Session 2

PENSION REFORM AND CAPITAL MARKETS

PRIVATIZING PENSIONS: MORE THAN AN INTERESTING THOUGHT?

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Privatization of public pension schemes, partial or complete, is on the political agenda in many countries. In the Netherlands, the discussion focuses on second-pillar pension schemes. Although these schemes are funded, they feature intergenerational risk sharing. This paper documents the consumption, labour supply and welfare effects of a privatization of these second-pillar schemes. It adopts a stochastic model of life-cycle planning that includes endogenous saving, investment and labour supply behaviour. The analysis offers a decomposition of the welfare effect of privatization in order to assess the effects of intergenerational risk sharing and of labour market distortions.

1 Introduction

A large literature has developed that assesses the welfare aspects of pension schemes. An important result is that defined-benefit (DB) pension schemes feature different types of intergenerational risk sharing that the market for whatever reason cannot provide. By this argument, DB pension schemes add to social welfare. Another result is that pension schemes generally aggravate already existing distortions on labour and capital markets, an aspect that decreases welfare. Some studies find that the risk sharing effects dominate (Nishiyama and Smetters, 2007; Fehr and Habermann, 2008), while others conclude that the distortions are dominant (Krueger and Kubler, 2006; Fuster *et al.*, 2007).

Almost without exception, the literature focuses on the case of PAYG-financed pension schemes. For the Netherlands, the case of funded schemes is more interesting. Moreover, the case of funded schemes differs from the PAYG case for two reasons. First, to the extent that the introduction of a funded scheme substitutes pension saving for private saving, the effect on aggregate saving may be minor. The case of the introduction of an unfunded scheme is known to be entirely different. Second, a funded scheme generally features a tight link between benefits and contributions. In contrast, in a PAYG scheme such a link either is weak or does not exist.[1]

This paper explores the effects of the privatization of a funded pension scheme. It therefore constructs an OLG model in which the rate of return on equity is stochastic and labour supply is endogenous. Unlike Teulings and de Vries (2006) and Bovenberg *et al*. (2007), households decide on the size and the portfolio composition of their private saving accounts. The idea that households do not save otherwise than through a pension fund is not only unrealistic, but would also in our case be misleading as households would be constrained from adjusting their private savings in order to compensate for a reduction of pension savings.

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[1] Lindbeck and Persson (2003) stress the usefulness of distinguishing carefully the concept of actuarial fairness from the financing concept (funded, unfunded).

Our model has a relation with a few models in the literature that combine capital income risk with aggregate labour income risk (Bodie *et al.*, 1985, Viceira, 2001, Cocco *et al.*, 2005 and Gomes *et al.*, 2008). Although our paper takes labour productivity and thus gross labour income as non-stochastic, labour income net of pension contributions is stochastic, as the rate of pension contributions in our model reflects shocks in the rate of return on equity. The paper that comes closest to our paper is that of Bodie *et al.* (1992) which includes labour income shocks that are perfectly correlated with stock price shocks.

Unlike Bodie *et al.* (1992) and Gomes *et al.* (2008), we adopt a specification in which labour supply is not driven by a wealth effect. Our motivation is that empirically, wealth effects are usually found to be small when compared with substitution effects (Lumsdaine and Mitchell, 1999). The implication is that labour supply is unresponsive to changes in financial wealth. Hence, labour flexibility cannot play a role in absorbing capital market shocks and the impact that the two above-mentioned studies find of labour flexibility on portfolio composition does not arise in our model.

Our approach is to analyze a hypothetical DB scheme. This allows us to give clear-cut answers on the question what is the role of typical elements of DB schemes, like the insurance against capital market uncertainty or lifetime uncertainty. The disadvantage is that real-world schemes are different, because of factors neglected in the simulation approach. See Samwick and Skinner (2004) and Poterba *et al.* (2007) for a comparison of the actual performance of DB and DC schemes.

Our analysis highlights four elements. The probably most well-known effect of DB schemes is intergenerational risk sharing. While the market does not allow trade with the unborn, DB schemes can. This type of risk sharing will be lost when the scheme is abandoned (Gordon and Varian, 1988; Bovenberg *et al.*, 2007; Gollier, 2008).

The second element is labour market distortions due to contingent transfers. If transfers among generations relate to labour income, they act as a wedge on labour supply. Hence, intergenerational risk sharing can result in effectively taxing or subsidizing labour supply. Both factors decrease social welfare and it is this welfare loss that will vanish when a DB scheme is abandoned.[2]

The third element also relates to labour market distortions, but now due to the fact that the contribution rate and the pension accumulation rate are uniform across generations. This element is common to DB plans (Bodie *et al.*, 1985) and is even legally prescribed in the Netherlands.[3] As the terminal value of a pension contribution is lower, the older the household, pension contributions are larger than the rights accumulated for young workers, whereas beyond a certain age (typically, about 45 years old) the opposite holds true. The uniformity of the pension contribution rate thus works as an incentive for young workers to take up leisure, whereas beyond a certain age, households are induced to increase their labour supply. The distortion of the labour supply decision of both groups of workers creates an additional welfare loss.

The fourth element is annuity markets. Pension schemes automatically convert the wealth upon retirement into an annuity, thereby insuring participants against lifetime uncertainty. This insurance could be achieved on the market as well, provided that annuity markets are perfect. In reality, annuity markets show large imperfections (Poterba, 2001). Our analysis takes this to the extreme and simply assumes (in the benchmark at least) that annuity markets do not exist.

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[2] Taxes are levied also for other (non-pension) reasons, which increases the role of labour market distortions. Future work will take this into account.

[3] Aarssen and Kuipers (2007) and Bonenkamp (2007) calculated the transfers between different age cohorts for the Netherlands that are due to the uniformity of the contribution rate and the build-up rate and found them to be quite large.

This paper will focus on the steady-state implications of the privatization of pension schemes. We will present four types of simulations: 1) privatization of the funded DB scheme (benchmark simulation); 2) the same as 1), but now assuming that perfect annuity markets exist; 3) a simulation that explores the role of labour supply endogeneity and 4) a simulation that explores the role of the uniform contribution rate. Together, these simulations indicate the overall contribution of the funded DB pension scheme to welfare and the contributions of various elements, among which insurance against lifetime uncertainty, uniform pricing and labour supply endogeneity.

Our analysis is not exhaustive. DB schemes offer additional advantages that our analysis does not capture. The obligatory nature of pensions prevents myopic households from saving too little. Moreover, pension funds may be better investors than individual households, able to achieve higher rates of return on average, less volatile rates of return or both. In addition, pension funds will be less subject to capital market constraints (*e.g.* borrowing constraints and short-selling constraints) than individual households.[4] These and other elements do not reduce the value of our results, but help to put them more in perspective.

The structure of our paper is as follows. The next section sets up our model. Then, we describe various aspects of the life-cycle behaviour of households in the baseline. Subsequently, we report the effects of the four simulations described above. We focus on the effects on consumption, labour supply and welfare. We end with some concluding remarks.

2 An OLG model with pensions

The model describes a small open economy for which factor prices are given. It consists of overlapping generations of households and a pension fund.

Households have a finite life with uncertain length. They enter the economy at the age of 20 and may work up to the age of 65. From that age onwards, they receive a pension until they die. The time of death is uncertain, but occurs at the age of 100 or before with certainty. We work with periods of five years, so we define the working phase of the life-cycle to consist of 9 periods, the retirement phase to consist of 7 periods and the life-cycle to consist of 16 periods. Households maximize a utility function by choosing their savings and their investment in risky assets at different ages in their lives. In the working phase of their life-cycle, they also choose optimally their consumption of leisure.

The pension fund in the model receives contributions from working generations and pays pensions to retired generations. Households are obliged to participate in this pension fund. This corresponds to the Dutch situation in which workers are obliged to participate in a pension scheme if they decide to sign a labour contract. The pension scheme is of the DB type: pension benefits relate to the individual's labour history, but are unrelated to both capital market rates of return and to the length of life. Shocks to pension wealth are absorbed by the contributions that the pension fund levies upon working cohorts.

This section develops the model that we use for our analysis. It starts by specifying the nature of the stochastic variables in the model. Subsequently, it specifies the model for households and that for the pension fund.

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[4] See also Bovenberg *et al.* (2007) for an overview.

2.1 Stochastic assumptions

We focus on one major form of macroeconomic risks: equity return risk. The gross rate of return on equity follows a lognormal white noise process. The second asset in the economy is a bond, the return of which is riskless. The excess return on the risky asset is defined as:[5]

$$\tilde{e}_s(t) = \tilde{R}_s(t) - \tilde{R}_b \tag{1}$$

In equation (1), index b points to bonds and s to equity. The expected value of the excess return on equity is denoted as μ_s, whereas its variance is denoted as σ_s^2.

Our model distinguishes the case with and without a perfect life insurance market. In the former case, households receive an annuity return on their private savings that reflects their mortality risk (Yaari, 1965). As mortality rates are allowed to differ by age, the annuity return will be age-dependent. We abstract from macroeconomic longevity risk, so population growth at the level of generations is non-stochastic.

More precisely, in the simulations in which annuity markets are assumed to exist, the wealth of those who die at time t with age i, is transferred to the people of the same cohort who survive. This makes the effective rate of return on the two assets equal to $R_m(t,i) = \tilde{R}_m(t)/\zeta(t,i) \quad m = b,s$, where $\zeta(t,i)$ reflects the survival rate of cohort *i* in period *t*. Similarly, $e_s(t,i) = \tilde{e}_s(t)/\zeta(t,i)$. Hence, it is R_b and R_s (and e_s) that drive private savings if annuity markets are assumed perfect, rather than their equivalents $\tilde{R}_b$, $\tilde{R}_s$ (and $\tilde{e}_s$).

The literature offers a simple approach to price assets in complete markets in case of partial equilibrium modelling. Partial equilibrium models of small open economies assume exogenous given capital market developments. Equity income is the only source of uncertainty. Given these assumptions there is a unique stochastic discount factor which can be used to calculate the value of all assets and their derivatives. This unique stochastic discount factor reads as follows (see Cochrane, 2005, page 73):

$$\tilde{m}(t) = \frac{1}{\tilde{R}_b} - \frac{1}{\tilde{R}_b}\frac{\mu_s}{\sigma_s^2}\left(\tilde{e}_s(t) - \mu_s\right) \tag{2}$$

given the stochastic assumption made. This discount factor implies that non-stochastic income flows are discounted by the bond rate, because the last term disappears after taking expectations. However, stochastic income flows are discounted with a correction which depends on the covariance with the excess return.

Two examples may illustrate the working of the stochastic discount factor. Assume a bond price p_b that gives a pay out $d_b(+1)$ and a rest value $p_b(+1)$ in next year. According to asset valuation theory, it holds that:

$$p_b(t) = E\tilde{m}(t+1)\left(d_b(t+1) + p_b(t+1)\right) \tag{3}$$

This implies for the rate of return $\tilde{R}_b(t+1) = \left(d_b(t+1) + p_b(t+1)\right)/p_b(t)$

$$1 = E\tilde{m}(t+1)\tilde{R}_b(t+1) \tag{4}$$

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[5] In this document we use suffixes as indicators for variables that refer to specific time periods or ages. For individual variables we use only the age suffix j, for intergenerational variables we use both the age suffix j and the time suffix t, for aggregated (macro) variables we use only time suffix t. At the individual level time and age are related on a one-to-one basis, so using the age indicator j is sufficient.

The same argument leads to:

$$1 = E\tilde{m}(t+1)\tilde{R}_s(t+1) \tag{5}$$

for the rate of return on shares. Subtract both equations to obtain for the excess return on shares:

$$0 = E\tilde{m}(t+1)\tilde{e}_s(t+1) \tag{6}$$

Equation (4) and (6) are easy to verify after substitution of the expression for the stochastic discount factor (equation (2)), taking expectations and using the definitions of the expected value and variance of the excess return on shares. All derivative assets can be valued using this stochastic discount factor, too. For instance, our model is characterized by stochastic net wages, due to stochastic pension premiums. This implies that human wealth, the discounted value of net wages, can be considered as a derivative asset of bonds and shares. The pay-out of human wealth (net wages) has to be valued with the stochastic discount factor $\tilde{m}$. In the household model we will use $m(t,i) = \zeta(t,i)\tilde{m}(t)$.

2.2 The household decision problem

An individual of age j maximizes his expected intertemporal utility, U, which is defined over his remaining lifetime:

$$U(j) = E_j \sum_{i=j}^{j_e} u(i) d_s(i) \text{ with} \tag{7}$$

$$d_s(i) = \prod_{l=j}^{i-1} \delta(l)^{-1}$$

Here, j_e (= 100 years) denotes the maximum attainable age.[6] The discount factor is defined as $\delta(l) = \tilde{\delta} / \zeta(l)$ with $\tilde{\delta}$ the time preference factor and $\zeta(j)$ the conditional (upon being alive at the start of year j) probability of living through the next period. E_j is the expectations operator, used to account for the uncertainty of utility derived from consumption.[7]

The felicity function, u, has as arguments the consumption of commodities, c, and the consumption of leisure, v:

$$u(i) = \frac{1}{1-\gamma}\left(\alpha_c c(i) + \alpha_v \frac{v(i)^{1-\beta}}{1-\beta}\right)^{1-\gamma} \text{ with} \tag{8}$$

$$\alpha_c, \alpha_v > 0,\ \beta > 1,\ \gamma > 0$$

$1/\gamma$ denotes the elasticity of intertemporal substitution and $1/\beta$ the price elasticity of leisure demand. We assume $\beta > 1$, ensuring that commodity consumption is always positive. α_c and α_v are utility weights of respectively the consumption of commodities and leisure.

The asset accumulation equation describes the development of household financial wealth, $w_f^h(i)$, through time:

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[6] The consumption of children is attributed to their parents.

[7] Note, we use as convention $\prod_{l=j}^{j-1} \delta(l)^{-1} = 1$.

$$w_f^h(i+1) = R_b(i+1)\left(w_f^h(i) + y(i) - c(i)\right) + e_s(i+1)w_s^h(i) \tag{9}$$

Equation (9) signals that households receive non-capital income $y(i)$, consume $c(i)$ and invest their savings in bonds and equity. Riskless bonds earn a yearly gross return R_b and equity earns an annual gross return R_s (with an excess return e_s). As explained in the previous section, the effective rates of return on the two assets depend on the household's mortality rate in case annuity markets are present. Hence, the effective rates of return are age-dependent. $w_s^h(i)$ denotes the household's investment in risky equity. Regarding the timing of transactions, we assume that all variables (transactions, demographic changes, stocks) are measured at the start of a period.

Non-capital income equals labour income $y_w(i)$ in the working ages, $i < j_r$, where j_r (= 65 years) denotes the maximum age in the working phase. Labour income depends on the working time, the wage rate $p_l(i)$ and the pension premium rate τ_p:

$$y(i) = y_w(i) = (1-\tau_p(i))\left(1-v(i)\right)p_l(i) \qquad \text{for } i < j_r \tag{10}$$

Working time is expressed as $1-v(i)$, indicating that we have normalized the time endowment to unity. Non-capital income equals pension income $y_p(i)$ in the retirement period ($i \geq j_r$). The pension level (replacement rate) at the start of the retirement period depends on the work effort over the past in an average-wage defined benefit (DB) system:

$$y_p(i+1) = y_p(i) + a\left(1-v(i)\right)p_l(i) \qquad \text{for } i < j_r - 1 \quad \text{and } y_p(5) = 0 \tag{11}$$

with a the accrual rate. Pension income is constant over time:

$$y(i) = y_p(i) = y_p(i-1) \qquad \text{for } i \geq j_r \tag{12}$$

The household's problem is to maximize expected intertemporal utility (7), subject to the asset accumulation equation (9), his initial amount of financial wealth, $w_f^h(i)$, and a Kuhn-Tucker condition that ensures that leisure does not exceed the time endowment of the household.

