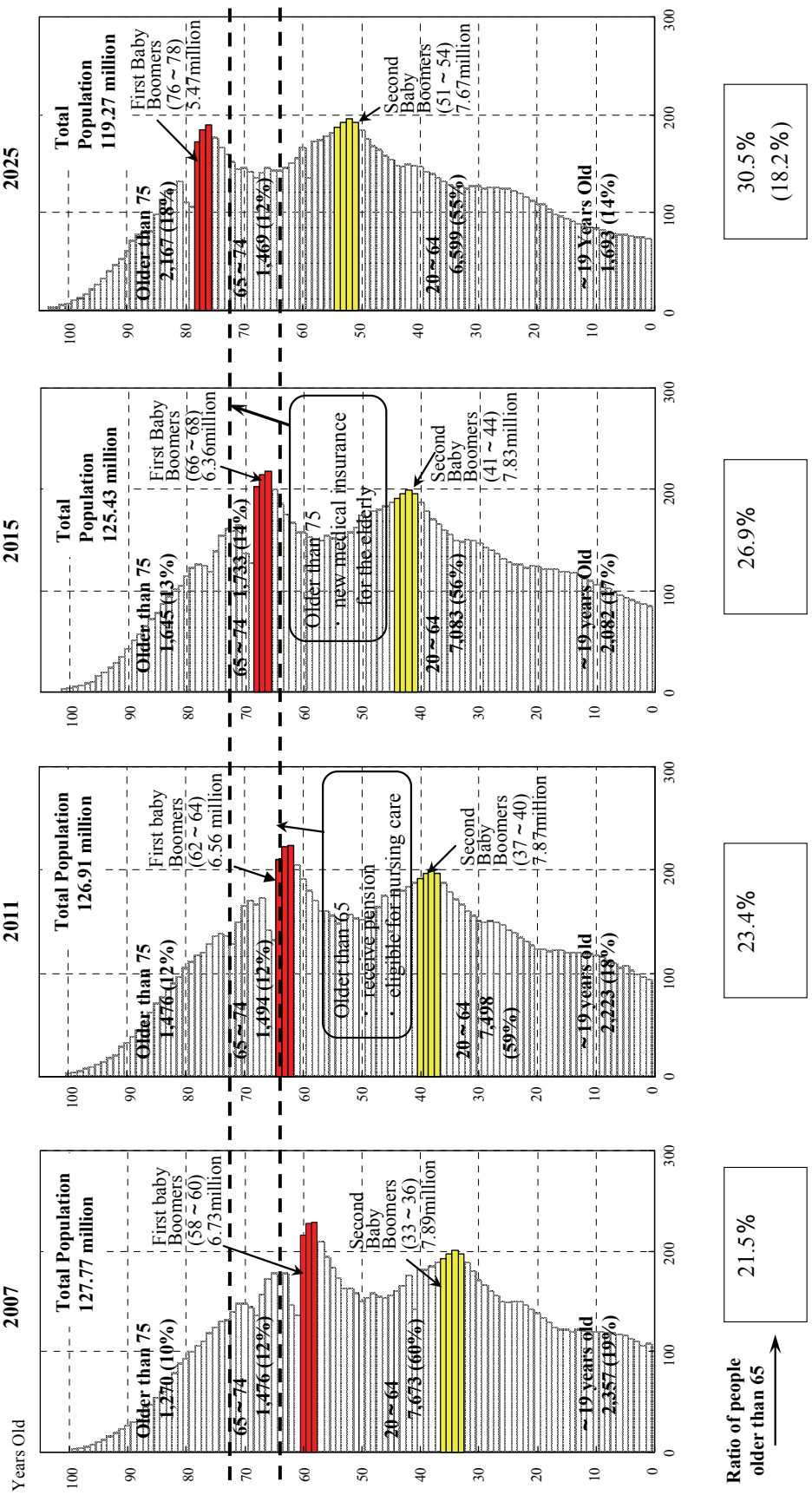
2 Registration of vital statistic in 2008, Ministry of Health, Labor and Welfare.

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.

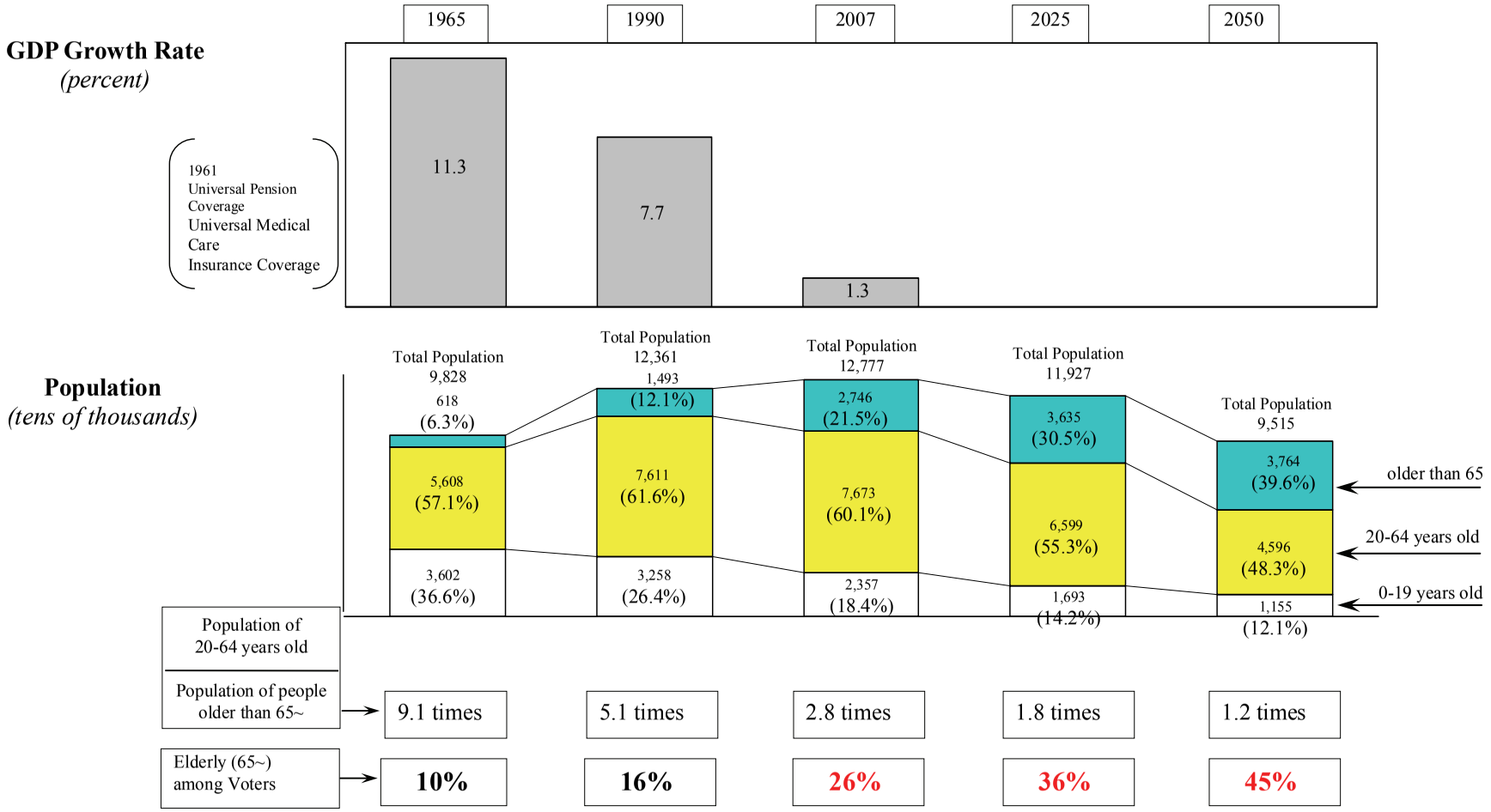
[7] The ratio of elderly people (2007) × elderly election turnout (2005) against elderly people (2007) × elderly turnout (2005) + working age people (2007) × working age turnout (2005).