2.3 Household behaviour

In our model, households decide on their savings, on their investment in equity and on their leisure demand. We start to describe leisure demand. The equation that expresses leisure demand is as follows:

$$v(i) = \left(\frac{\alpha_c}{\alpha_v}\tilde{p}_v(i)\right)^{-\frac{1}{\beta}} \tag{13}$$

where the shadow price of leisure, $\tilde{p}_v$, is defined as the maximum of the actual price of leisure, p_v, and the ratio α_v / α_c. This ensures that leisure time does not exceed the time endowment of the household. In case the time constraint is binding, $\tilde{p}_v = \alpha_v / \alpha_c$; alternatively, $\tilde{p}_v$ equals p_v.

$$\tilde{p}_v(i) = \max\left\{\frac{\alpha_v}{\alpha_c}, p_v(i)\right\} \tag{14}$$

Two aspects of leisure demand deserve discussion. First, due to our felicity function, leisure demand does not depend on the household's financial or total wealth position. This accords with empirical evidence (Lumsdaine and Mitchell, 1999). Second, a Kuhn-Tucker condition ensures that

leisure demand does not exceed unity. This holds true for retired workers, who will be assumed below to have zero labour productivity. It also applies to non-retired workers whose productivity falls below a certain level.[8] Our model thus captures the labour supply decision both at the intensive and the extensive margin.

The price of leisure consists of three components:

$$p_v(i) = (1-\tau_p(i))p_l(i) + p_r(i) \tag{15}$$

The first is the age-specific wage rate and the second the pension contributions which are proportional to the wage rate. The third component measures the discounted value of future pension income that can be attributed to the marginal hour of work, $p_r(i)$:

$$p_r(i) = ap_l(i)\sum_{h=j_r}^{j_e}\left(\prod_{l=i}^{h-1}R_b(l+1)^{-1}\right) \tag{16}$$

This component is also proportional to the wage rate.

Our specification of the felicity function implies that the consumption of commodities has a minimum that is strictly positive:[9]

$$c(i) > c_l(i) \equiv -\frac{\alpha_v}{\alpha_c}\frac{v(i)^{1-\beta}}{1-\beta} > 0 \tag{17}$$

Equation (17) demonstrates that this minimum amount of consumption is age-dependent and decreasing in leisure time. Because it relates to leisure time, we call this labour-induced consumption and denote it as c_l. This minimum amount of consumption plays an important role in our consumption equation, which reads as follows:

$$c(i) = c_l(i) + \left(\frac{1}{\alpha_c p_f(i)}\right)^{\frac{\gamma-1}{\gamma}}\left[w^h(i) - w_l^h(i)\right] \tag{18}$$

Here, w^h denotes total household wealth, which we will define below. w_l^h, the wealth that relates to current and future labour-induced consumption, is described by the following equation:[10]

$$w_l^h(i) = E_i\sum_{h=i}^{j_e}\left(\prod_{l=i}^{h-1}m(l+1)^{-1}\right)c_l(h) \tag{19}$$

The second term at the RHS of equation (18) reflects the basic feature of the standard life-cycle model, consumption being proportional with total household wealth. The first and third term however indicate that the life-cycle pattern of commodities consumption deviates from the pattern of this standard model, due to the interaction with leisure demand. In particular, the first and third term taken together establish that the household consumes more (fewer) commodities than prescribed by the standard model in years in which his labour supply is relatively high (low). Our

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8 Actually, as long as labour productivity is below α_v / α_c, our model predicts zero labour supply. This indicates that retirement occurs in our model not only when labour productivity becomes sufficiently low, but also when the preference for leisure becomes sufficiently high.

9 Except if v would be zero, a case that we will not consider.

10 Note, households have expectations conditional on the state of the economy. These expectations depend on the state of the economy only and are time-invariant. We use the method of parameterized expectations (see Heer and Maussner (2005), chapter 3), *i.e.* we project $\sum_{h=i+1}^{j_e}\left(\prod_{l=i}^{h-1}m(l+1)^{-1}\right)c_l(h)$ on the state of the economy at time i using regression methods.

felicity specification thus brings about a positive correlation between consumption and labour supply and, given that labour supply is increasing with the wage rate, between consumption and current labour income. Hence, consumption and current income are more strongly correlated than in the standard life-cycle model, which may help to solve part of the excess sensitivity of consumption that is found in empirical research (Flavin, 1981).

Total wealth is defined as the sum of explicit assets (here, financial wealth) and implicit assets (here, human wealth, denoted w_h^h, and pension rights, denoted w_p^h):

$$w^h(i) = w_f^h(i) + w_h^h(i) + w_p^h(i) \tag{20}$$

Human wealth is defined as the discounted expected value of future after-tax labour income:[11]

$$w_h^h(i) = E_i \sum_{h=i}^{j_r} \left(\prod_{l=i}^{h-1} m(l+1) \right) (1-v(h)) p_v(h) \tag{21}$$

Pension wealth is the accumulation of pension rights minus the pension benefits that have already been paid out, where $\delta_{j \geq j_r}$ equals one for the retirement years and is zero otherwise.

$$w_p^h(j+1) = R_b(j+1)\left[w_p^h(j) + (1-v(j)) p_r(j) - \delta_{j>j_r} y_p(j) \right] \tag{22}$$

The price index of total wealth:

$$p_f(i) = \left[\sum_{h=i}^{j_e-1} \alpha_c^{\frac{1-\gamma}{\gamma}} \prod_{l=i}^{h-1} \left(\frac{R_b(l+1)\phi(l+1)}{\delta(l+1)} \right)^{\frac{1}{\gamma}} \frac{1}{R_b(l+1)\phi(l+1)} \right]^{\frac{\gamma}{\gamma-1}} \tag{23}$$

is a composite of the constant utility weight α_c. As in the standard life-cycle model, the weighting factors refer to two effects. A rate of return higher than the rate of time preference increases savings on account of the substitution effect. The second element of the weighting factor describes the income effect of returns on investments. A high rate of return also adds to consumption possibilities, the income effect. If the intertemporal elasticity of substitution is below unity ($1/\gamma < 1$), the income effect dominates the substitution effect.

Different from the standard life-cycle model is the rate of return $R_b\phi$. This variable measures the certainty-equivalent rate of return. It differs from the risk-free rate of interest because the rates of return on equity and human wealth are stochastic and different from the risk-free rate of interest. The certainty-equivalent rate of return is age-specific. Indeed, pensioners do not own human capital and are therefore not subject to stochastic fluctuations in the rate of return on human wealth. In addition, workers of different age have different amounts of human capital and are therefore differentially affected by shocks in the rate of return on human wealth. The equation for the certainty-equivalent rate of return can be derived as follows:

$$\phi(l+1) = \left[E_i \left(1 + a_n(l) e_n(l+1) + a_s(l) e_s(l+1) \right)^{1-\gamma} \right]^{\frac{1}{1-\gamma}} \tag{24}$$

Here, e_n and e_s are the excess rates of return on human capital and equity respectively. a_n and a_s measure the share of human wealth and equity in total household wealth respectively.

The third dimension of the household's decision problem is the allocation of wealth over bonds and equity. An age-dependent fraction of total wealth net of consumption, $a_s(i)$, is invested

[11] See footnote 11.

in the risky asset (where both total wealth and consumption are corrected for labour-induced consumption):

$$w_s^h(i) = a_s(i)R_b(i+1)\left[\left(w^h(i) - w_l^h(i)\right) - \left(c(i) - c_l(i)\right)\right] \tag{25}$$

The investment share in the risky asset, a_s is implicitly defined by the following two equations:

$$0 = E_i\left(1 + a_n(i)e_n(i+1) + a_s(i)e_s(i+1)\right)^{-\gamma} e_l(i+1) \text{ and } l \in \{n, s\} \tag{26}$$

with a_n the implicit portfolio share of human wealth and:[12]

$$e_n(i+1) = \frac{w_h^h(i+1) - w_l^h(i+1) + R_b(i+1)y_b(i)}{w_h^h(i) - w_l^h(i)} - R_b(i+1) \tag{27}$$

in which y_b is net broad labour income, *i.e.* labour income net of pension contributions but including pension rights and excluding labour-induced consumption: $y_b \equiv (1-v)p_v - c_l$.

The RHS of equation (26) can be approximated by a second-order Taylor expansion around zero. This leads to the following expression for the fraction of total household wealth that is invested in equity:

$$a_s(i) = \frac{\mu_s - \gamma a_n(i)\sigma_{ns}(i)}{\gamma\left[\sigma_s^2 - \mu_s^2\right]} \tag{28}$$

in which $\mu_s / (\gamma\left[\sigma_s^2 - \mu_s^2\right])$ is the tangency portfolio and $(a_n(i)\sigma_{ns}(i)) / \left[\sigma_s^2 - \mu_s^2\right]$ is the income hedge portfolio. $\sigma_{ns}(i)$ denotes the covariance between the excess return on equity and that on human capital. This covariance term is age-specific. It is positive for all working generations. The implicit portfolio share of human wealth can be approximated in the same way

$$a_n(i) = \frac{\mu_n - \gamma a_s(i)\sigma_{ns}(i)}{\gamma\left[\sigma_n^2 - \mu_n^2\right]} \tag{29}$$

The value function is defined as

$$V(i) = \frac{1}{1-\gamma} p_f(i)^{\gamma-1}\left[w^h(i) - w_l^h(i)\right]^{1-\gamma} \tag{30}$$

2.4 The behaviour of retirees

Retirees have zero labour productivity so that $p_v = \alpha_v / \alpha_c$ and $v = 1$. Pre-commitment consumption equals $c_l = (\alpha_v / \alpha_c) / (\beta - 1)$ and the equation for consumption adjusts correspondingly. Importantly, $e_n = 0$ for retirees, since they are not subject to labour income shocks. Hence, the investment share for pensioners does not contain a hedging component and is independent of age:

$$a_s(i) = \frac{\mu_s}{\gamma\left[\sigma_s^2 - \mu_s^2\right]} \tag{31}$$

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[12] The error terms e_n are calculated assuming perfect foresight. A future research step will be replacing this assumption with the rational expectation assumption.

which is comparable with Viceira (2001). This implies that $\phi(i)$ is age-independent for retired people.

2.5 *The behaviour of workers*

The leisure of workers is given by equation (13) and their consumption by equation (18). The investment in equity as a fraction of their total wealth is given in equation (28). A feature of the life-cycle model we employ is that human wealth as a fraction of total household wealth drops to zero at the age of 65. It can be derived that a_n displays a similar pattern. Labour income net of pension premiums is positively correlated with equity return shocks. Consequently, a_s increases over the life-cycle. As the hedging role of human capital diminishes over the life-cycle, households decide to invest an increasing fraction of their total wealth in equity. Although equation (28) is similar to that of Viceira (2001), the hedging demand for equity does not increase with age in that paper. The reason is that all workers in Viceira (2001) face the same probability to become retired, so that human wealth is actually independent of age. We consider our approach more realistic.

2.6 *Pension sector*

Pension funds start each period with a given amount of financial wealth w_f^p. They receive premium income $\tau_p y_{wg}$ from workers ($j < j_r$) and pay benefits y_p to retirees. The remainder is invested in bonds or equity. Assets have a return which is received at the start of next period. Assets evolve according to:[13]

$$w_f^p(t+1) = \tilde{R}_b(t+1)\left[w_f^p(t) + \tau_p(t) y_{wg}(t) - y_p(t) \right] + \tilde{e}_s(t+1) w_s^p(t) \tag{32}$$

in which the macro variables are obtained by aggregation over the age cohorts (for instance $y_p(t) = \sum_j n(t,j) y_p(t,j)$). In this equation τ_p is the pension premium rate and y_{wg} is gross wage income, *i.e.* income before premiums are paid ($y_{wg}(t) = \sum_j n(t,j)(1 - v(j) p_l(j))$. w_s^p denotes the amount that the pension scheme has invested in equity.

The pension benefits for ($j \geq j_r$) are given in pure DB: shocks are absorbed in the premium rate, while the built up remains time-independent. The representative pension fund uses a simple premium rule. It fixes the premium at a rate that gradually reduces deviations of financial wealth from the pension rights

$$\tau_p(t): \; E_t \Delta w_f^p(t+1) = \Delta w_p^h(t+1) - \mu\left(w_f^p(t) - w_p^h(t) \right) \tag{33}$$

The partial adjustment specification in equation (33) implies a gradual adjustment of financial wealth of the pension fund to its liabilities or, alternatively, a gradual convergence of the coverage ratio towards the level of unity. Hence, a deviation of the coverage ratio from one will generally not be eliminated in one period. This is essential, as it means that the pension scheme organizes risk sharing between non-overlapping generations of households, something that the private market is unable to organize. Unlike households, we do not let the pension fund optimize over the portfolio allocation of its financial wealth. We rather fix this portfolio allocation to the level that coincides with the portfolio allocation (for the case without pension funds) of the average household.

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[13] See footnote 5 for notational conventions.

2.7 Alternative model settings

The benchmark version of our model abstracts from annuity markets, so private savings cannot be insured against longevity risk. An alternative model version assumes that annuity markets exist, so that there is full insurance against longevity risk at actuarially fair prices. As mortality rates are age-dependent, effective rates of return are also age-dependent in this case. Another model version assumes exogenous labour supply. In this model version, labour supply is not an instrument of the household optimization problem. A third alternative version assumes fair pension pricing. In this model version, the equation for the uniform pension contribution rate does not apply. Instead, each cohort faces a cohort-specific pension contribution rate, equal to the present value of the marginal pension right.

As the modifications that arise when implementing one of these alternative versions are pretty straightforward, we omit a detailed description with model equations.

3 Calibration and the numerical solution of the base run

The intertemporal substitution elasticity takes a value of 0.5 ($\gamma = 2$). The rate of time preference, $\tilde{\delta} - 1$, takes a value of 1.25 percent. The net risk-free rate, $\tilde{R}_b - 1$, equals 2 percent. The mean and the standard deviation of the excess rate of return on equity, μ_s and σ_s, are chosen to equal 1 and 10 percent respectively.[14]

Total available time a year is scaled to one and the annual gross wage rate to 2. The price elasticity of leisure equals $-1/3$ ($\beta = 3$). The parameters α_v and α_c are chosen such that annual leisure time and annual working time during working ages equal 0.5. This is achieved by taking values for α_v and α_c of 0.25 and 1 respectively.

The pattern of mortality rates is such that cohorts up to the age of 75 have a size of 10 and older cohorts have size equal to that of their predecessor minus 2, so that the last cohort in the model, aged 95-99, has size 2. In the simulations with a pension fund we assume an adjustment parameter $\mu = 0.5$ and an accrual rate $a = 0.0125$ a year.

We start in a world without pension funds and without insurance against longevity risk. These assumptions imply as only source of uncertainty equity income of households.

Figures 1 and 2 give more insight into the life-cycle behaviour of households in the model version without pension funds and without annuity markets. For convenience, we focus on the median case, *i.e.* we present results for the case in which the rate of return on equity equals its mean in all years: $\tilde{e}_s(t) = \mu_s$.

The left panel of Figure 1 portrays the development of financial wealth, human wealth and their sum, total household wealth, as a function of the age of the household. The household accumulates financial wealth during the working phase in order to finance consumption during retirement. Human wealth is highest when households enter the labour market and falls gradually to zero over the working phase.

The right panel of Figure 1 displays average consumption and income as a function of age. Consumption increases during the working ages due to the fact that the return on savings is larger

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[14] The values taken for the mean and the standard deviation of the rate of return on equity are much lower than in the data. This is not so much of a problem, as this paper only *explores* the effects of pension reform. For a more thorough assessment of the issue, obviously more realistic values need to be included. We leave this for future research.

Figure 1

Age Profiles of Wealth (left panel) and of Consumption and Income (right panel)

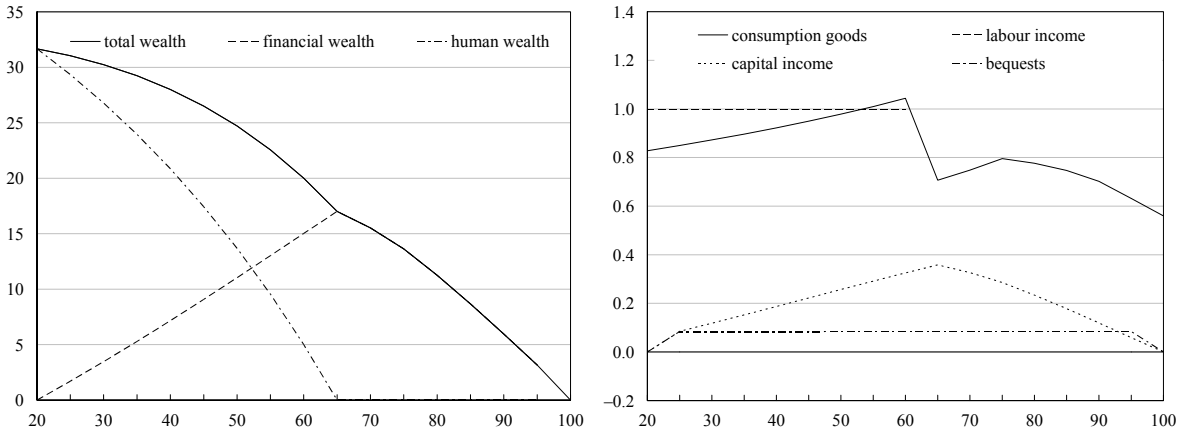


Figure 2

Equity as a Fraction of Total Wealth (left) and Financial Wealth (right)

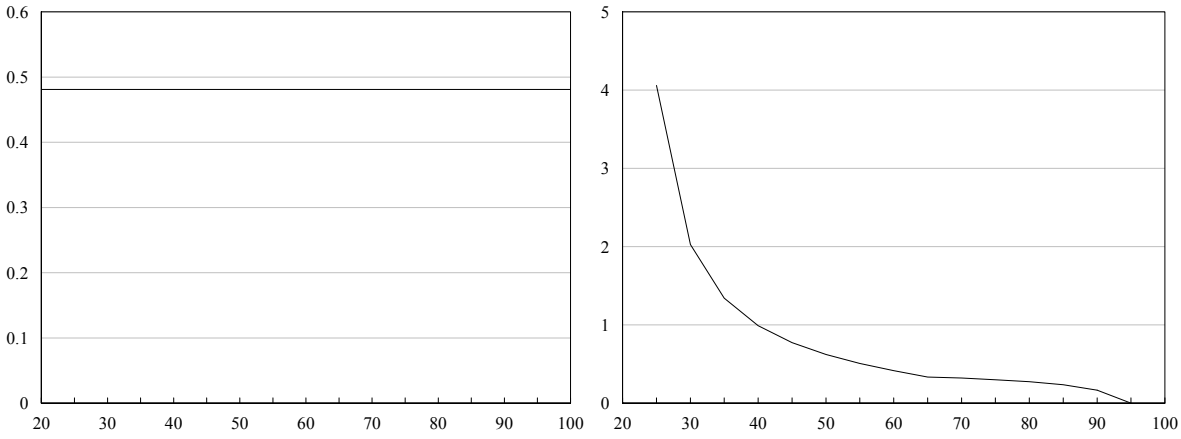
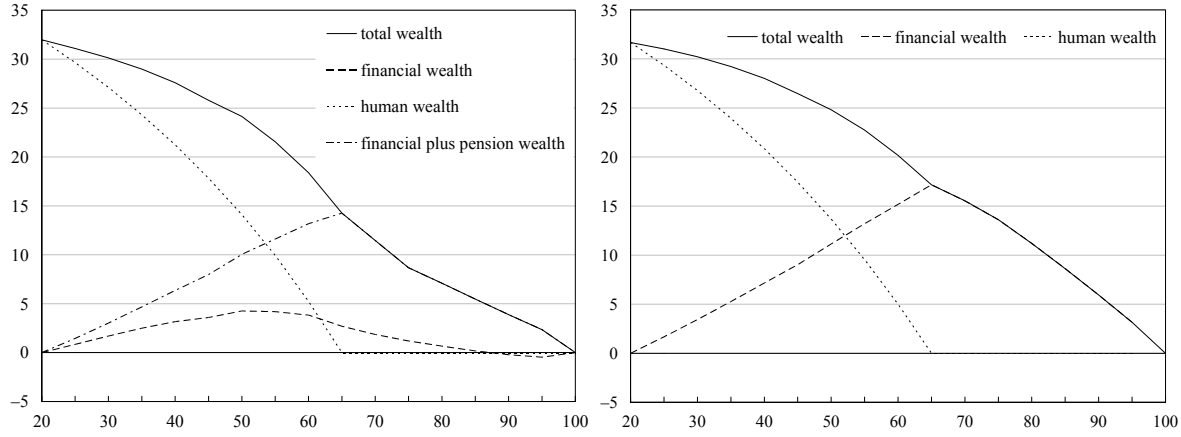


Figure 3

Wealth Profile with (left) and without Pension Funds (right)



than the rate of time preference. At retirement, consumption drops. This may look as a violation of the Euler condition that characterizes optimal consumption behaviour. It is not however. Retirement implies that the household is forced to reduce its labour supply to zero and to start consuming leisure at the maximum rate. In order to achieve marginal utility smoothing, the household then has to reduce the consumption of commodities upon retirement.

After the age of 65, consumption starts increasing again. The increase turns into a decline at later ages. This occurs in the years with a positive death probability. Without annuity markets households prefer to frontload consumption, *i.e.* the time preference increases relative to the return of savings in this period.

There are three sources of income: labour income, capital income and income from bequests. Labour income is generated during the working ages. Capital income develops in line with financial wealth. Bequests are constant over the life cycle. This is based on our assumption that in the absence of annuity markets aggregate wealth of those who die is distributed equally over all living households by the government.

The left panel of Figure 2 displays the fraction of households' total wealth invested in equity. Equity investment as a fraction of total household wealth is constant over the life-cycle, a well-known property of the CRRA function (Merton, 1969; Samuelson, 1969). Since financial wealth as a share of total wealth increases over the life-cycle, the ratio of equity investment over financial household wealth falls over the life cycle. Note that we have assumed perfect capital markets in which there are no short-selling constraints. Indeed, young cohorts start to invest about 4 times their stock of private savings into equity. Only at the age of 40, the share of financial wealth drops below unity and the household no longer needs to go short in riskless bonds.

4 Stochastic Simulations

4.1 Privatising pensions

We draw 100 different stochastic paths. For convenience, we only present the means. This section compares the case with pension funds (left panels) with that without pension funds (right panels).

The accumulation of private financial wealth is slower in the model with a pension fund for the obvious reason that pension savings and private savings are substitutes. It is not that obvious that the sum of private and pension savings in the model with a pension fund is also smaller than private savings in the model without a pension fund. The reason is that the insurance that the pension scheme provides against equity return and lifetime uncertainty reduces the need for precautionary saving, thereby decreasing the accumulation of financial wealth. Figure 4 shows the counterpart of this: the smaller savings in the model with a pension fund imply higher consumption during working ages, but lower consumption at higher ages.

Privatization is calculated to imply a negative welfare effect. Although the pension scheme in our model distorts the labour market in two ways, the insurance that the pension scheme provides to the household against capital income risk and longevity risk obviously dominates. In particular, the welfare loss of privatization equals 13.3 per cent. To see how this effect can be decomposed, the next sections will calculate the effects of the same reform with alternative model versions.

Figure 4

Consumption and Income Profile with (left) and without (right) Pension Funds

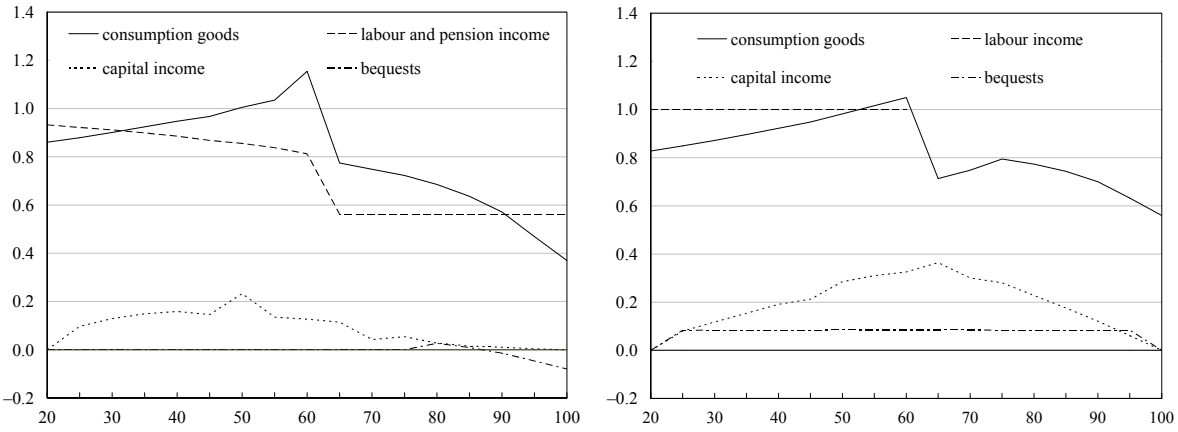
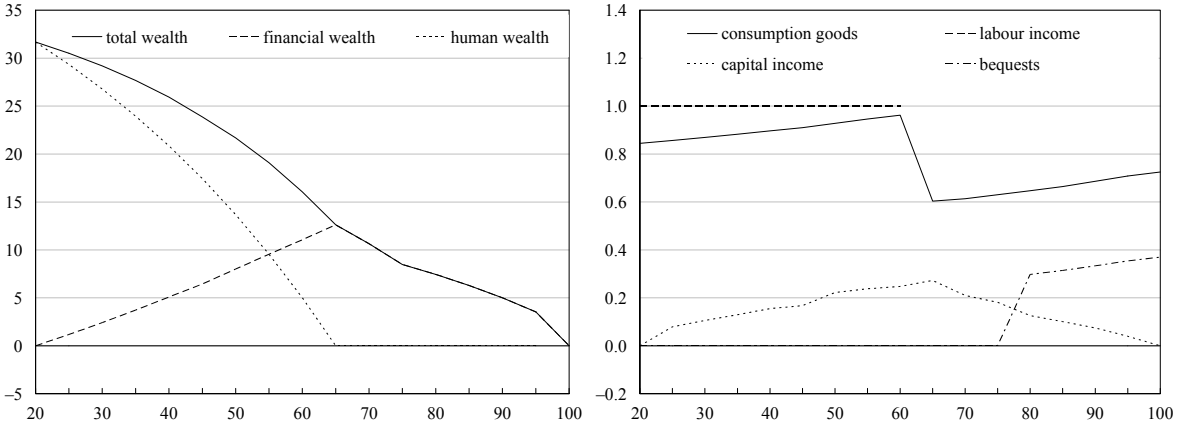


Figure 5

Wealth Profile and Consumption with Annuity Market



4.2 The contribution of annuity markets

The previous section showed a welfare decline of 13.3 per cent for the steady state generations in case pensions are privatised. The absence of annuity markets in the model without a pension fund explains about 8 per cent of this overall welfare decrease. The reason is that without annuity markets, the household needs to hold additional savings to protect himself against under-consumption in case he lives longer as expected. Hence, with annuity markets, he can consume at a higher rate at more advanced ages (compare the right panels of Figure 4 and 5). In order to finance the higher consumption, consumption at lower ages is somewhat reduced.

4.3 The contribution of diminished intergenerational risk sharing

Coverage deficits are reflected in catching-up premiums, levied upon labour income. Similarly, higher than expected returns on equity imply surpluses in the pension scheme that

translate into negative premiums on labour. The two cases have in common that they distort the labour supply decision of individual households. Privatization of the pension schemes removes this effect. This amounts to a 0.8 per cent welfare gain.

4.4 The influence of uniform premiums

The impact of uniform pension pricing when compared with actuarially fair pricing on welfare is about 2.5 per cent. Like catching-up premiums, uniform pension pricing leads to distortions on the labour market. Unlike catching-up premiums which in an average simulation will be close to zero, the implicit premiums that are due to uniform pension pricing are non-zero on an average simulation. They are positive for young workers and negative for old workers. This may help to explain our finding that the welfare gain that stems from the removal of the distortion due to uniform pricing is an order of magnitude larger than the welfare gain attached to the removal of catching-up premiums. Should we include taxes in our model, this conclusion may again be modified. This is beyond the scope of this paper, however.

5 Concluding remarks

Our analysis has shown that privatising a funded DB pension scheme is on net welfare-decreasing. The steady-state loss from privatization is 13.3 per cent. Of this, 8.4 per cent can be attributed to valuable intergenerational risk sharing between non-overlapping generations. This is lost when the scheme is privatized. Another 8 per cent is due to insurance against lifetime uncertainty. This is also lost upon privatization if annuity markets are assumed to be absent. Should we assume that well-functioning annuity markets exist, this part of the welfare loss can be avoided as households can switch to annuity markets to insure against lifetime uncertainty.

Pension schemes like the ones studied here are also known to distort labour markets. The fact that pension contributions are levied on labour income implies that the part of contributions that is used by the pension fund to restore the coverage rate acts as wedge on labour supply, similar to a labour income tax. The elimination of the labour market distortion that is due to the levying of (positive and negative) catching-up premiums produces a welfare gain, albeit quite meagre: 0.8 per cent.

Pension schemes distort the labour market for another reason as well. That is that the accumulation of pension rights and the pension contribution rate do not distinguish between generations. Since, the terminal value of pension contributions decreases with age, this means that young working generations pay more than what is actuarially fair; for older working generations, the opposite holds true. The labour market is distorted along two dimensions. Young generations supply too little labour and older generations too much. Privatization eliminates this inefficiency. The contribution to welfare is calculated to be another 2.5 per cent.

Overall, the welfare implications of labour market distortions are non-negligible, but small when compared to the welfare effects that are due to intergenerational risk sharing. This confirms earlier calculations, like those in Nishiyama and Smetters (2007) and Fehr and Habermann (2008).

Although these findings are interesting, our paper cannot be considered finalized. Future research will add a sensitivity analysis. It will also increase the number of stochastic simulations in order to get a more accurate estimation of the distributions of variables. It will also focus on the effects that will occur during the transition form a public to a private pension scheme.

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THE IMPACT OF THE FINANCIAL CRISIS ON FUNDED PENSION SAVING

Robert Gillingham,[*] Adam Leive[*] and Anita Tuladhar[*]

A key fiscal risk presented by the current financial crisis is its effect on retirement saving. A broad array of retirement plans – public and private, collective and individual – have accumulated a large stock of financial and real assets in recent years that will be used to finance future pension benefits (Figure 1). The level of funding has increased not only in nominal terms, but also as a share of aggregate GDP, with the increase stemming from earnings on existing retirement saving as well as net deposits (contributions less benefits). Deviations from this trend since 1995 occurred in 2000 and 2002. In each of these cases, equity markets were also in decline, more than offsetting the positive returns on some other assets and net contributions (contributions less distributions). The reduction in equity prices that started in 2007 accelerated during 2008. Figure 2 presents indexes of total returns on two broad-based U.S. equity indexes. The indexes equal the value of a $100 investment in each of the portfolios at the end of October 2007, when each portfolio reached its end-month peak. The value of the Dow Jones Industrial Average fell by roughly one-third, and the value of the more broadly based S & P 500 portfolio (and other broad-based portfolios) fell by more than two-fifths. In U.S. dollar terms, European and emerging market equities have fared even worse, although that is likely an exchange-rate artifact (they fared much better in dollar terms before the decline began).

1 Impact of the recent stock market decline on pension fund assets

1.1 Distribution of assets, end-2007

The impact of the stock market on the assets of a pension fund depends on (1) the share of equities in the fund's portfolio and (2) the performance of the particular equities held by the fund. Figure 3 displays pension fund assets at the end of 2007 for those G20 countries for which data are available, as well as several other countries for which data are available. Six countries – the United States, the United Kingdom, Canada, Netherlands, Australia, and Switzerland – accounted for roughly 90 per cent of total pension fund assets. In each of these countries, pension assets equaled at least 90 per cent of GDP, and equities comprised at least 40 per cent of aggregate fund assets. For all countries combined, direct investments in equities comprised almost 45 per cent of total assets, and investments in mutual funds, in which equities play a predominant role, accounted for another 19 per cent.