[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

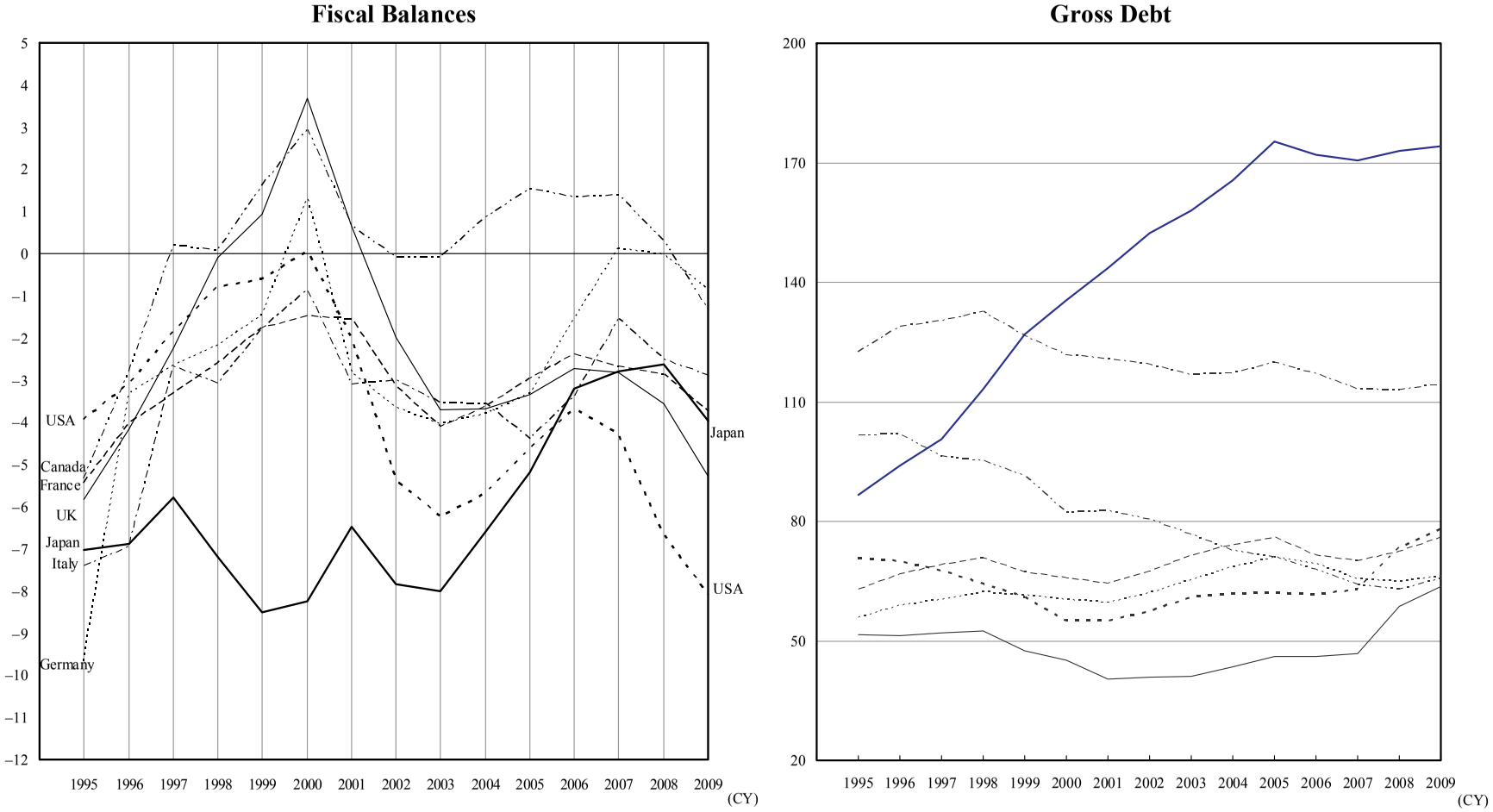


Note: Figures from Ministry of Internal Affairs and Communications, *National Census*, and National Institute of Population and Social Security Research (December 2006), *Population Projections for Japan: 2006-2055.*

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).

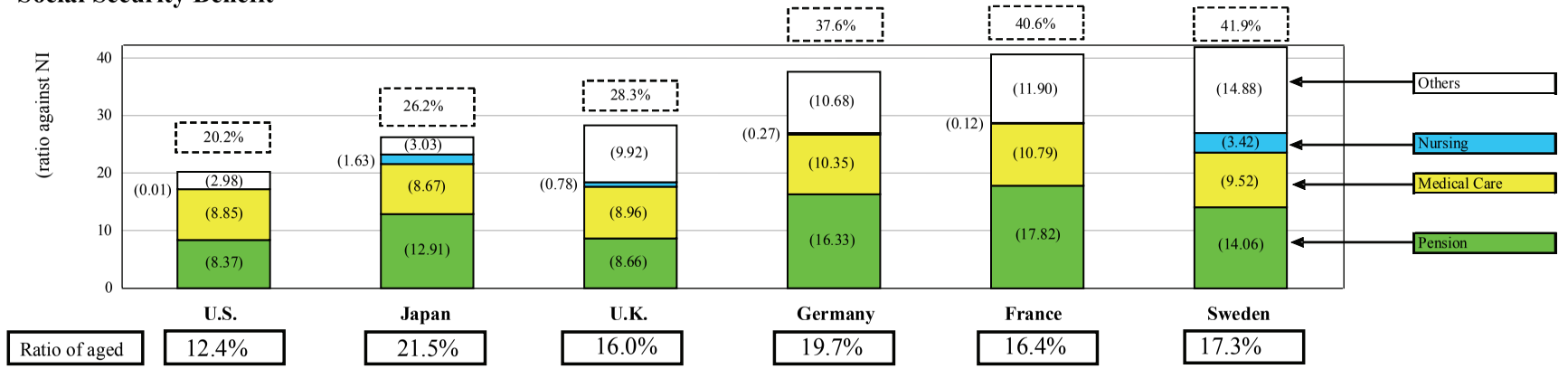
Lower figure shows national burden plus fiscal deficit. If you deduct social security benefit from national burden and deficit, the result is ranged from 16.5 per cent (Germany) – to 24.3 per cent (Sweden), around 20 per cent. That is, around 20 per cent of NI is used to expenditures other than social 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

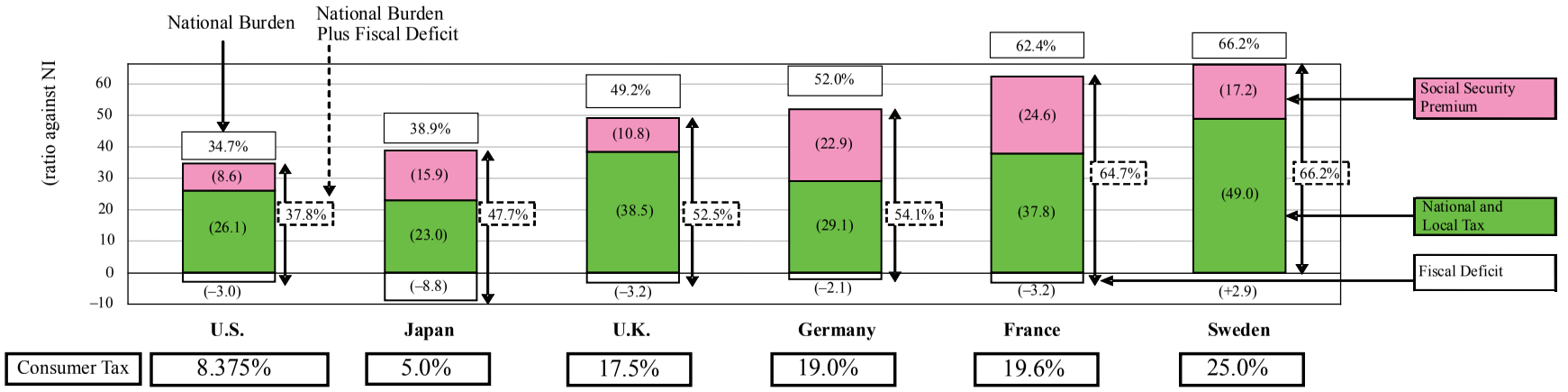
(percent)