Figure 3 demonstrates how important equities have been to pension saving, both in the aggregate and for the countries with the largest stock of pension assets. The impact of the stock market declines on a particular country will also depend on how steeply stock prices have fallen in that country (assuming a significant home country bias) and how significant total pension saving is relative to the size of the economy. Figure 4 categorizes countries according to these two variables, as well as the share of equities in pension saving. The domestic stock markets of almost all of the countries have declined by more than one-third. However, only 15 of the 41 countries for which data are available have *either* more than 50 per cent equities in their pension portfolios *or* pension assets greater than 50 per cent of GDP. Only four have all three of these characteristics, but these

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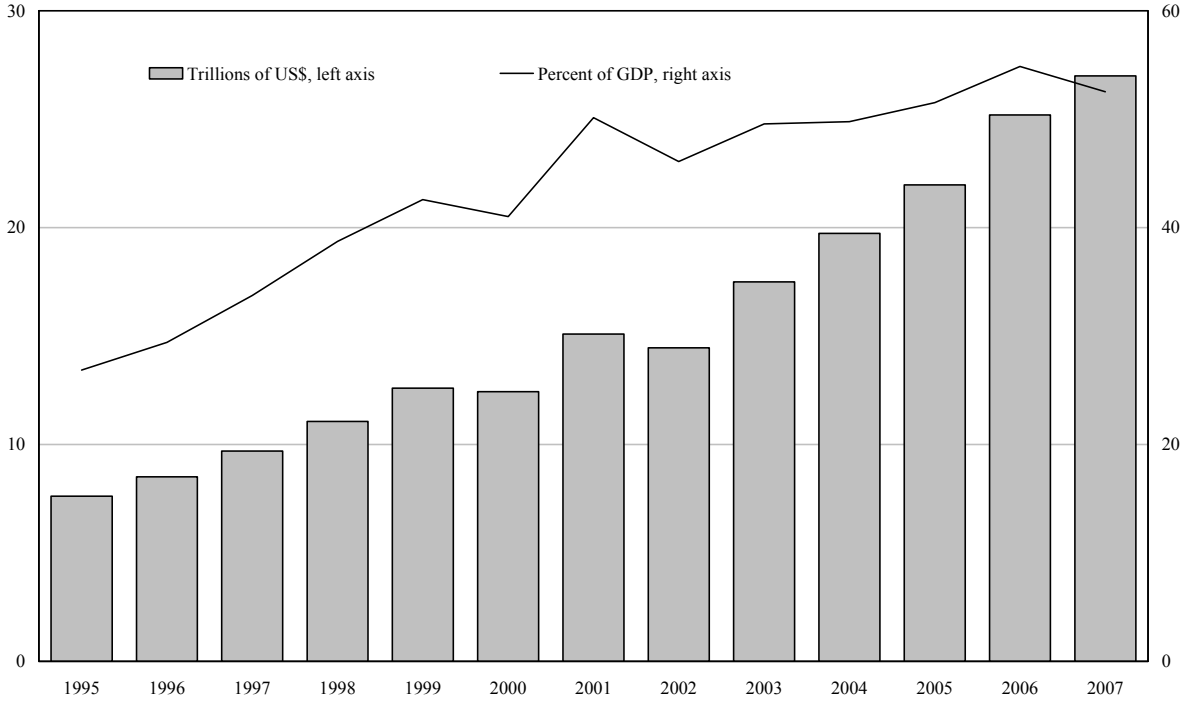
The views expressed in this paper are the authors alone and do not necessarily reflect the views of the International Monetary Fund.

Figure 1

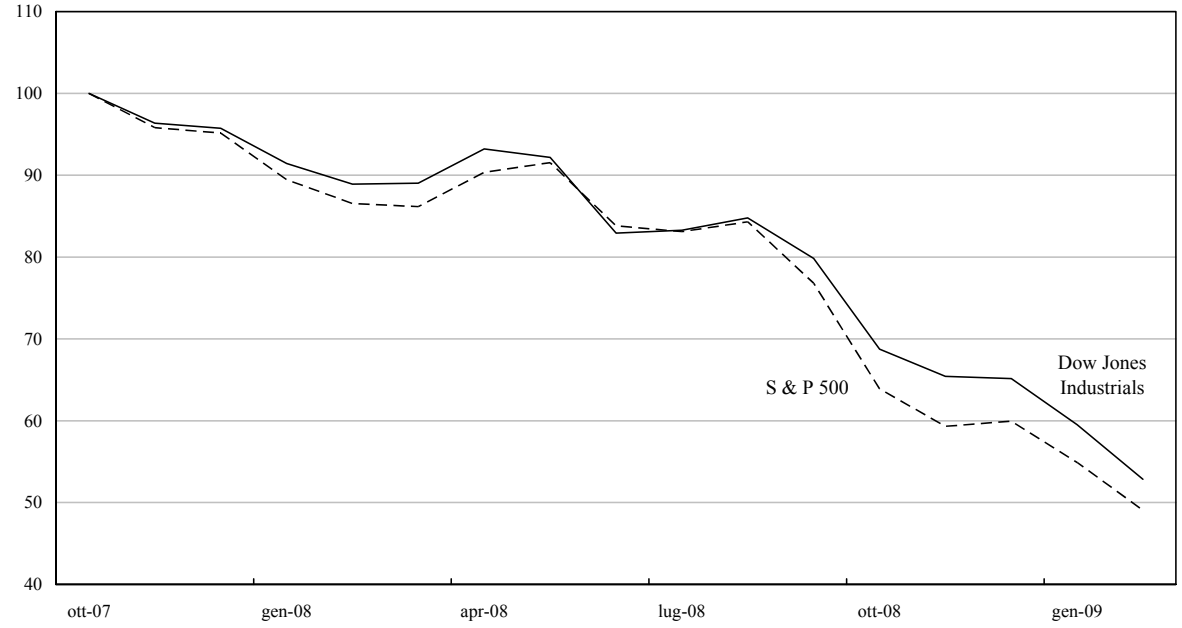
Pension Fund Assets in OECD Countries, End-year 1995 to End-year 2007



Note: Totals include both public and private plans.
Source: OECD Global Pension Database; and staff estimates.

Figure 2

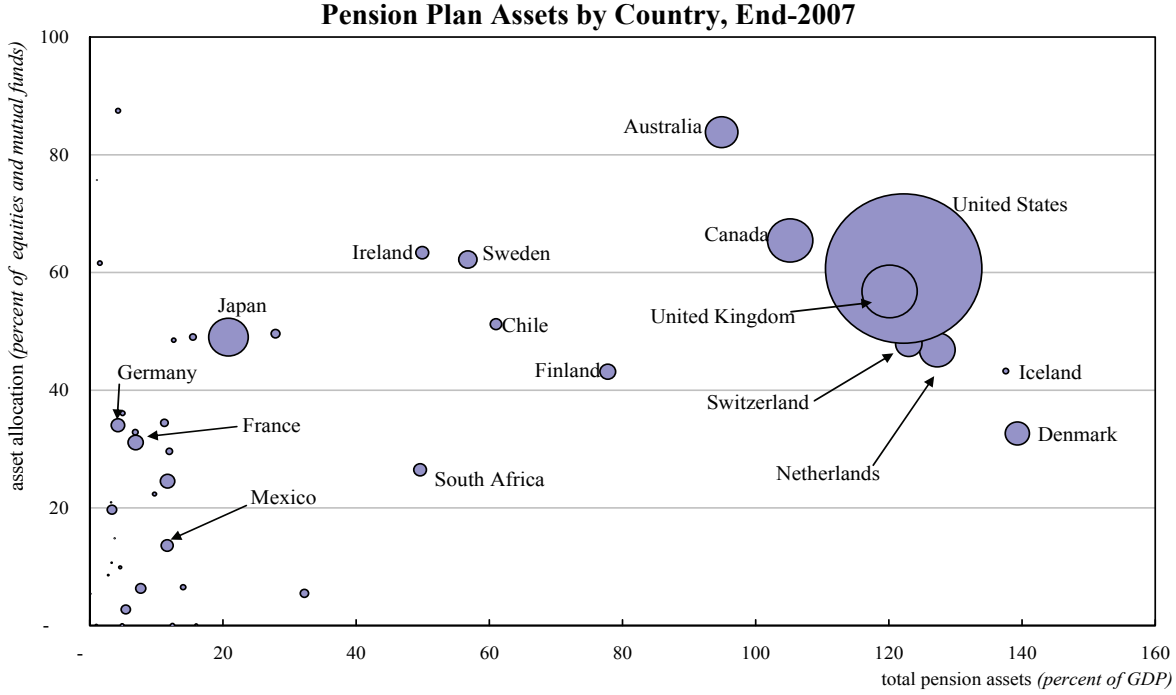
Total Equity Return Indexes, End-October 2007 to End-November 2008



Source: Haver Analytics.

Figure 3

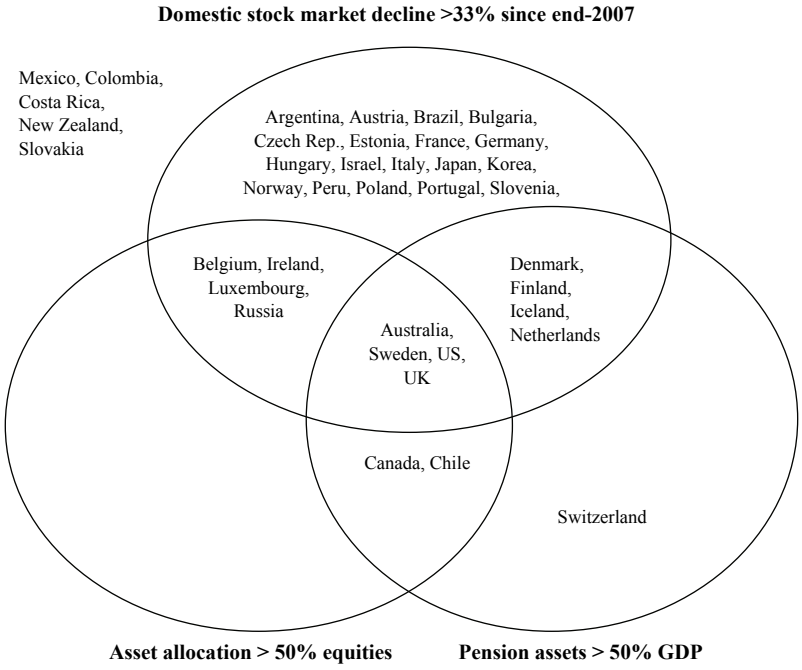
Pension Plan Assets by Country, End-2007



Source: OECD Global Pension Database; and staff estimates.

Figure 4

Pension Fund Assets by Country, End-2007

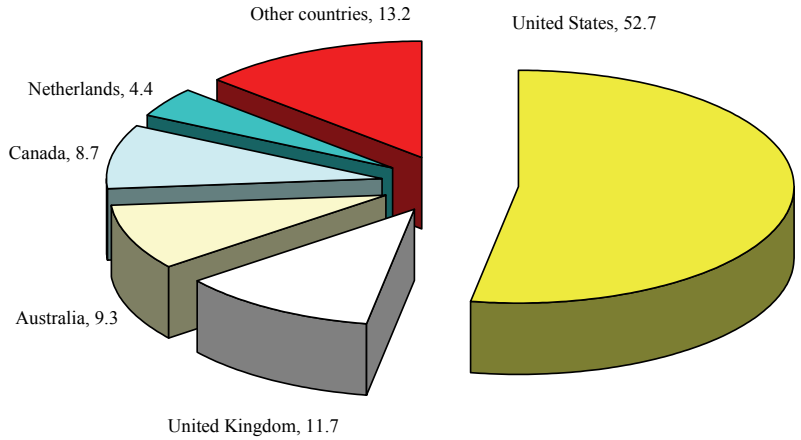


Source: OECD Global Pension Database; and staff estimates.

four countries account for over 80 per cent of pension saving.

Figure 5

Distribution of Equity Losses



Source: OECD Global Pension Database and staff estimates.

1.2 Estimated equity losses

Applying the domestic stock market decline through November 2008 to the equity and mutual fund holdings for each country as of end-2007 yields a rough estimate of the impact of the stock market declines on global pension assets. The aggregate loss from the fall in domestic equity markets was roughly 36 per cent (Appendix, Table 1). In addition, however, European and emerging-market countries have had additional losses in dollar terms due to an exchange rate depreciation of 15 per cent. The total estimated reduction in the aggregate dollar value of equities and mutual funds is 43 per cent or $6.7 trillion. In absolute terms, these losses are concentrated in the countries with the largest holdings. Losses in the United States are roughly $3.5 trillion, representing more than one-half of the total (Figure 5). Other countries with large aggregate losses include the United Kingdom ($0.8 trillion), Australia and Canada (both at roughly $0.6 trillion).

Another important consideration is what the distributional incidence of these losses is likely to be. Among people over age 65 in the United States, for instance, funded pensions and annuities account for 21 per cent of income of the richest income quintile, but just 3 per cent for the poorest (Burtless, 2008). In the U.K., occupational pensions comprise over 30 per cent of income for the richest quintile of pensioners and only 1 per cent for the poorest. Most European countries rely almost entirely on pay-as-you-go, defined-benefit pension schemes. In a few countries, however, funded plans cover a larger share of the retirement income of lower-income pensioners. For instance, all participants in the Chilean pension system invest in individual accounts, although the government does guarantee a minimum pension level. Where pay-as-you-go systems are (partially) funded or augmented with defined-contribution plans, the benefits from these defined-contribution plans are often guaranteed by the government. Consequently, lower-income households will be relying primarily on faith and credit of their governments either to honor their pay-as-you-go promises (see below for a discussion of the difficulties with this option) or compensate them for losses on their defined-contribution schemes that reduce benefits below a specified minimum. Absent significant cuts in government-provided or government-guaranteed benefits, the distributional incidence is likely to be – for the most part – benign.[1]

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[1] A separate risk is pension fund exposure to potentially "toxic" assets, such as mortgage-backed securities and credit default swaps. The OECD has estimated average holdings of 3 per cent of such assets in the portfolios of pension funds that member countries have (OECD, 2008). Structured products – the class of assets within which toxic assets fall – represent about 8 per cent of pension fund assets worldwide. The risk is concentrated in the U.S., Sweden, and Japan.

2 Short- and medium-term responses

An array of economic agents will have to respond to the decrease in pension saving. These responses will depend on how persistent the fall in stock prices is. For this reason, it is useful to distinguish short- and medium-term responses for longer-term responses. These responses can be distinguished depending on whether the plan is defined-contribution or defined-benefit, what entity sponsors the plan, and whether a more broad-reaching government response – with attendant fiscal implications – is appropriate. (In all cases, individuals have the option of adjusting their rate of retirement saving to offset the effects of financial markets on the assets of the official pension plans in which they participate).

2.1 Unprotected defined-contribution plans

For unprotected defined-contribution plans (representing roughly three-quarters of defined-contribution assets), neither the pension plan itself nor the plan sponsor provides any guarantee with respect to the rate of return or the size of benefits. Consequently, the impact of the recent fall in the stock market will fall directly on the individual participant. Of the reported $9.4 trillion invested in unprotected defined-contribution plans as of the end of 2007, $8.0 trillion were in U.S. funds. Roughly $6.8 trillion were, in turn, held in personal accounts, with the remainder in employer-sponsored 401k and similar type accounts. As noted above, these accounts are held primarily by higher-income households, and their responses will likely depend on their age. Younger workers have the luxury of waiting to see if the market recovers. These workers suffered similar losses between 1999 and 2002, but the market had recovered almost completely prior to the recent relapse. Older workers, on the other hand, have less time to recover and are likely to suffer more severe cuts in retirement income. This is especially true if workers would like to purchase annuity with at least some of their retirement saving. The depressed value in their accounts, combined with low interest rates, will make the purchase of annuities far less attractive.

To evaluate the impact of a financial crises on individual retirement saving in the form of equities, we simulate the performance of individual accounts over the past 45 years. We assumed that workers made regular investments in an S&P 500 indexed fund over a 40-year working life. Two profiles of real deposits were simulated, one in which a constant $1,000 is invested each year and one in which the deposits grows smoothly from $667 in the first year to $1,333 in the last year. The only variable within these two profiles is the S&P rate of return, which is allowed to follow its historical path. The results of the simulation are displayed in Figure 6, where the horizontal axis displays the year in which the worker retires.

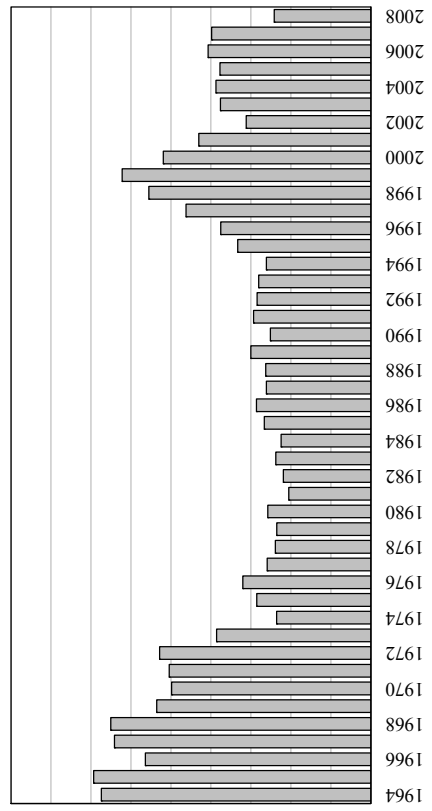
As Figure 6 demostrates, there is a huge amount of inter-cohort variation. The value of the accounts vary from $123 thousand to $400 thousand for the level deposit profile. The variation is comparable for the growing deposit profile ($103 thousand to $347 thousand), although the levels are slightly lower because the a larger share of the deposits occurs later in a worker's career. The real internal rates of return (IRRs) earned on the deposits (the single rate that yields the same account total) show similar variation, ranging from 4.9 to 9.4 per cent for the level deposit profile (4.6 to 9.5 per cent for the growing deposit profile). It is interesting to note, however, that the minimum IRR is over 4.5 per cent in both cases. Moreover, despite the meltdown in the S&P 500 over the past 1½ years, workers retiring at the end of 2008 did not have the worst individual-account performance. In other words, even though the individual accounts produce "lucky" and "unlucky" cohorts, they still provide a reasonable rate of return even for unlucky cohorts.