Social Security Benefit



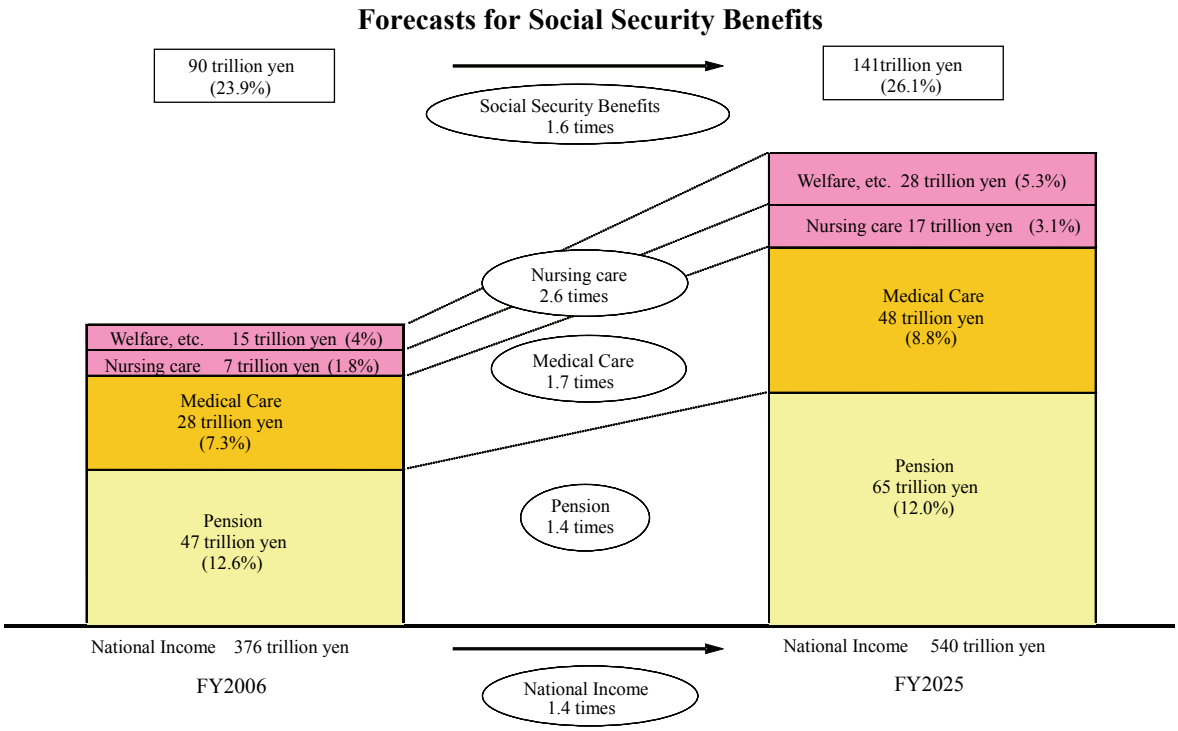
FY2005, Estimated by Ministry of Health, Welfare and Labor based on *Social Expenditure Database 2008*.

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

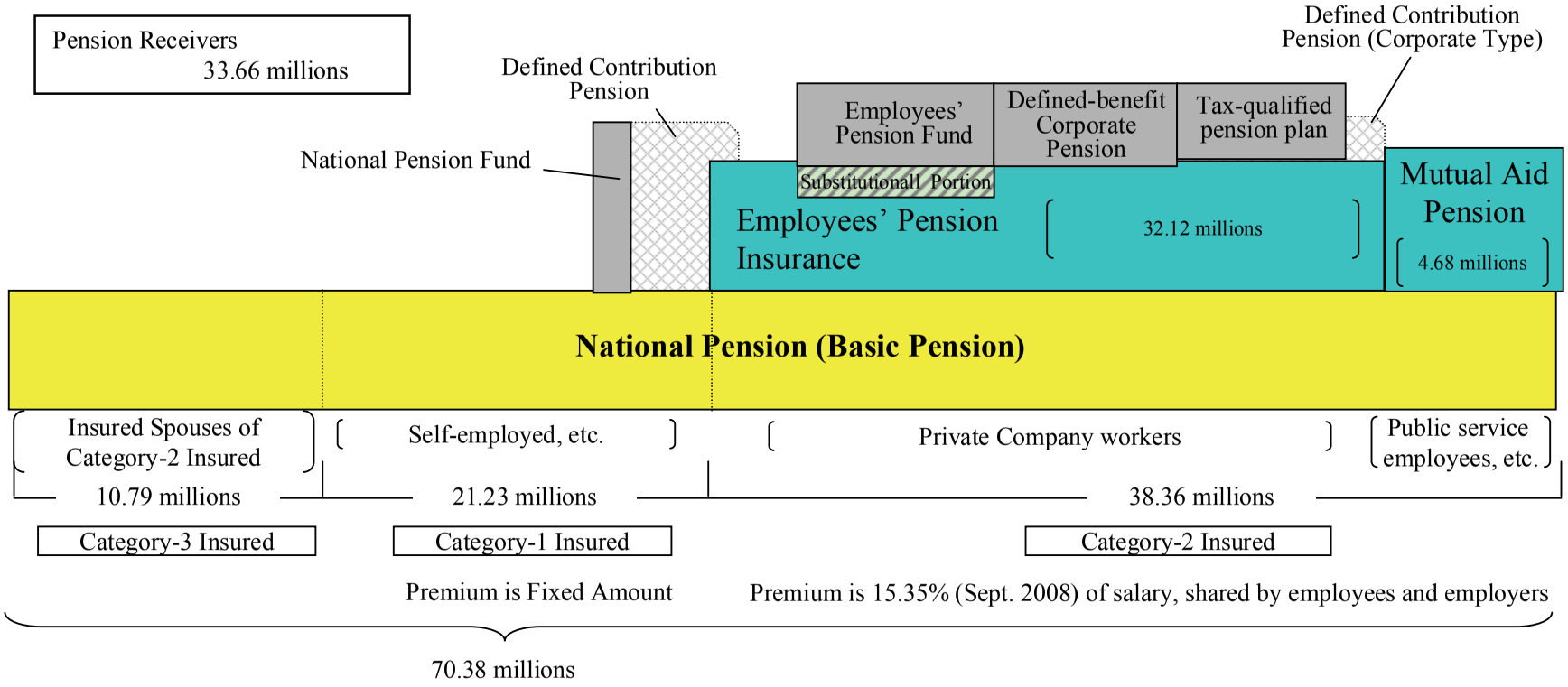
2.1 Japanese Pension System

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

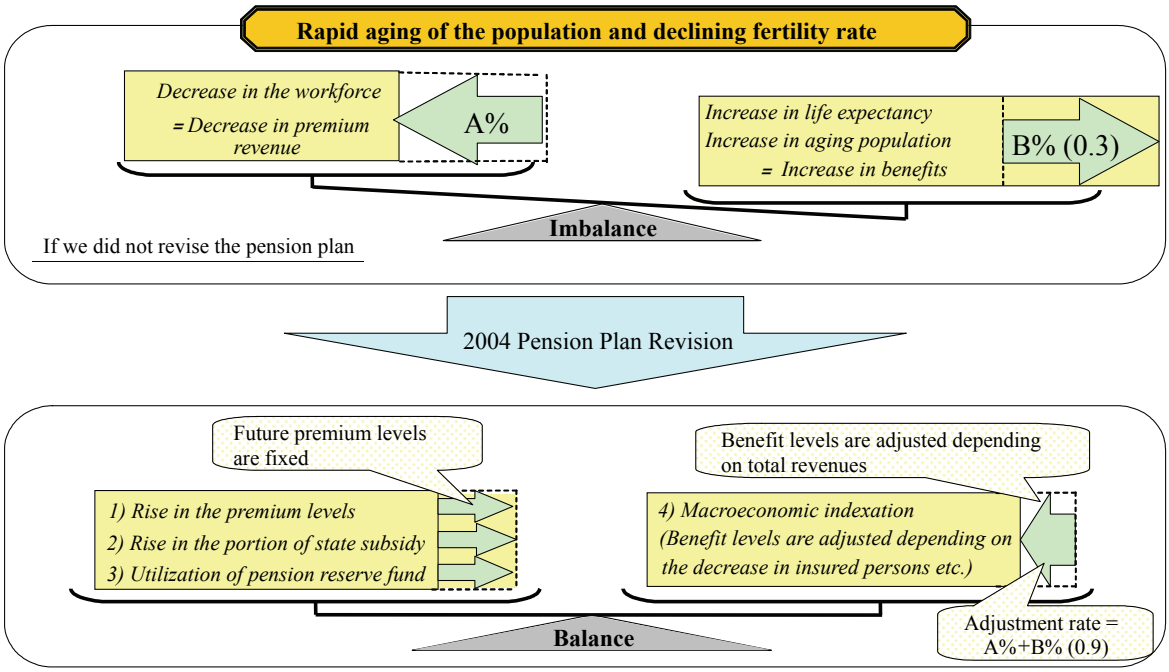


Figure 10

Estimation of the Premium Rate with/without Reform

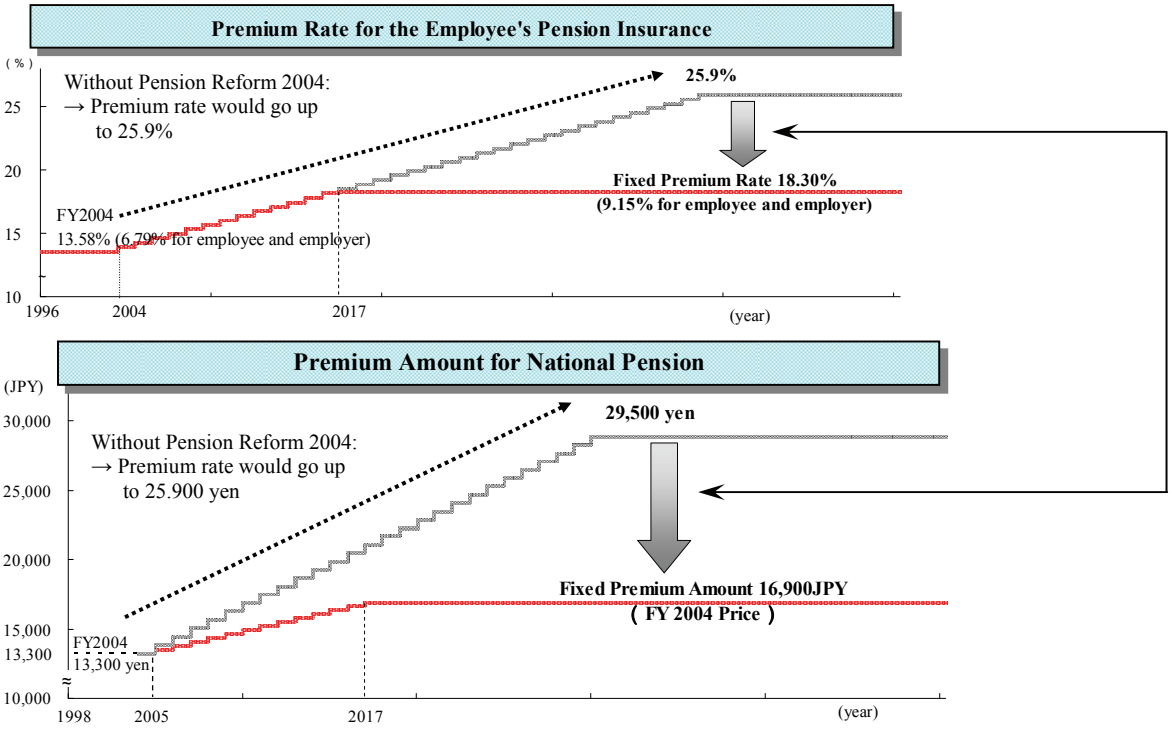
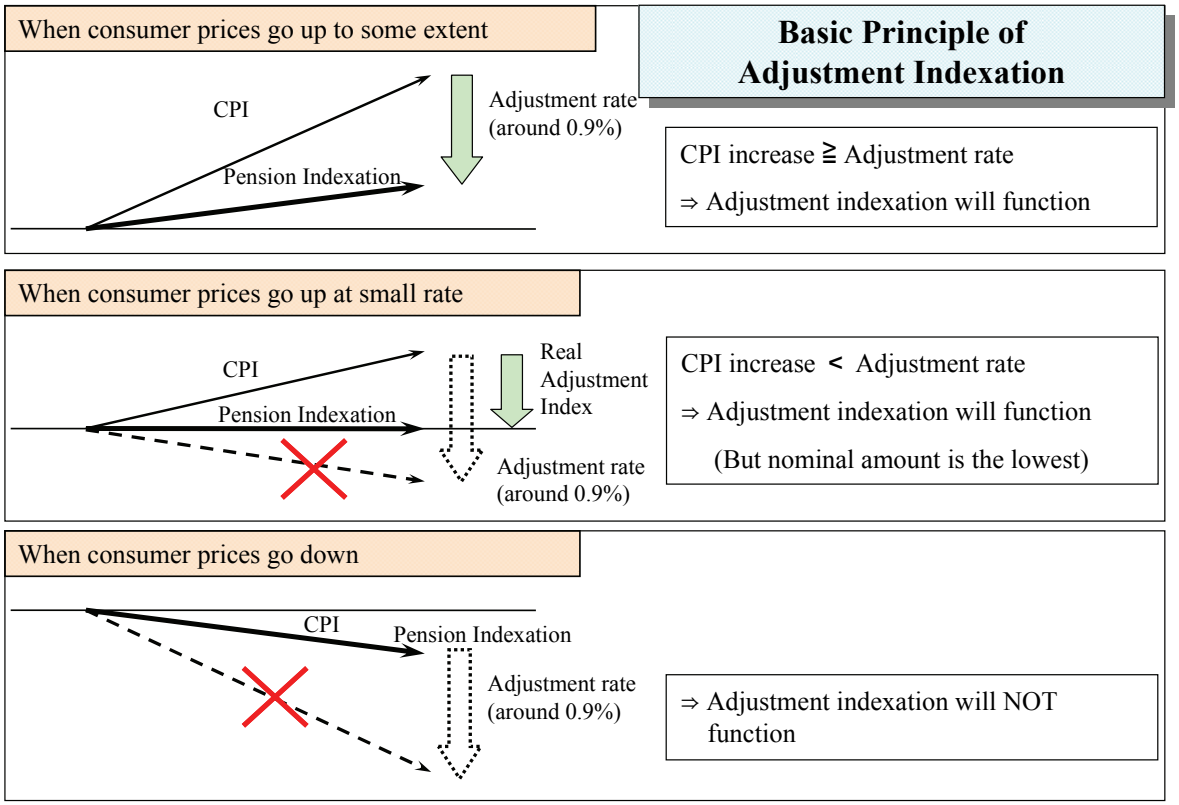


Figure 11

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.

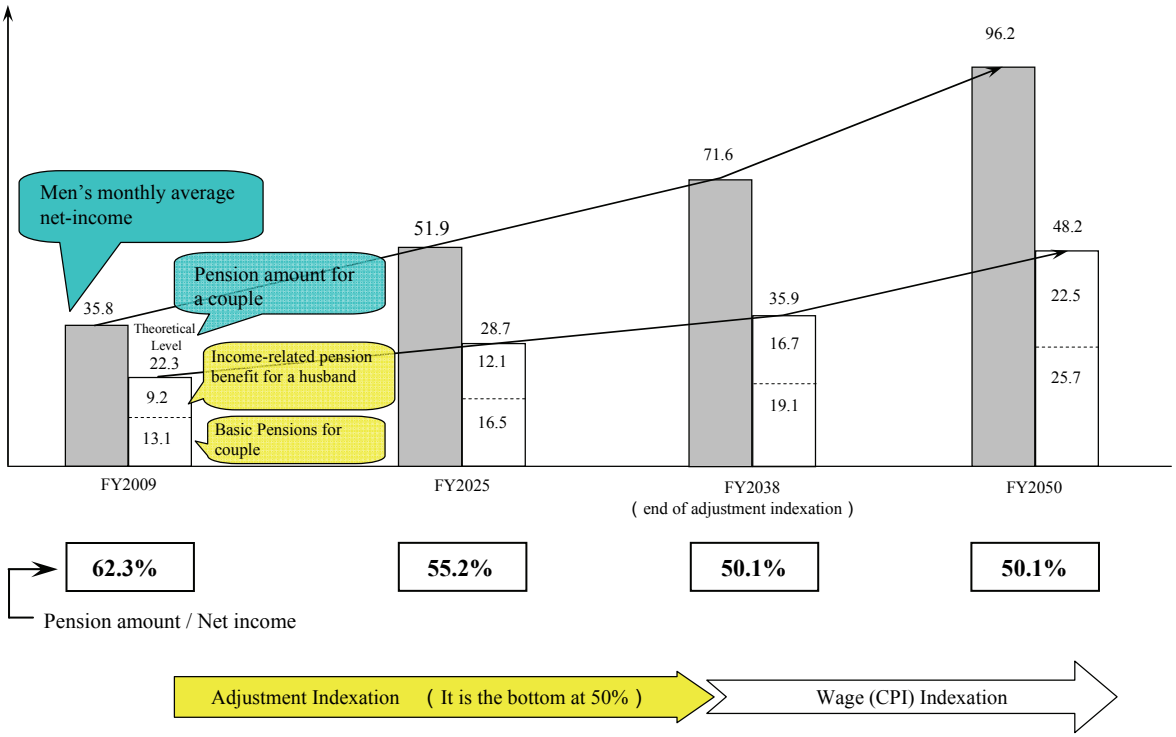
The lower part shows when the CPI goes down, they don't deduct adjustment indexation so that in this case pension indexation equals the decline of the CPI.