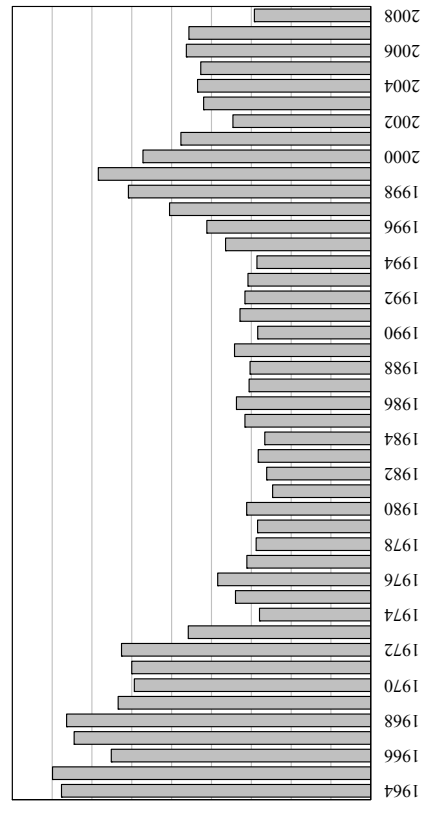
Figure 6

Variation in Performance of Individual Retirement Accounts

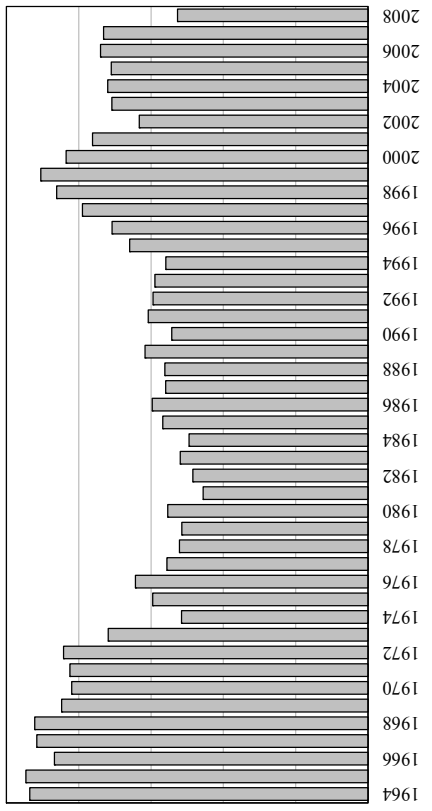
Equal Real Annual Deposits of $1,000 **Real Deposits Double over Working Life from $667 to $1,333**

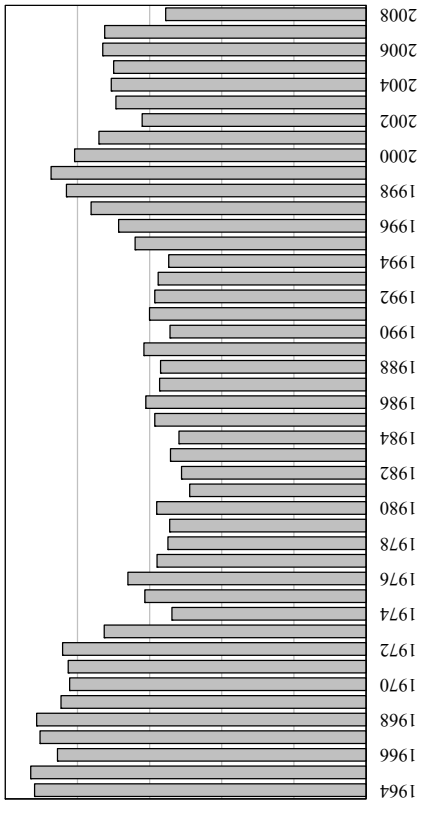
Value of Individual Retirement Account at Retirement *(thousands of dollars)*





Internal Rate of Return on Deposits *(percent)*





Note: Retirement accounts cumulate over 40-year working life with returns equal to historical total returns on S&P 500 portfolio. Label on horizontal axis identifies the final year of contribution.
Source: Haver Analytics and staff estimates.

2.2 Private-sector defined-benefit and protected defined-contribution plans

For these plans, the benefit risk is shared in a variety of ways, depending upon how the plan is structured (OECD 2005):

- "Traditional" DB plan: a DB plan where benefits are linked through a formula to the members' wages or salaries, length of employment, or other factors. In this case, the plan sponsor bears the "rate-of-return risk" – that is, the risk that contributions plus investment returns will be insufficient to cover benefits – but the participant bears the risk that the sponsor will default if it cannot afford the benefits.
- "Hybrid" DB plan or protected DC plan: a DB plan where benefits depend on a rate of return credited to contributions, where this rate of return is either specified in the plan rules, independently of the actual return on any supporting assets (e.g. fixed, indexed to a market benchmark, tied to salary or profit growth, etc.), or is calculated with reference to the actual return of any supporting assets and a minimum return guarantee specified in the plan rules. In this case, the plan sponsor and participant share the rate-of-return risk when it is tied to a market rate or the guarantee applies to benefits, and, again, the participant bears the default risk.
- "Mixed" DB plans: a DB plan that has two separate DB and DC components but which are treated as part of the same plan.

For defined-benefit plans sponsored by private employers, funding rules determine the response, which typically comprises the extent and timing of increase in contributions by sponsoring employers and the degree to which benefits can be reduced or are conditional:

- Rules for Underfunding: Typically, the strength of the guarantee from the sponsoring agency is correlated with the extent of financing provided. The responsibility for closing the funding gap rests largely with the sponsoring agency if the benefits are underwritten by them (Austria, Canada, Ireland, Japan, Portugal, United Kingdom and United States). In countries where the plans are not as strongly tied with the employer and usually underwritten by insurance companies, the burden sharing is generally more flexible (Denmark, Germany, Iceland, Netherlands, Sweden). Nonetheless, even in the former group of countries, the risk can be shared with the members through, for instance, cuts in non-accrued benefits (United States) or accrued benefits with agreement with labor support (Japan).
- Rules for Plan Termination by Solvent Employer: In more severe case of underfunding, with the approval of the pensions regulator, the plans may be terminated by solvent employers. In such a case, detailed rules specify actions such as transfer of the accounts (Austria, Finland, Iceland), purchase of annuities (Canada, the UK, the US), "freeze" of the plan (US), and allocation of assets to members and beneficiaries.

To avert the wind-up of plans, there are increasing demands for temporarily amending the funding rules. Since the requirements for increasing contributions comes precisely at the time of a liquidity crunch faced by companies, several countries are already considering relaxing the time required for making up shortfalls (Canada, USA), valuation methodology, and preventing a freeze of plans. Concerns remain, however, that such a relaxation would affect the long-term health of the plans adversely affecting members and the government in the future.

2.3 Defined-benefit and protected defined-contribution plans for government employees

Pension plans sponsored by governments for their employees represent a sort of "halfway house" between private employer-sponsored plans and national social insurance. This is especially true for pension plans sponsored by subnational governments, where the distinction between social insurance and an employer-sponsored pension plan is typically more sharply drawn. Government

sponsors have a broader menu of possible responses since they can draw on the future taxing power of the government in response to financial market developments. The government options for reform are also different, since they will typically depend on specific legislation rather than a generally applicable regulatory structure.

These plans are important. For instance, as of the end of 2007, almost $4 trillion were held by federal, state, and local government defined-benefit pension plans in the United States (almost one-third of the assets held by occupational pension plans worldwide and more than one-fifth of total U.S. pension assets). The value of these assets had fallen by roughly $1 trillion dollars by October 2008 (Munnell, et al. 2008). Three-quarters of these assets are held by state and local pension plans, which are typically subject to stringent funding requirements. The recent drop in equity prices will trigger requirements to close the resulting funding gap (on a mark-to-market basis, the estimated aggregate funding ratio fell to 65 per cent in October 2008).

3 Central government responses

The responses of the central government fall into four categories:

1) Plan sponsor for national social insurance programs – National social insurance pension plans hold significant assets (Table 2). In some cases, these assets are specialized and largely impervious to financial market movements. (In the United States, the social security system holds $2 trillion in "Treasury specials," which are non-marketable government bonds that can be redeemed at par at any time, that offset a small portion of the present value of future cash flows.) However, in other countries, such as Canada, the Netherlands, New Zealand, and Norway, the national pension system holds a substantial quantity of marketable securities, including equities. The recent decline in financial markets will present these countries with the same challenges faced by private- and public-sector employers. Since national pension systems are not typically fully funded (Norway is a notable exception), the percentage impact on the pension systems will be smaller. This fact provides scant relief, however, since most national pension schemes face significant pay-as-you-go funding shortfalls absent reform.

   Chile is a special case, in which the national social insurance program has been transformed into a system of funded individual accounts. The government guards against risk by providing holders of individual retirement accounts with a choice of portfolios, with one portfolio specifically designed to shield risk for workers near retirement. This "E portfolio" had losses of only 1 per cent over 2008.

2) Pension plan guarantor – A number of countries have pension fund guarantee schemes that offer insurance against the loss of assets in private defined-benefit plans due to employer insolvency. Implemented in 1961, Sweden's guarantee scheme is the oldest and has been followed by the United States (1974), Germany (1974), Ontario, Canada (1980), Switzerland (1986), Japan (1989), and most recently, the United Kingdom (2005). Premiums collected from employers are based on some combination of a flat rate per member, the size of unfunded liabilities, and, in Sweden and the United Kingdom, the risk of sponsor default. The schemes also collect income from investments, which are mostly in fixed-income securities. Equities generally represent less than a third of investment assets across countries. In case of employer insolvency, benefits range across countries, with the United States, United Kingdom, Sweden, and Germany offering relatively higher amounts.

   Partly due to low pricing of premiums, weak funding rules, and limited adjustment for plan sponsor risk, guarantee schemes in the United States, United Kingdom, and Ontario, Canada were in deficit in 2008. The U.S. Pension Benefit Guaranty Corporation (PBGC), which covers 44 million workers, currently has a projected deficit of $11.1 billion in net present value terms.

The smaller Ontario Pension Benefit Guarantee Fund (PBGF), which covers 1 million workers, currently has a deficit exceeding $CAD 100 million. Just three years since its inception, the deficit in the United Kingdom Pension Protection Fund (PPF) stands at 500 million pounds.

The current financial crisis has yet to lead to widespread claims on the guarantee schemes; however, it is possible that the current systemic shock may overwhelm those already in deficit and require government intervention. As a federal corporation, the PBGC represents a sizeable contingent liability to the federal government. Already, the U.S. Congress on December 11, 2008, rolled back part of the Pension Protection Act of 2006, which increased the funding requirements of underfunded plans. (In the United States, however, PBGC benefits are limited to the income and assets of the guarantor agency. Consequently, a surge in defaults would trigger reduced benefits and place additional pressure on the government to allocate additional resources to the agency.) While Ontario's PBGF is not explicitly backed by government, the fund has borrowed money on two occasions: in 1988, it received a $CAD 22 million loan when an automaker failed and in 2001, it received a $CAD 330 million loan when a large steel company did. The United Kingdom's PPF is not explicitly backed by taxpayers. However, should the balance on these schemes substantially deteriorate further, it appears likely that government financial support may be forthcoming.

In addition to creating pension plan guaranty agencies, some governments also guarantee minimum benefits or minimum rates of return to defined-contribution pension plans (Whitehouse, 2007). The recent fall in financial markets significantly increases the option value of these guarantees, increasing the contingent liabilities of the government directly.

3) Pension plan regulator – The national government typically regulates the operation of private-sector pension plans, in particular with respect to funding requirements. The recent fall in pension-plan assets would typically trigger action under these regulations. One option is to adjust funding requirements and, especially, the time within which pension plans have to restore adequate funding levels. Such action could forestall plan defaults.

4) Political pressure – Arguably the largest risk faced by governments with respect to pension funding is the possibility that the government – and, in turn, the taxpayer – will be forced to compensate pension plans for at least a portion of the reductions in asset value they have suffered. This type of contingent liability is more open-ended. As recent calls for government action to compensate homeowners for the loss in house values demonstrate, the call on government resources could approach a significant portion of the recently suffered losses.[2]

4 Longer-term concerns

4.1 Short- and medium-term responses should not compromise fiscal sustainability

The immediate long-term concern with respect to the fiscal impact of the financial crisis is that any short- or medium-term response be consistent with long-term fiscal sustainability. With fiscal responses to the financial crisis and the economic recession threatening to exceed several percentage points of GDP for possibly several years, it is important that any budgetary resources allocated to assist pension funds be carefully circumscribed. As the recovery from the financial crisis in the early years of this decade demonstrated, equity markets can recover quickly. Any assistance to pension plans should be targeted only on those lower-income households for whom

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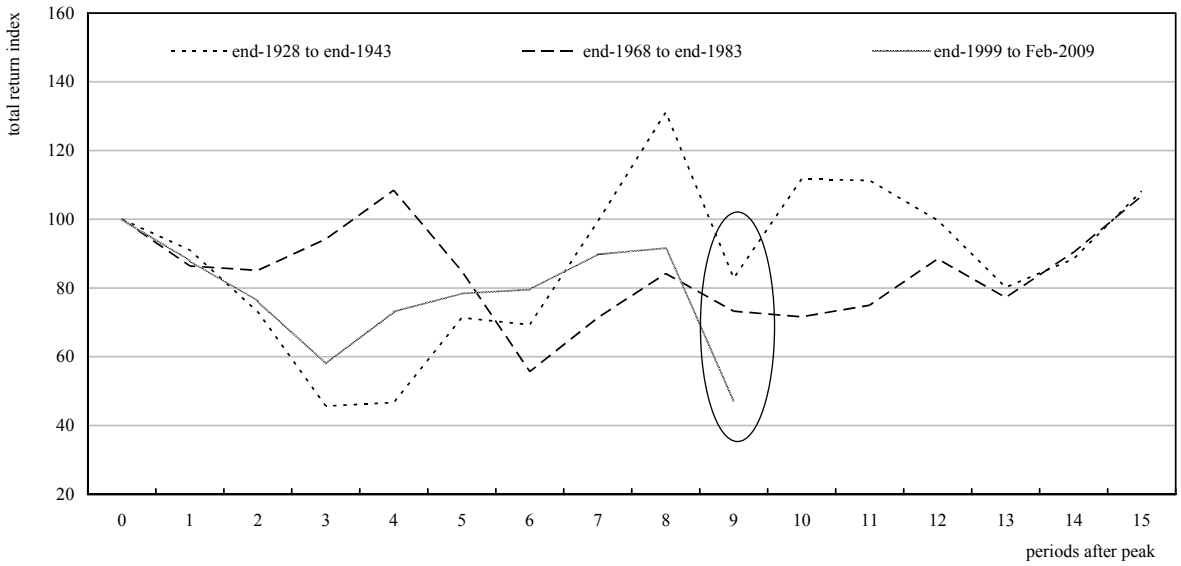
[2] In the United States, pension plans of S&P 1500 companies lost nearly half a trillion dollars in 2008, nearly 80 per cent of which occurred in the last quarter (Mercer, 2009).

Figure 7

Real S&P 500 Total Return Index for Three Extended Market Slowdowns



Source: Haver Analytics.

current retirement income is likely to be seriously reduced. Assistance to higher-income households will either trigger tax increases that these households would be likely to bear or cuts in other, higher-priority spending programs.

4.2 How persistent is the current financial crisis likely to be?

The key long-term concern is whether the current financial crisis is part of a structural break in the dynamics of economic growth and financial-market returns. A relatively short drop in financial markets would have limited and specific effects, primarily for households that are either in or near retirement. On the other hand, a longer structural break similar to that experienced from the end-1968 to end-1983 would have serious consequences for the size and adequacy of retirement saving that go beyond the impact on pension funding levels. Figure 7 presents market return indexes similar to those in Figure 2 for three periods during which equity markets were stagnant for relatively long periods in the United States. During the Great Depression, the value of an investment in the S & P 500 portfolio fell by almost 60 per cent in three years. It recovered in year 8 only to fluctuate above and below its initial value until well into World War II. A similar investment at the end of 1968 never reached a similar low point, but it remained below its original value for 13 of the next 14 years. More recently, an investment at the end of 1999 has yet to recover to its original value after nine years. Moreover, its value at this point is below the value of the investments in the earlier periods after the same number of years.

The more important correlate with the financial market during the 1970s and early 1980s was the structural break in labor productivity growth. Over this period, productivity grew at an annual rate of 1.4 per cent, significantly below the postwar average (through 2008 QIV) of 2.1 per cent. Fortunately, labor productivity growth during the current market slowdown has averaged 2.4 per cent per year, slightly higher than the postwar average. If, however, the current

financial crisis were to persist and be accompanied by a global productivity or growth slowdown, it would seriously impact the ability of countries to address their long-term fiscal challenges, most notable population aging. The impact on the finances of pay-as-you-go pension schemes, where productivity growth is a major determinant of the sustainable steady-state rate of return to pension contributions, would threaten the fiscal sustainability in a broad range of industrial countries, with indirect and serious implications for growth in developing economies.

APPENDIX

Table 1

Funded Pension Saving and Estimated Losses

Country	Total Assets			Total Equities and Mutual Funds			Share of Equities	Stock Market Decline	Exch. Rate Depreciation	Equity & Mutual Fund Losses			
	Billions of Dollars	Share of Total	Share of GDP	Billions of Dollars	Share of Total	Share of GDP				Percent	Billions of Dollars	Share of Total	Share of GDP
Australia	956.5	3.6	96.7	801.6	5.2	81.0	83.8	41.3	24.9	76.4	612.6	9.3	61.9
Argentina	27.7	0.1	9.3	8.2	0.1	2.7	29.6	49.8	9.5	64.0	5.3	0.1	1.8
Austria	18.0	0.1	4.5	6.3	0.0	1.6	35.1	61.2	7.7	73.7	4.7	0.1	1.2
Belgium	18.2	0.1	3.7	16.4	0.1	3.3	90.1	53.8	7.7	65.7	10.7	0.2	2.2
Brazil	288.4	1.1	19.4	174.8	1.1	11.7	60.6	41.2	21.2	71.1	124.4	1.9	8.4
Bulgaria	1.6	0.0	3.6	0.5	0.0	1.1	31.1	79.5	12.6	102.1	0.5	0.0	1.1
Canada	1,475.0	5.5	98.3	955.8	6.2	63.7	64.8	35.0	18.7	60.2	575.8	8.7	38.4
Chile	105.6	0.4	61.2	54.7	0.4	31.7	51.8	22.1	20.3	46.9	25.7	0.4	14.9
Colombia	24.6	0.1	10.9	1.7	0.0	0.8	7.0	31.6	13.4	49.2	0.8	0.0	0.4
Costa Rica	5.0	0.0	17.5	0.1	0.0	0.4	2.1	4.4	10.2	15.0	0.0	0.0	0.1
Czech Republic	8.2	0.0	4.2	0.9	0.0	0.4	10.4	52.7	8.8	66.1	0.6	0.0	0.3
Denmark	438.2	1.6	128.6	148.6	1.0	43.6	33.9	46.6	12.5	64.9	96.5	1.5	28.3
Estonia	1.0	0.0	4.2	0.1	0.0	0.4	9.7	63.5	12.6	84.0	0.1	0.0	0.3
Finland	175.2	0.7	65.6	75.5	0.5	28.3	43.1	53.4	7.7	65.3	49.3	0.7	18.5
France	179.2	0.7	6.4	55.7	0.4	2.0	31.1	42.7	7.7	53.7	29.9	0.5	1.1
Germany	136.5	0.5	3.8	42.7	0.3	1.2	31.3	40.4	7.7	51.2	21.9	0.3	0.6
Greece	0.0	0.0	0.0	0.0	0.0	0.0	5.4	65.5	7.7	78.3	0.0	0.0	0.0
Hong Kong	64.6	0.2	30.0	33.8	0.2	15.7	52.4	48.3	-0.6	47.4	16.0	0.2	7.4
Hungary	15.1	0.1	10.0	4.5	0.0	3.0	30.0	53.3	16.5	78.6	3.6	0.1	2.3
Iceland	27.6	0.1	140.7	11.9	0.1	60.8	43.2	94.4	48.3	188.3	22.5	0.3	114.5
Ireland	118.6	0.4	43.4	78.7	0.5	28.8	66.3	66.2	7.7	79.1	62.2	0.9	22.8
Israel	54.5	0.2	30.9	4.0	0.0	2.3	7.3	46.2	-0.4	45.7	1.8	0.0	1.0
Japan	1,021.0	3.8	22.1	500.3	3.2	10.8	49.0	41.8	-16.1	18.9	94.8	1.4	2.1
South Korea	76.8	0.3	8.0	5.5	0.0	0.6	7.2	40.7	32.0	85.7	4.7	0.1	0.5
Latvia	0.3	0.0	1.1	0.0	0.0	0.0	1.2	45.9	12.7	64.4	0.0	0.0	0.0
Luxembourg	0.5	0.0	1.0	0.4	0.0	0.7	74.0	59.5	7.7	71.9	0.3	0.0	0.5
Mexico	110.4	0.4	10.2	13.7	0.1	1.3	12.4	24.2	16.9	45.3	6.2	0.1	0.6
Netherlands	1,013.4	3.8	120.2	453.0	2.9	53.7	44.7	52.3	7.7	64.1	290.4	4.4	34.4
Norway	27.4	0.1	6.3	8.9	0.1	2.0	32.5	54.3	20.5	86.0	7.7	0.1	1.8
Pakistan	0.0	0.0	0.0	0.0	0.0	0.0	30.4	58.3	22.6	94.1	0.0	0.0	0.0
Peru	19.5	0.1	16.3	10.2	0.1	8.5	52.1	59.8	3.6	65.5	6.7	0.1	5.6
Poland	51.5	0.2	10.4	18.1	0.1	3.7	35.1	51.1	-5.3	43.0	7.8	0.1	1.6
Portugal	34.6	0.1	14.4	16.3	0.1	6.8	47.1	49.7	7.7	61.3	10.0	0.2	4.2
Romania	0.0	0.0	0.0	0.0	0.0	0.0	8.5	69.7	18.2	100.5	0.0	0.0	0.0
Russia	16.0	0.1	1.0	9.8	0.1	0.6	61.6	71.3	10.0	88.5	8.7	0.1	0.6
Slovak Republic	3.1	0.0	3.5	0.3	0.0	0.4	11.2	19.4	-13.3	3.5	0.0	0.0	0.0
Slovenia	1.6	0.0	3.0	0.3	0.0	0.5	16.2	67.5	7.7	80.5	0.2	0.0	0.4
South Africa	201.9	0.8	69.2	34.7	0.2	11.9	17.2	35.4	32.6	79.5	27.6	0.4	9.5
Spain	128.8	0.5	8.2	30.8	0.2	2.0	23.9	39.4	7.7	50.2	15.5	0.2	1.0
Sweden	260.7	1.0	53.9	162.1	1.0	33.5	62.2	38.8	18.6	64.6	104.7	1.6	21.6
Switzerland	505.4	1.9	109.9	243.6	1.6	53.0	48.2	34.8	4.2	40.5	98.6	1.5	21.5
Thailand	12.8	0.0	4.9	1.8	0.0	0.7	14.2	47.6	3.8	53.1	1.0	0.0	0.4
United Kingdom	2,151.4	8.0	76.9	1,222.0	7.9	43.7	56.8	31.3	24.1	63.0	769.8	11.7	27.5
United States	17,076.9	63.6	121.4	10,263.2	66.3	72.9	60.1	33.8	0.0	33.8	3,472.8	52.7	24.7
Total	26,853.2	100.0	59.9	15,471.4	100.0	34.5	57.6	35.7	5.1	42.6	6,592.1	100.0	14.7

Table 2

Pension Reserve Funds

Country	Name	Type	Since	Asset size *(millions $USD 2006)*
United States	Social Security Trust Fund	social security reserve fund	1940	2,048,112
Japan	National reserve funds (incl. GPIF)	social security reserve fund	1959	1,217,551
Norway	Government Pension Fund – Global	sovereign pension reserve fund	1990	278,124
Korea	National Pension Fund	social security reserve fund	1988	190,842
Sweden	National Pension Funds	sovereign pension reserve fund	2000	117,468
Canada	Canada Pension Plan reserve fund	social security reserve fund	1962	86,392
Spain	Social Security Reserve Fund	social security reserve fund	1997	44,875
France	Pension Reserve Fund (FRR)	sovereign pension reserve fund	1999	39,140
Ireland	National Pensions Reserve Fund	sovereign pension reserve fund	2001	23,710
Australia	Future Fund	sovereign pension reserve fund	2006	13,678
Portugal	Financial Stabilisation Fund	sovereign pension reserve fund	1989	8,330
Mexico	IMSS Reserve Fund	social security reserve fund		7,392
New Zealand	Superannuation Fund	sovereign pension reserve fund	2001	6,666
Poland	Demographic Reserve Fund	sovereign pension reserve fund	2002	1,760
Denmark	Social Security Fund	social security reserve fund	1964	659

Note: Social security reserve funds are classified as funds managed and legally ownded by the social security scheme. Sovereign pension reserve funds are classified as being owned by government but "legally assigned to support the social security system or more generally to address fiscal imbalances caused by demographic ageing".
Source: Yermo, J. (2008), "Governance and Investment of Public Pension Reserve Funds in Selected OECD Countries", OECD, Working Paper on Insurance and Private Pensions, No. 15.

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PENSION SYSTEMS IN EMES: IMPLICATIONS FOR CAPITAL FLOWS AND FINANCIAL MARKETS

Ramón Moreno[*] *and Marjorie Santos*[*]

1 Introduction and summary

Pension systems can influence capital flows by affecting saving and investment. At the same time, the growth of pension fund assets has implications for the depth of financial markets. This paper seeks to shed light on these effects, by highlighting three relevant aspects:

- *first, the stage in the demographic transition.* Since around the mid-1960s, lower emerging market economy (EME) fertility rates have meant lower dependency ratios, which has tended to boost saving, and also a rise in the working-age population, which has tended to boost investment. The transition has worked out as predicted in some countries but not in others. In particular, in the aftermath of crises (e.g., Asia in the late 1990s), saving and investment have tended to fall, and current account balances to rise. Nevertheless, current account surpluses are expected to fall or turn to deficits as populations age in coming decades. In some countries, this process has already begun.
- *second, pension system design.* National saving could be affected by how pension benefits are financed. Recent reforms have favoured plans based on defined contribution and prefunding, moving away from defined benefit and pay-as-you-go plans. However, with a few exceptions, it is not clear that such pension system reforms have helped increase saving. This could be due to lower precautionary saving, transitional fiscal costs associated with pension reforms, problems with low or declining pension fund coverage, and high costs.
- *third, pension fund asset accumulation and financial deepening.* Rapid growth in pension fund assets appears to be associated with deeper financial markets in a number of EMEs. This could also influence capital flows by affecting saving and current account balances, as well as the pattern of gross capital flows.

2 Stages in the demographic transition

The demographic transition in EMEs over the past 40 years may be described as follows. In a first stage, which began around the mid-1960s, declining fertility rates[1] resulted in an increase in the working-age population and a decline in the share of the dependent young, with only a gradual increase in the share of the elderly population (Table 1).[2] The result has been declines in overall dependency ratios (the ratio of dependent young plus elderly to the working-age population) from around the mid-1960s to the present. (Annex, Figure 8). However, this stage of the demographic

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[*] Bank for International Settlements (BIS). The views expressed in this paper are those of the authors and do not necessarily reflect those of the BIS. The authors thank, without implicating, Már Gudmundsson, Philip Turner and William White for valuable comments. Contributions by Pablo García-Luna and Jimmy Shek to this paper are also gratefully acknowledged. This paper first appeared in BIS (2008) and covers the period to about 2007, before the full impact of the crisis was felt in EMEs. A final section has been added to highlight some issues associated with the implications of the global financial crisis.

[1] Lee (2003), Figure 2, observes that fertility rates in developing countries began to fall in the 1960s. This reflects factors that raise the opportunity costs of bearing children. Such factors include increased productivity of labour, which raises the value of time for parents, increased investment in children because of higher incomes and higher returns on education (due to longer life spans and greater demand for more skilled workers) and higher rates of urbanisation. Certain developments reduce the value of children, such as government provision of a safety net or the availability of pensions.

[2] The population forecasts are taken from the United Nations *World Population Prospects*, the most widely used source for population forecasts. The forecasts assume medium fertility.

Table 1

Changes in Population Shares[1]
(percent)

Country	1950–65			1965–2010			2010–50		
	Young[2]	Working[3]	Elderly[4]	Young[2]	Working[3]	Elderly[4]	Young[2]	Working[3]	Elderly[4]
China	6.6	–6.1	–0.5	–20.6	15.0	5.5	–4.3	–14.3	18.6
India	4.0	–3.9	–0.1	–10.8	8.1	2.7	–12.5	0.2	12.3
Other Asia[5]	2.7	–1.9	–0.8	–17.5	12.6	5.0	–9.1	–7.4	16.4
Latin America[6]	2.8	–3.4	0.6	–16.5	12.2	4.3	–9.6	–5.6	15.3
CEE[7]	0.9	–2.6	1.8	–14.6	7.2	7.5	–0.5	–15.1	15.6
Other EMEs[8]	2.9	–3.1	0.2	–13.8	12.1	1.8	–9.4	–2.7	12.1
Memo:									
United States	*3.3*	*–4.3*	*1.0*	*–10.2*	*5.6*	*4.6*	*–2.9*	*–5.9*	*8.8*
Japan	*–9.5*	*7.6*	*1.9*	*–12.6*	*–8.1*	*20.7*	*–2.1*	*–11.6*	*13.7*
Western Europe[9]	*1.0*	*–3.6*	*2.6*	*–7.8*	*1.8*	*6.0*	*–0.9*	*–8.5*	*9.3*

Aggregates are weighted averages based on total population data for 2000.
[1] Population in each age group as a share of total population. [2] Population aged 14 or less. [3] Population aged 15–59. [4] Population aged 60 and above. [5] Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore and Thailand. [6] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [7] The Czech Republic, Hungary, Poland and Russia. [8] Saudi Arabia, South Africa and Turkey. [9] France, Germany, Switzerland and the United Kingdom.
Source: United Nations, *World Population Prospects*.

transition is over or will end in the next couple of decades in some EMEs. Many countries are entering a second stage in which child dependency ratios are falling more gradually or have stabilised while elderly dependency ratios are rising more steeply (three right-hand columns in Table 1). As a result, projections up to 2050 indicate that overall dependency ratios will generally tend to rise. The implications of these trends for rates of investment and saving are discussed below.

2.1 Implications for saving, investment and capital flows

To see how the demographic transition would affect capital flows, it is worth recalling that a country's net capital flows, or net financing requirements, depend on the current account balance CAB_t, which in turn reflects the behaviour of saving (Sav_t) and investment (Inv_t). That is:[3]

$$CAB_t = Sav_t - Inv_t \quad (1)$$

The implications of demographic changes for saving and investment would depend on the stage in the demographic transition. When populations are relatively young, increases in the labour

[3] In this paper, current account and investment data are used to estimate national saving.

Table 2

Saving, Investment and Current Account[1]

Country	Change from 1980-2006 (*percent*)[2]			Level in 2006 *(percent)*		
	Saving	Investment	Current Account	Saving	Investment	Current Account
China	19.5	10.1	9.4	54.1	44.6	9.4
India	15.0	14.8	0.2	33.8	34.9	–1.1
Other Asia[3]	3.5	–5.3	8.8	30.8	25.6	5.2
Latin America[4]	0.9	–4.1	5.0	21.9	20.1	1.8
CEE[5]	2.2	–2.6	4.8	25.9	21.1	4.8
Other EMEs[6]	–11.4	–2.5	–9.0	25.8	21.2	4.7
Memo:						
United States	–7.0	–0.7	–6.2	13.9	20.0	–6.2
Japan	–3.8	–8.7	4.9	28.0	24.1	3.9
Western Europe[7]	–1.8	–3.8	2.0	20.3	19.0	1.3

[1] As a percentage of GDP. [2] For CEE, change from 1992–2006. [3] Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore and Thailand. For this group, saving and investment increased by about 7 percentage points from 1980–96. [4] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [5] The Czech Republic, Hungary, Poland and Russia. [6] Saudi Arabia, South Africa and Turkey. [7] France, Germany, Switzerland and the United Kingdom.
Source: IMF, *World Economic Outlook*.

force would tend to raise the marginal product of capital, supporting higher rates of investment spending. At the same time, the falling overall dependency ratios resulting from lower fertility and child dependency would allow households to increase their rates of saving. (This is sometimes described in the literature as the first demographic dividend).[4] Conversely, when populations are relatively old, the declining labour force would tend to lower rates of investment while the increases in overall dependency associated with ageing populations would tend to lower saving.