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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We would like to thank the discussion by Teresa Ter-Minassian, and the comments by Glenn Follette, Joaquim Oliveria and Rafael Rofman. Jasmina Bjeletic, Carlos Herrera, Soledad Hormazábal and Carolina Romero provided very efficient research assistance.

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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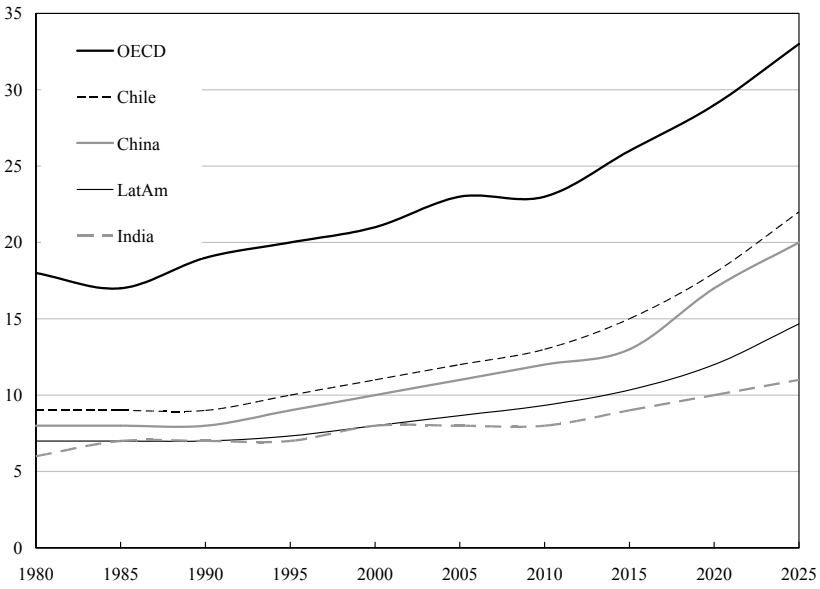
[2] For a description of the context and the contents of the reform, see Superintendencia de Administradoras de Fondos de Pensiones (2003), Arenas *et al.* (2006) and Favre *et al.* (2006), and more recently Iglesias (2009).

Figure 1

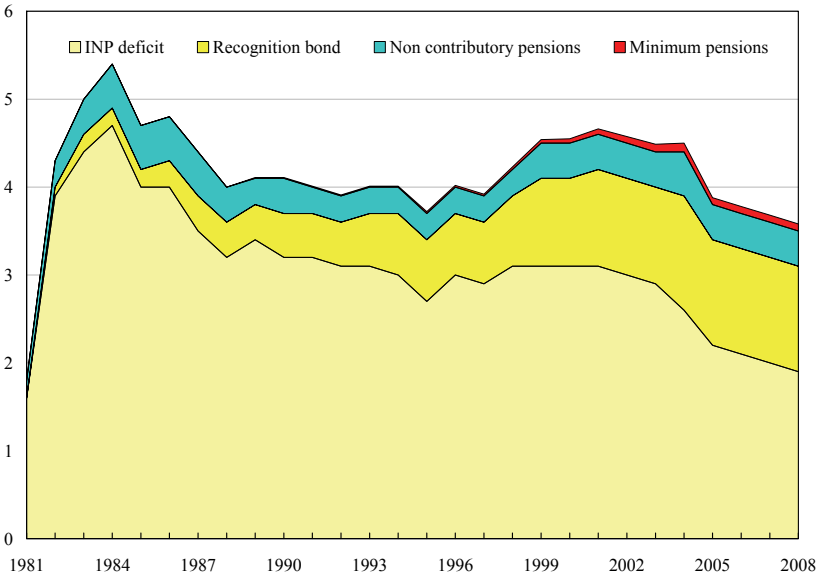
Old-age Dependency Ratio, 1980-2025
(L +65 / L 15-64)



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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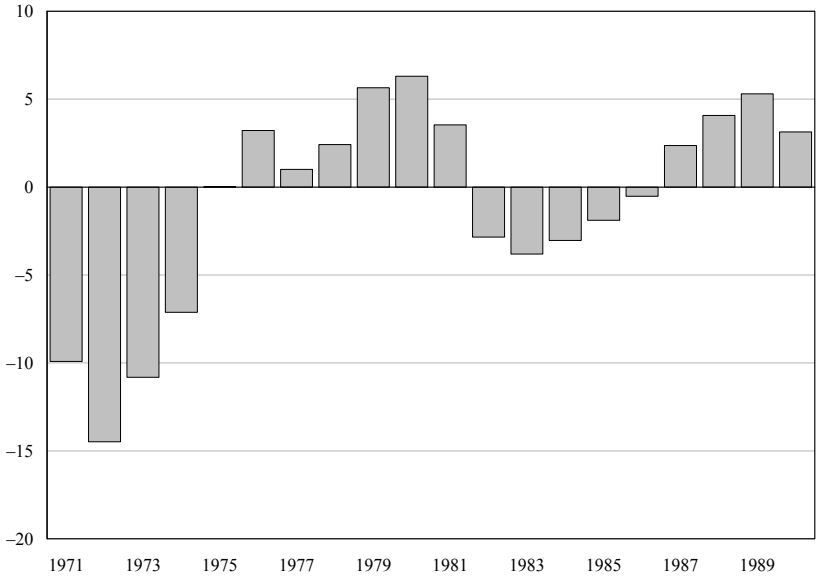
[3] A negative lesson of the Chilean experience, as reported in Vial (2008), is the poor management of recognition bonds due to the absence of precise statistics on workers history, and the lack of reliable statistics, even today, to base adequate projections.

[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

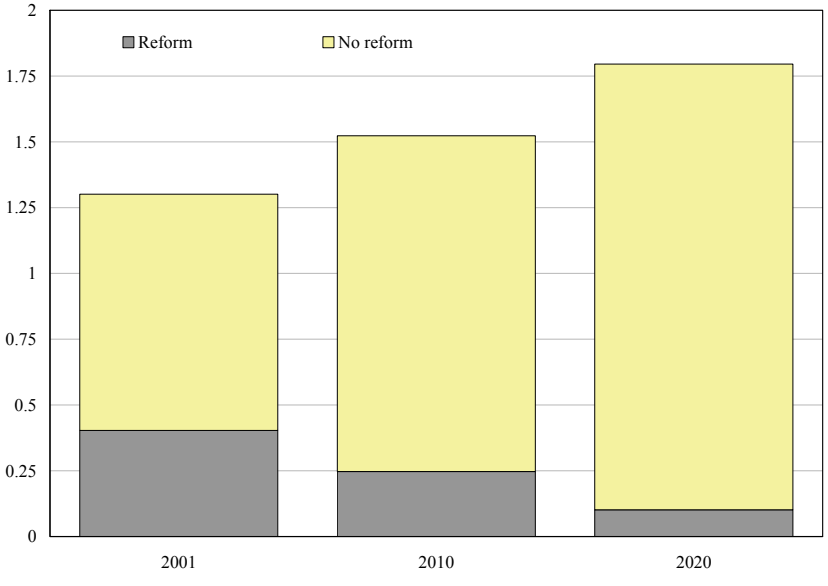
Central Government Net Lending in Chile
(cash, percent of GDP)



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).