To shed some light on these demographic effects, Table 2 summarises trends in saving and investment over the past quarter century, with more details in Annex, Figure 9.

Table 2 covers the period 1981-2006, for which data on saving and investment in EMEs are more readily available. As working-age populations tended to increase during this period, investment would have been expected to rise. At the same time, declining overall dependency ratios would tend to increase saving rates. However, Table 2 gives a much more mixed impression. In line with expectations, both saving and investment in China and India increased sharply over the period as overall dependency ratios fell, while declining in Japan where (reflecting a rapidly ageing population) dependency ratios have risen for some time now. However, contrary to expectations, increases in saving in the remaining EMEs have generally been modest, and investment ratios have generally declined. One reason is the effect of crises which appear to have persistent effects in

[4] The ultimate effects on national saving would depend on a variety of other factors. For example, the growth in output associated with higher investment and embedded total factor productivity growth could further increase household saving, corporate and government saving. However, household saving would tend to fall at higher levels of wealth. In line with this, empirical studies find that growth is associated with higher household saving, but higher real per capita income is associated lower household saving. (see, e.g., Loayza *et al.*, 2000 and Bulíř and Swiston, 2006).

dampening national saving and investment. In particular, the Asian crisis of 1997-98 obscures the very large increases in investment and saving that occurred in the region until 1996 (see footnote 3 in Table 2). Indeed, Bloom and Williamson (1998) find that increases in investment and saving rates (with the former exceeding the latter) were apparent in East Asia up to the first half of the 1990s as overall dependency ratios fell (Annex, Figure 9). They conclude that the increase in working-age relative to dependent population contributed to East Asia's so-called economic miracle. The effects of earlier crises also appear to have dampened saving and investment growth in Latin America. In the case of the United States, the sharp decline in saving appears in part to reflect perceived increases in wealth associated with rising asset prices, and the emergence of a financing technology (home equity financing) that increased the liquidity of the wealth held by households.

The ambiguity of the results in Table 2 highlights the extent to which factors other than demographics can play an important role in influencing national saving and investment.

As for current accounts, there appears to have been an extended cycle in which a number of EMEs started with current account deficits but more recently – often in the aftermath of crises – have experienced current account surpluses.[5] Demographics would predict that over time, EME current account surpluses would turn to deficits again. For example, a recent study (IMF, 2004) covering 115 countries found that investment tended to exceed saving on average over the sample period. However, a rise in the share of the working-age population tended to increase the saving to GDP ratio more than it increased the investment ratio (by 0.72 and 0.31 respectively).[6] A rise in the share of the elderly population tended to reduce the saving ratio more than it reduced the investment ratio (by –0.35 and –0.14 respectively). This implies that the current account balance would tend to rise with a larger share of the working-age population, and fall in response to ageing in the population.[7]

Looking ahead, a question of interest is to what extent ageing is already affecting saving and investment or might do so in the near future. Table 1 (three right-hand columns) indicates that particularly sharp declines in the shares of working-age population and increases in the shares of the elderly are projected for CEE and China. The declines in shares of working-age population and increases in elderly population are roughly comparable to those already observed in Japan. In CEE and China, and some other countries, the projected rise in elderly dependency is comparatively steep (Annex, Figure 8).

This implies that saving and investment might be expected to fall and current accounts tend to deficit in CEE and China sooner than in other countries. However, as discussed earlier, there is considerable uncertainty about the timing of these effects because of the influence of other factors on saving and investment. For example, Singapore's population has been ageing for some time now, and elderly and overall dependency ratios are projected to rise more steeply than in other countries (Annex, Figures 8 and 9). However, while saving and investment ratios have fallen, Singapore's saving remains well above the average for EMEs, while investment ratios are somewhat above average.

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[5] In the aftermath of the Asian crisis, these surpluses reflected declines in investment that exceeded declines in national saving. See Moreno (2007).

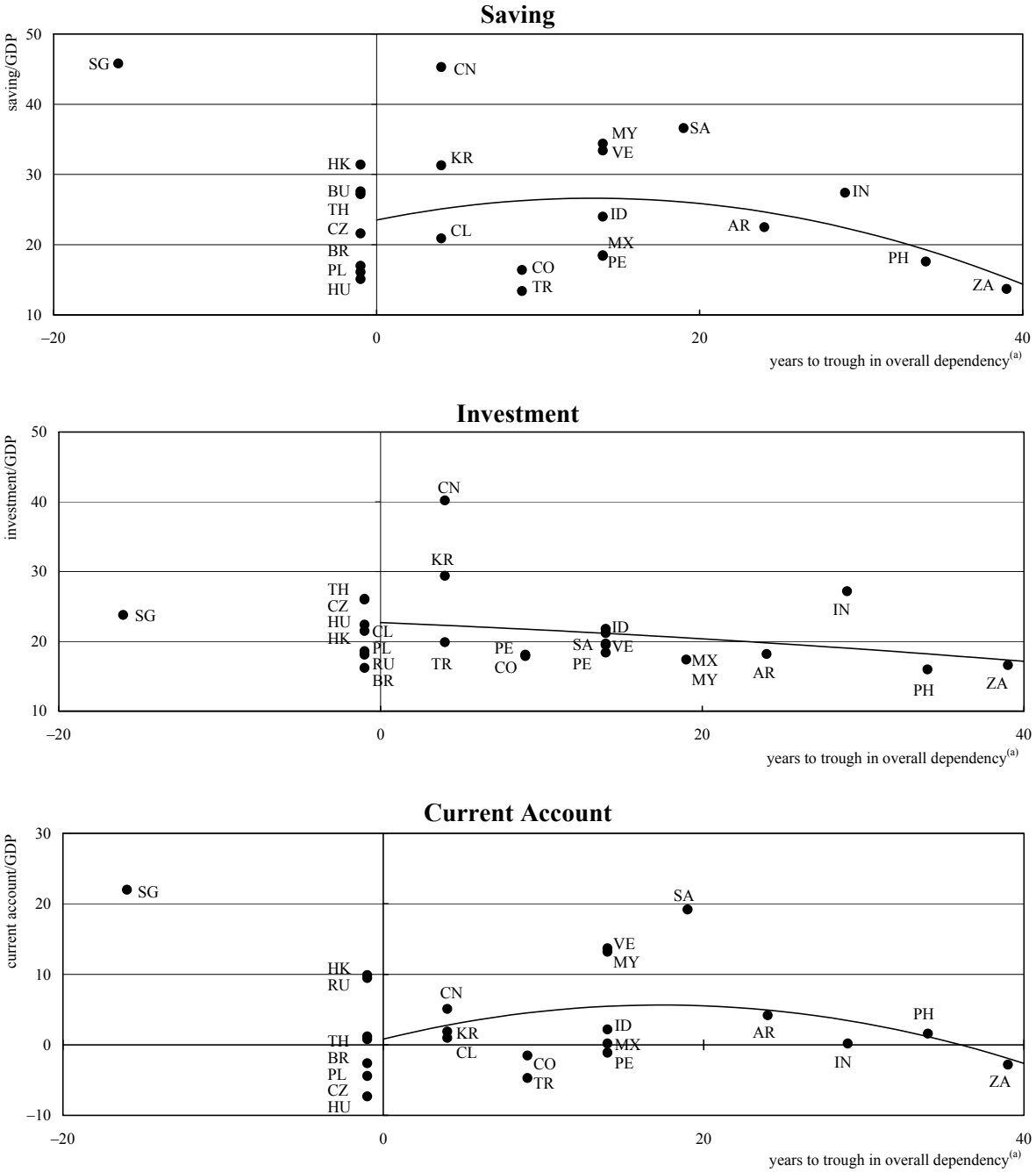
[6] IMF (2004), Table 3.1, page 143, estimates that in a panel of 115 countries over the period 1960-2000 a rise in the share of the working-age population was associated with an increase in real GDP per capita, while a rise in the share of the elderly population was associated with a decline.

[7] Additional perspective is provided by a study by Bulíř and Swiston (2006), Table 2, who estimate the effects of changes in overall dependency ratios on private saving in a cross-section analysis of 44 developed and emerging market economies. They find that in this decade, a 1 point increase in the overall dependency ratio is associated with a 0.3 percentage point decline in the ratio of private saving to GDP. The association is higher (0.63) in industrial countries, and has risen compared to the 1990s (see also Loayza *et al.*, 2000). Furthermore, Asian economies are found to save more than is predicted in the model, and until the end of the 1990s, Latin American countries tended to save less than predicted. These regressions explain between two thirds and three fourths of the cross-country variance of the private saving rate.

Figure 1

Saving, Investment, Current Account and Years to Trough in Dependency Ratios

(average of 2002-08, percent)



AR=Argentina; BR=Brazil; CL=Chile; CN=China; CO=Colombia; CZ=Czech Republic; HK=Hong Kong SAR; HU=Hungary; ID=Indonesia; IN=India; KR=Korea; MX=Mexico; MY=Malaysia; PE=Peru; PH=Philippines; PL=Poland; RU=Russia; SA=Saudi Arabia; SG=Singapore (not included in the regression, but the data points are shown in the figure); TH=Thailand; TR=Turkey; VE=Venezuela; ZA=South Africa.

(a) Where 2008=year 0. Overall dependency ratio is defined as the population less than 15 years of age plus population 80 years or older divided by the population of 15-59 years-olds.

Source: IMF and United Nations.

Additional perspective can be gained from Figure 1, which relates saving, investment and current account balances to the years to trough in overall dependency in a small cross-section of EMEs. In each Figure, countries on the right side of the x-axis are younger, implying higher overall dependency ratios (because of high child dependency). Moving left on the x-axis towards zero, overall dependency ratios are low (reflecting higher working-age populations and lower child dependency ratios). Dependency ratios then rise again in response to a rising share of elderly population and lower share of working-age populations. Focusing first on saving (left-hand panel), we would expect a non-linear relationship in which saving is low in countries where the population is young (right side of the axis), tends to rise towards the middle of the Figure and then declines when approaching the zero point of the x-axis or past it. A quadratic regression line broadly reveals such a relationship in saving and in the current account. (The regression line for investment turns out to be linear). Again, caution is needed in interpreting these results because of wide dispersion in the data. In particular, Singapore is a significant outlier with an older population and very high rates of saving.[8]

3 Pension system design

A key challenge faced by pension authorities is to generate enough resources to meet pension liabilities given a desired level of coverage and replacement income while minimising the burden on the working-age population. In this connection, there has been much discussion of how to fund pension benefits, and specifically on the extent to which countries should rely on income transfers or (alternatively) accumulated assets to finance retirement spending. National practices appear to vary considerably. Drawing on research by the National Transfers Account project, Lee and Mason (2007) estimate that reliance on assets has been comparatively high in Thailand and the United States, and comparatively low in Japan and Taiwan, China (Figure 2).[9]

Some of these differences could reflect different institutional arrangements for financing old-age consumption, including differences in pension design and coverage. Traditionally. pension systems have relied on defined benefit (ie guaranteed incomes) pay-as-you-go systems, in which taxes on workers fund the pension incomes of the elderly. However, these systems tended to create very large implicit pension debts that, since they were not fully funded, raised concerns about the adequacy of replacement incomes and potential fiscal burdens. In particular, unfunded systems in which payments have to be implemented via transfers from the working-age population (e.g., traditional pay-as-you-go systems) raised concerns about increasing burdens on a declining pool of workers. Projected declines in the share of workers and increases in the share of elderly dependents in the population (Table 1, three right-hand columns) imply increases in elderly and overall dependency ratios. The issue is of particular interest in countries where populations are ageing more rapidly (e.g., CEE, Korea and China).

The potential financing problems that can arise in more traditional pension systems are illustrated by the experience of Korea, where the pension system is a *partially funded defined benefit* system managed by the government.[10] Holzmann *et al.* (2004) note that reserves accumulated through the public pension system were low compared to the estimated implicit pension debt (IPD), respectively 10 and 47 per cent of GDP, 10 years after the scheme was introduced. It was estimated that the fund would be completely exhausted within the first half of

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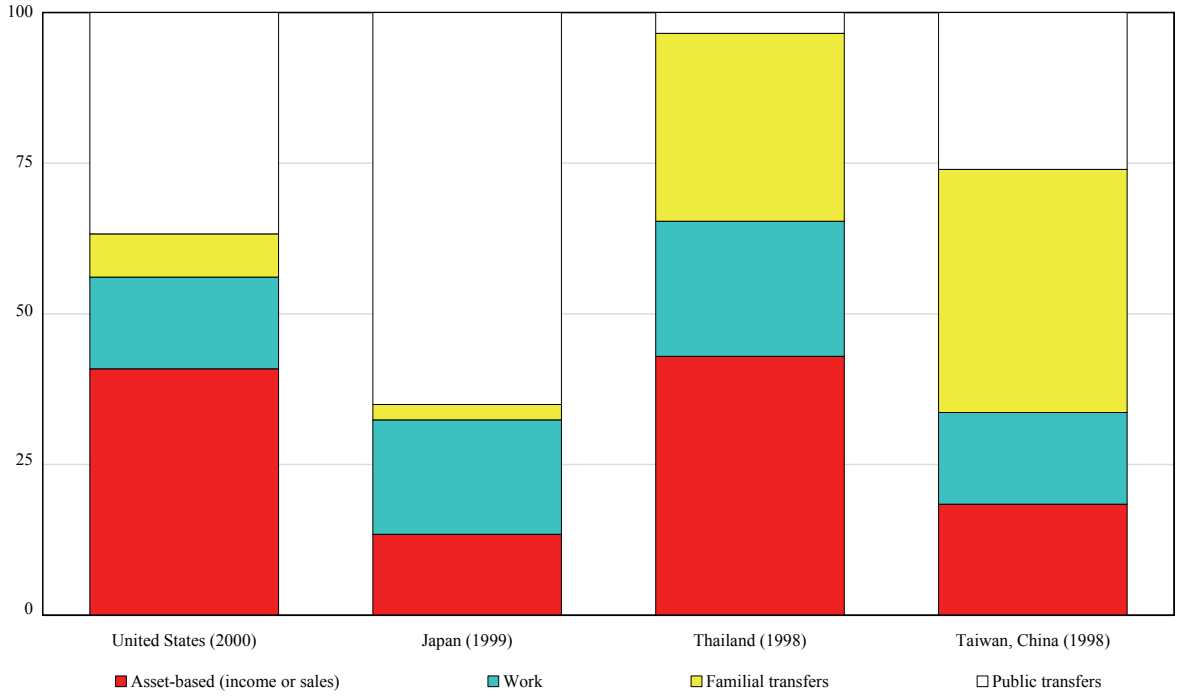
[8] Singapore is such an outlier that it was not included in the regression analysis. However, all other countries shown in the figure were included in the regression.

[9] At the same time, however, there appears to be significant reliance on familial transfers in Thailand and Taiwan.

[10] However, in 2007, the National Pension Service (NPS) mandated several investment banks (Morgan Stanley, Credit Suisse) to manage part of its assets. See Song Jung-a, "S Korea turns to global banks on pensions", *Financial Times*, 25 July 2007.

Figure 2

Financing of Old-age Consumption
(percent of total consumption)



We thank Ronald Lee for permission to use this figure.
Source: Lee and Mason (2007).

the 21st century.[11] One difficulty is that payment promises in a defined benefit plan do not depend on a pension system's performance or ability to accumulate assets. Another difficulty pertains to incentives to save under these arrangements discussed below.