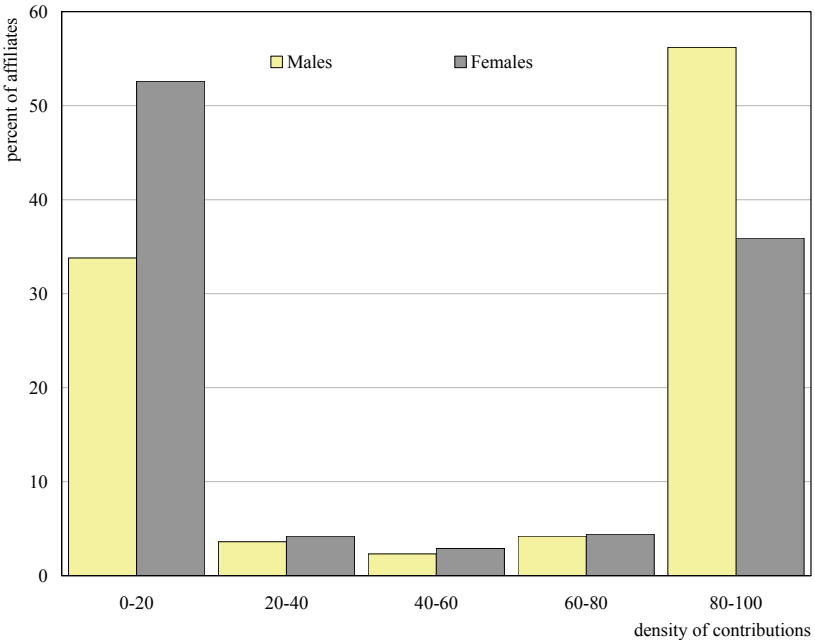
have had very low replacement ratios, due to a higher life expectancy (but lower legal retirement age) and to their traditionally lower participation rates and salaries. On the other hand, Chile shares, although to a lesser extent, a general trend in emerging economies: many members of the labour force 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.

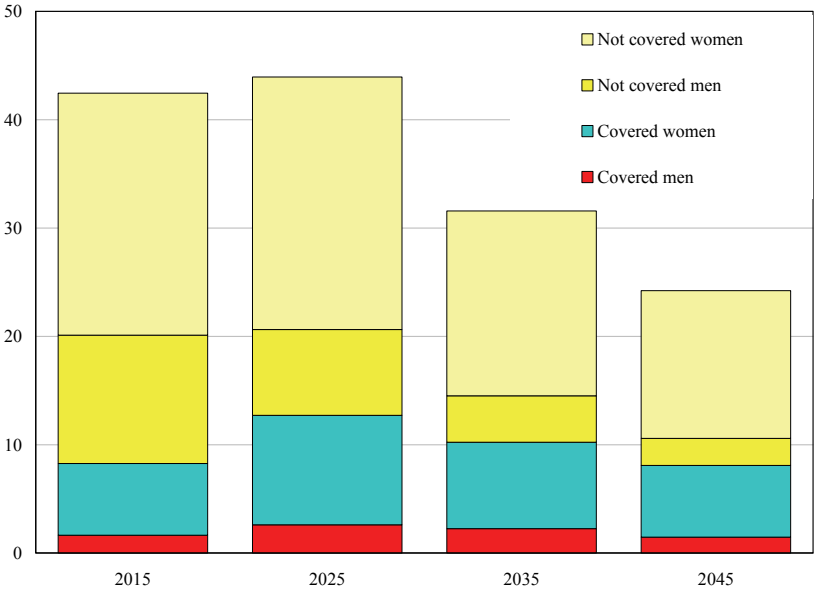
Based on a macro-actuarial model of the Chilean pensions system,[6] with linkages to United Nations demographic projections, and public finances, Favre *et al.* (2006) projected that more than 40 per cent of affiliates up to 2025 would accumulate pension rights below the contributory minimum pension 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

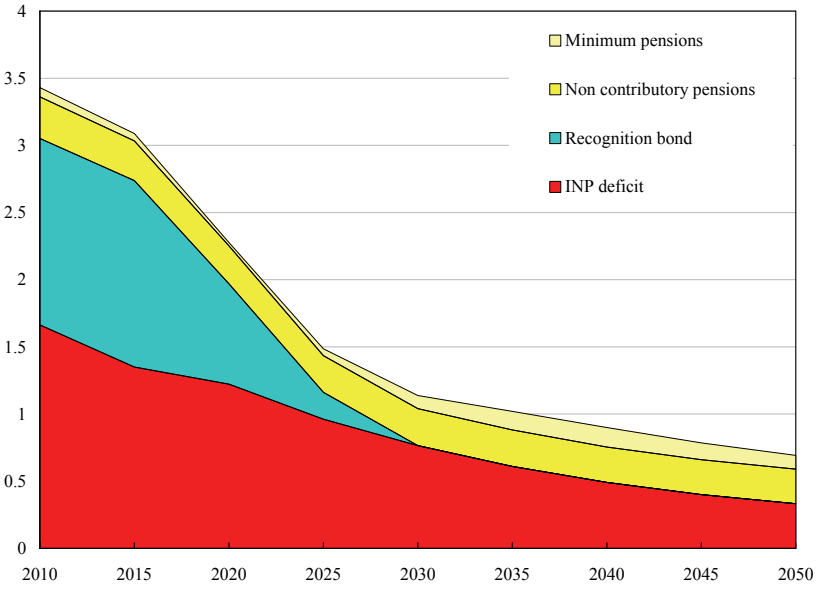
Projection of Minimum Pension Beneficiaries in Chile
(no-reform scenario, percentage of pensioners



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 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) 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

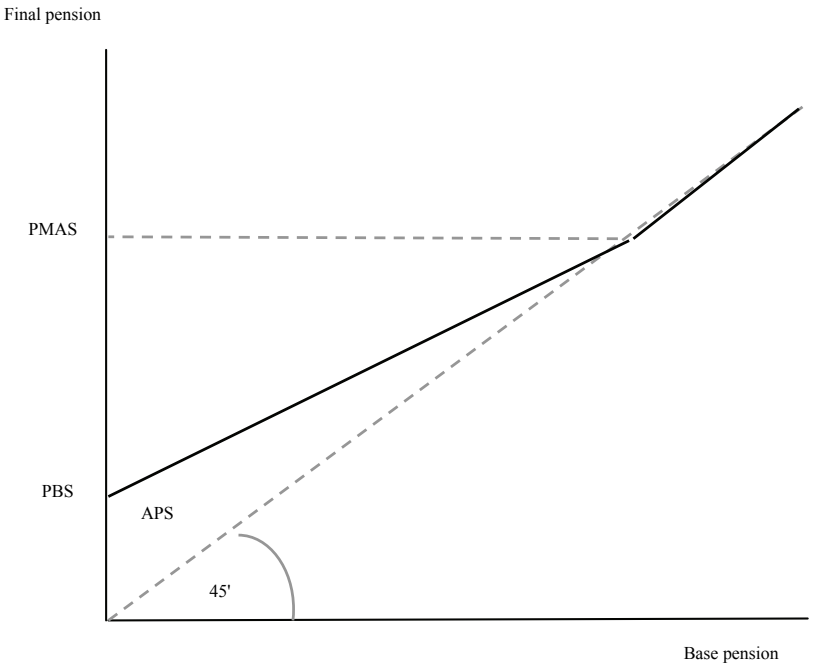
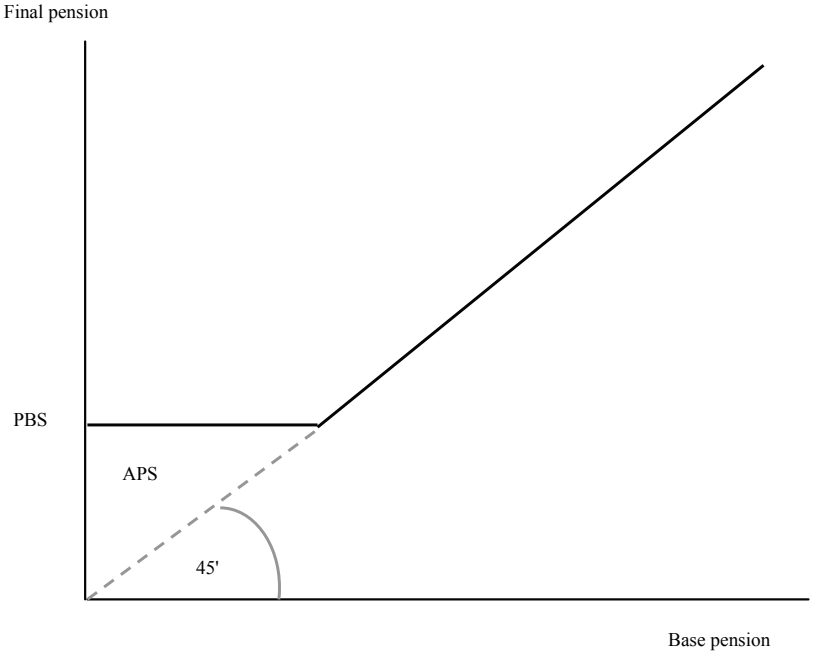


Figure 9

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).

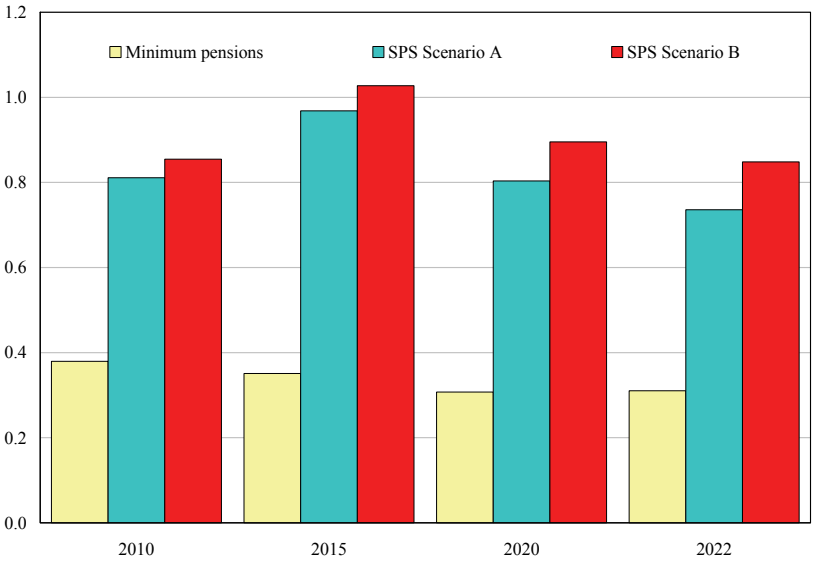
(10 per cent). Data on the recognition bond (key to calculate the amount of APS) comes from the information provided by pension funds administrators in the bidding process for disability and survivors insurance (referred to June 2002 to June 2008). All of the disability benefits are computed as PBS. 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

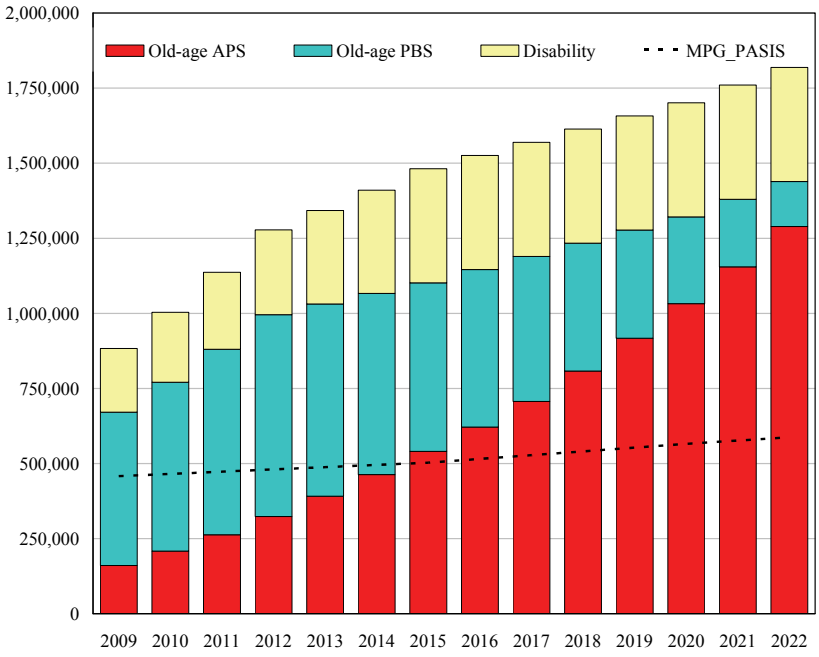
[13] Projection period (up to 2022) is limited due to the lack of disaggregated data of affiliates by sex and age, at earlier years.

[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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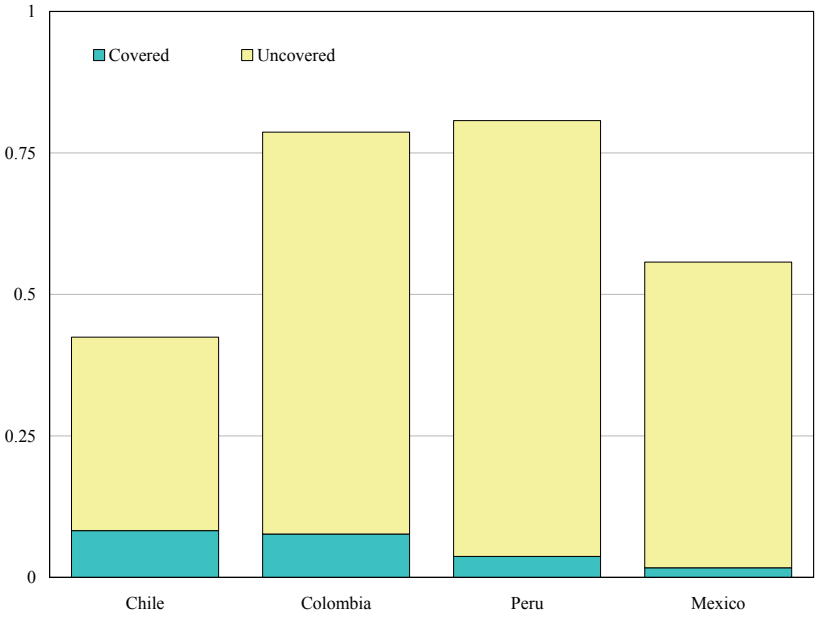
[15] For a deeper discussion of the pension system regulation and their main challenges, see Albo *et al.* (2007) for Mexico, Bernal *et al.* (2008) for Peru, and Muñoz *et al.* (2009) for Colombia.

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

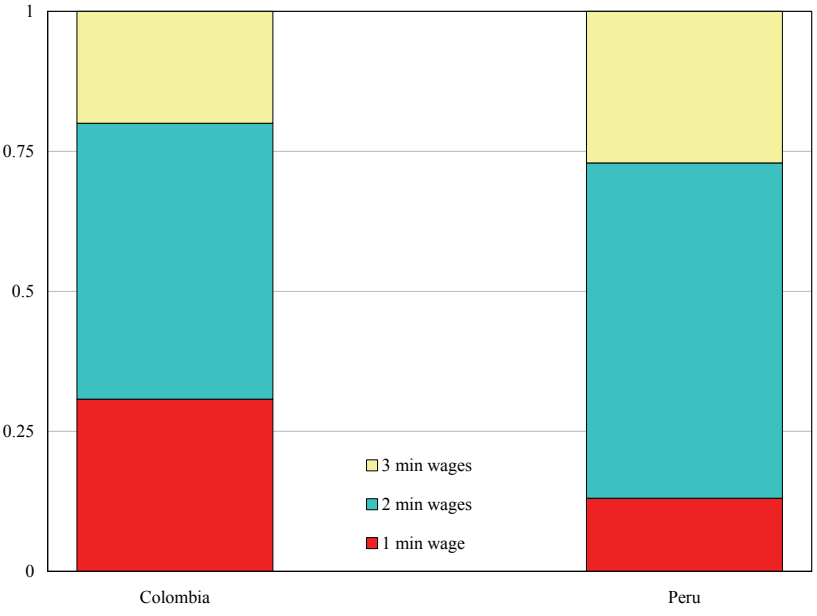
Projection of Minimum Pension Beneficiaries in Latin America
(percentage of pensioners, 2015 except 2035 for Mexico)



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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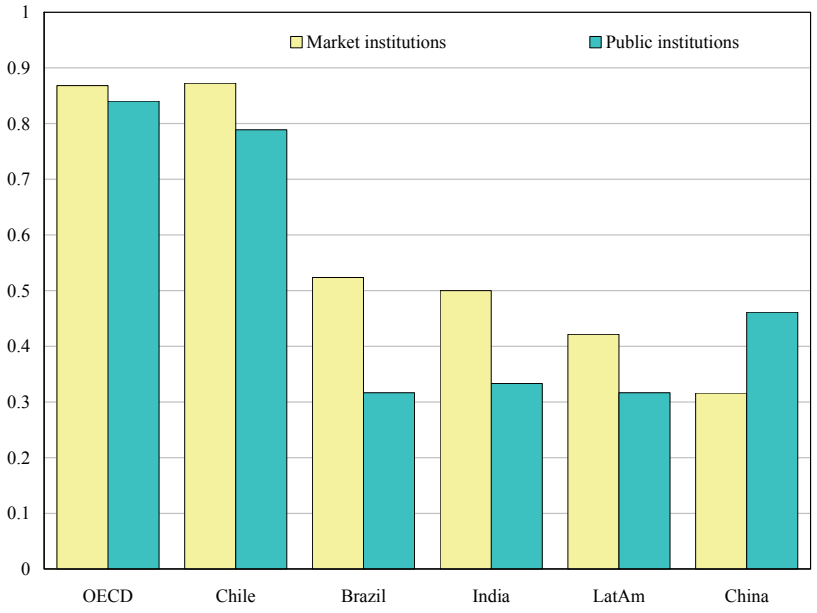
[16] This section relies heavily on Melguizo and Vial (2009). For an economic-theory oriented approach of the issue, see also Barr and Diamond (2006).

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.

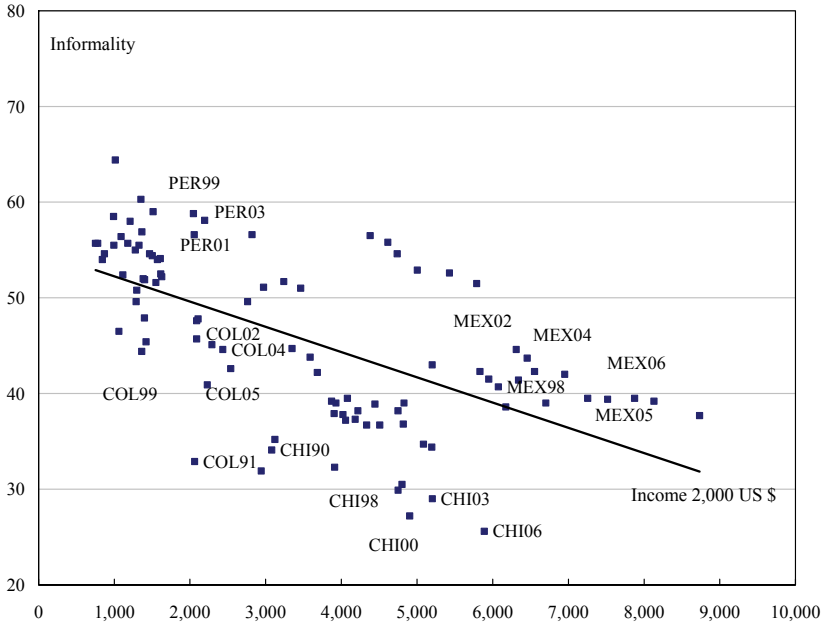
5.4 Informal labour market and solidarity pillar

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

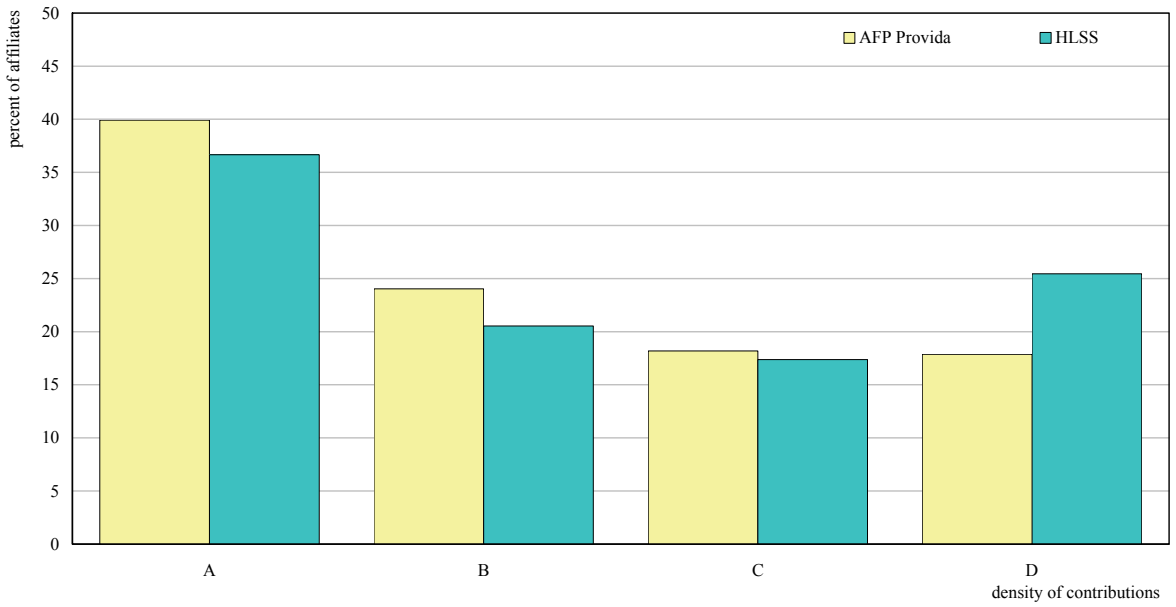
Projection of Fiscal Expenditure in Civil Pensions in Chile
(no-reform scenario, percent of GDP)

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

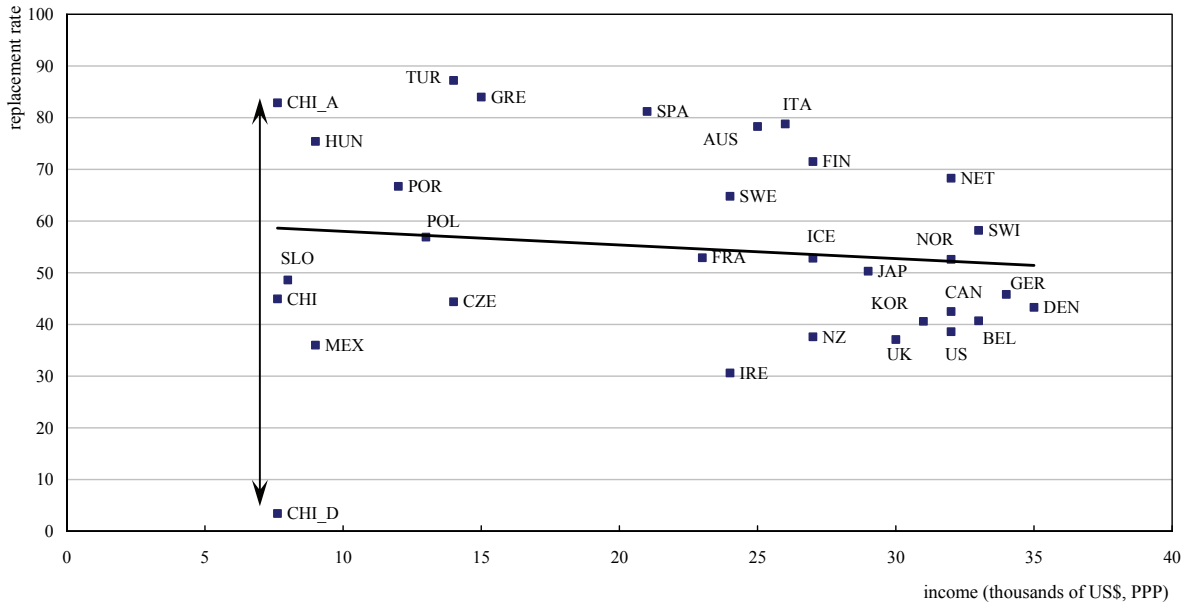
Categories of Affiliates by Density of Contributions in Chile



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.