Recent pension legislation (e.g., in Latin America) has instead sought to encourage wealth accumulation via personal saving to fund retirement consumption. In particular, there has been more emphasis on defined contribution, rather than defined benefit, which reduces the implicit pension debt. For example, Chile's pension system (introduced in 1981) is a *fully funded defined contribution* system of mandatory individual accounts managed by private pension fund administrators (AFPs). In the 1990s, eight emerging market economies implemented pension reforms similar to Chile's.[12]

In assessing the extent to which pension reforms of this latter type could reduce the burden on the working-age population, it is worth noting that in a closed economy, consumption by the old would always involve some transfer of resources away from the young. In a pay-as-you-go system, the transfer would involve the payment of taxes (e.g., for social security, as in the United States). In

[11] The precise estimated dates vary: by 2031 according to Moon (2002) and by 2047 according to the Ministry of Health and Welfare (Bateman, 2007).

[12] These are Peru (1993), Argentina and Colombia (1994), Uruguay (1995), Mexico and Bolivia (1997), El Salvador (1998) and Poland (1999). In contrast, Brazil has not adopted individual accounts and recently introduced a notional defined contribution system, which links contributions to benefits, but the contributions are not placed in individually funded accounts (Matijascic and Kay, 2008).

a fully funded system with private accounts (e.g., as in Latin America) the transfer would involve the payment of rent, interest income or dividends to, or purchases of assets from, retirees. Nevertheless, a fully funded defined contribution system can still reduce the burden on the working-age population if over time it increases saving and the stock of capital of the economy. Higher capital/labour ratios would raise worker productivity, making it easier to sustain any given level of elderly consumption out of current income. In an open economy, burdens on the working-age population could also be reduced via the accumulation of foreign assets, which can result from additional saving, or the diversification of pension fund portfolios (see below). This would reduce claims on domestically produced goods and services at the time of retirement (compared to the case of pay-as-you-go financing or domestic investment only).

Reformed pension systems could increase the incentive to save and reduce evasion because pension contributions are not transfers to others but are savings explicitly accruing to the individual.[13] However, the impact on saving rates of pension reforms similar to those adopted in Chile does not appear to be large.[14] Saving ratios in countries listed earlier as having adopted these reforms have generally not increased markedly over time (Annex, Figure 9). In Poland, for example, sharp increases in saving rates pre-date the 1999 pension reforms, and national saving rates have by and large drifted downwards since the reforms were adopted. In Latin America, saving rates are still comparatively low, and increases in some cases have only offset earlier declines.[15] An exception is Chile, where national saving rates have risen since the adoption of pension reforms in the 1980s.

Several factors may have limited the impact of pension reforms on national saving:

- *lack of financial literacy*. Pension reforms will not increase saving if contributors are not aware of the possible returns from saving. Some recent survey data from Chile suggests that many pension contributors (up to around 60 per cent) probably lack such awareness as they cannot provide estimates of the balances on their pension accounts. It also appears that contributors with lower awareness have smaller balances (Arenas de Mesa *et al.*, 2008);
- *reduced precautionary saving.* Precautionary household saving outside the pension system may have been reduced to the extent to which fully funded defined contribution plans are seen as more credible than defined benefit plans that are not fully funded. This effect may be accentuated if pension funds also contribute to financial deepening (see below). The impact on overall saving would then be small and could even be negative. In a number of countries, there has also been a decline in private saving offsetting increases in government saving. Indeed, Bulíř and Swiston (2006) find that the private saving offset to public saving has increased considerably in this decade; a 1 point rise in the ratio of public saving to GDP is offset by a 0.9 point decline in private saving (up from 0.4 to 0.6 in the 1990s). This may reflect lower precautionary saving, due not only to pension reforms but also to more credible macroeconomic policies;
- *transitional costs*. While pension reforms have increased assets to cover implicit pension debts, explicit recognition of such debts has resulted in larger fiscal deficits over a relatively extended transition period. Roldos (2007) notes that "the loss of contributions to individual accounts and

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[13] Indeed, in Korea, the contributions tend to be low due to a relatively large self-employed sector, where plan participants tend to underreport their income. A less developed infrastructure for enforcement and collection also plays a role. Reforms adopted in 2007 seek to improve the sustainability of the system by gradually reducing the income replacement rate from 60 to 50 per cent in 2008 and then to 40 per cent by 2028.

[14] The same could be said for current accounts. In Figure 1, the largest surpluses appear to be in countries that are export-oriented (*i.e.*, Singapore and Malaysia) or are commodity exporters (e.g., Venezuela). The extent to which mandatory contributions to provident funds might help explain the large current account surpluses in Singapore and Malaysia remains to be determined.

[15] OECD (2007) reaches a similar conclusion. It also notes that empirical work on the impact of pension reforms on national saving is not conclusive.

the payment of recognition bonds to those who moved to the new partially or fully funded systems added in some cases more than 10 percentage points of GDP to public debt ratios". It may also be noted that in some cases, such as Peru, reforms were implemented in such a way that workers had an incentive to stay with the traditional pay-as-you-go system, although this was later modified (Carranza and Morón, 2008);

- *declining pension coverage of workers.* OECD (2007, Box 2.1, pp 69-70) estimates that the weighted average of coverage for the Latin American region fell from 63 per cent before the pension reforms to 26 per cent in 2006 (however, the initial coverage could be an overestimate). In particular, while membership in pension funds has increased as a proportion of the registered workforce, the share of members who actually contribute has fallen in every country.[16] Research is needed to uncover the reasons, but an important factor appears to be whether a pension plan is mandatory, or the default is set to automatic enrolment (Beshears *et al.,* 2008). Given that pension plan contributions are mandatory in a number of EMEs, a large informal sector may also play a role. High administrative costs of pension systems (see next item) may also be partly responsible;[17]
- *high administrative costs*. Reforms that have forced workers to channel savings to fund their own retirement through private financial institutions have resulted in high fees.[18] Costs in these systems average 1 to 2 per cent in the long run, which can have the effect of lowering future pensions 20-30 per cent. Against this it has been argued that that high operating costs largely reflect marketing expenditures in retail-oriented pension fund systems and institutional reforms could reduce them (James *et al.*, 2001). It is also argued that government-run pension systems deliver much lower returns than private systems.[19]

4 Asset accumulation and financial deepening

4.1 Pension funds: asset growth and composition

Experience suggests that pension funds can contribute to financial sector deepening. As pension fund assets grow, they can help diversify the investor base and provide stable demand for fixed income securities as well as for new financial instruments (e.g., high-yield bonds, mortgage-backed securities (MBS), and foreign exchange and interest rate derivatives). The process is potentially symbiotic, as this in turn supports pension fund growth by increasing the availability of longer-maturity assets for pension fund investments.

Since 2000, pension fund assets have grown rapidly in a number of EMEs. As shown in Figure 3, as a percentage of GDP these assets have risen by more than 8 percentage points in Chile, Colombia, Peru and Poland. (In contrast, partly reflecting their initially greater size, pension fund assets have grown only moderately in Singapore and declined in Malaysia over the same period). However, there is still ample scope for further growth, as pension fund assets are generally still small in EMEs. In 2006, eight out of 13 EMEs shown in Figure 7 had assets of less than 20 per cent of GDP. Among EMEs, only in Chile, Singapore and Malaysia did pension fund assets exceed 50 per cent of GDP. Although this is comparable in size to some developed economies, it is still small compared to the 100 per cent of GDP recorded in the United States.

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[16] The percentage of registered workers who contribute ranges from 11 per cent in Peru to 31 per cent in Mexico and 58 per cent in Chile.

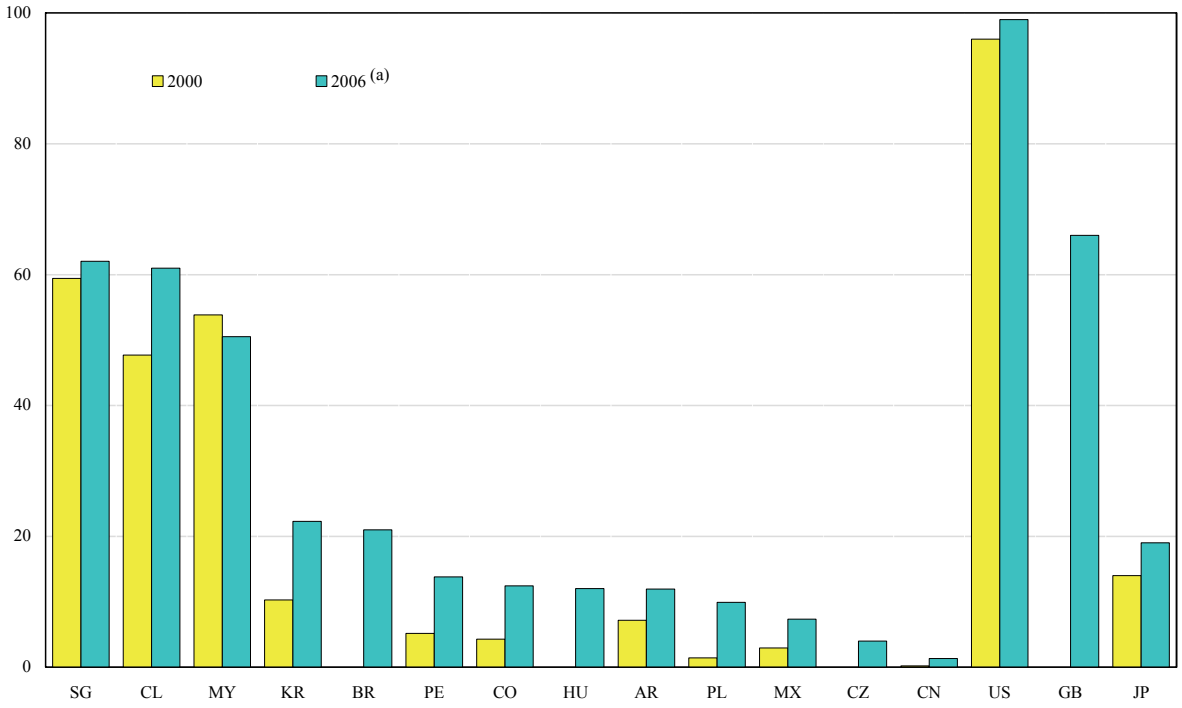
[17] In line with some of these developments, the success of recent (three-pillar) pension systems in achieving their social goals is being questioned, notably in Chile (Kay and Sinha, 2008). Efforts to address this could have effects on saving and investment as well.

[18] For a more severe critique, see Kotlikoff (2006).

[19] See James (2004) and Roldos (2007).

Figure 3

Pension Fund Assets
(percent of GDP)



AR=Argentina; BR=Brazil; CL=Chile; CN=China; CO=Colombia; CZ=Czech Republic; GB=United Kingdom; HU=Hungary; JP=Japan; KR=Korea; MX=Mexico; MY=Malaysia; PE=Peru; PL=Poland; SG=Singapore; US=United States.
(a) Or latest available.
Source: OECD, Association of Pension Fund Administrators; national data.

4.2 Composition of pension fund portfolios

The impact of pension fund accumulation on the domestic financial sector depends in part on the composition of pension fund portfolios. The following aspects may be highlighted.

First, the share of assets held in financial institutions has tended to decline in a number of EMEs (see Chan *et al*., 2006 for Latin America). This may reflect less reliance on bank deposits as investments, which could enhance demand for other financial instruments and financial deepening. However, in some countries, bank deposits remain significant. According to OECD statistics, in 2005 the share of cash and deposits in total pension fund assets in Thailand, Brazil and Indonesia was 40, 44 and 71 per cent respectively.

Second, the portfolio composition of pension fund assets in some EMEs, Latin America in particular, is highly weighted towards government bonds. Indeed, as reported by Chan et al., (2006), in the majority of Latin American countries they sampled pension funds held more than half of their portfolios in government debt (in Mexico and El Salvador it was more than four fifths). Of particular interest is that in five Latin American countries (Argentina, Bolivia, El Salvador, Peru and Uruguay) pension fund assets became more concentrated in government debt between 1999 and 2005. By way of comparison, the share of pension fund assets invested in bonds (both public and private) in the United States and Japan tended to fall (between 1995 and 2005, from 26 to 19 per cent and from 46 to 30 per cent, respectively; see Committee on the Global Financial System, 2007).

Table 3

Restrictions on Portfolio Composition and Actual Asset Composition
(percent of total assets, 2006 or 2007)

Country	Domestic Equities		Foreign Assets	
	Maximum Limits	Actual Composition	Maximum Limits	Actual Composition
India				
Korea	12	11	20	9
Singapore	PPR	0	PPR	…
Argentina	50	13	20	10
Chile	39	17	30	32
Colombia	30	15	20	14
Mexico	15	0.4	20	8
Peru	35	42	10.5	8
Hungary	50	8	30	5
Poland	40	32	5	2
Memo:				
United States	*PPR*	*41*	*PPR*	
United Kingdom	*PPR*	*40*	*PPR*	
Japan	*30*		*30*	

PPR = "prudent person rule".
Source: Poirson (2007); OECD, *Global Pension Statistics*; OECD (2008), *Latin American Economic Outlook*; Korea National Pension Service.

Third, some pension funds (e.g., Korea or Mexico, Table 3) tend to allocate a relatively small amount of their portfolios to equities, even if relatively young populations (e.g., in India) suggest that there is scope for increasing allocation to equities.[20] By way of comparison, in the United States, 41 and 24 per cent of pension fund assets are invested in equities and mutual funds, respectively. Fourth, with some exceptions (e.g., Chile), the allocation to foreign assets by EME pension funds also tends to be small.

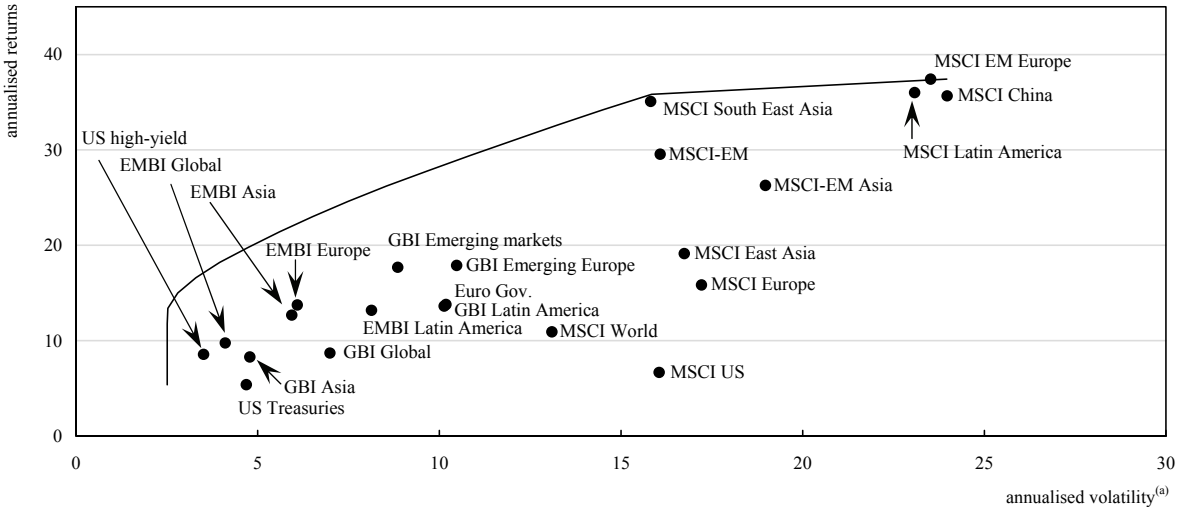
The lack of diversification in pension fund portfolios is in a number of cases the result of restrictions on pension fund investments in equities and foreign assets (Table 3). A major reason for these restrictions is that expanding pension fund portfolios to include assets with returns exhibiting very high volatility (domestic equities and foreign assets) is believed to create an unacceptable risk of losses that could impoverish pension fund participants.

There are two arguments for liberalising restrictions on pension fund investments, both of which have to do with the gains from diversification. First, liberalisation can reduce concentration in a portfolio and consequently lower the risk of very large losses. This can be particularly

[20] Some research suggests that it would be optimal to have portfolios that are more heavily skewed towards equities in economies where populations are younger (Gollier, 2005). However, this is a contentious issue.

Figure 4

Returns and Volatility, 2002-07
(unhedged returns in US dollars, percent)



The line represents the efficient portfolio frontier. EM= Emerging Markets; EMBI=Emerging Markets Bond Index; GBI= Government Bond Index; MSCI=Morgan Stanley Capital International.
(a) Standard deviation of returns, calculated using daily percentage changes in the return index.
Source: JPMorgan Chase; Merrill Lynch; Datastream.

important in emerging market economies which, in the past, have been vulnerable to sharp downturns or even financial crises. For example, a pension fund investing in domestic bank deposits avoids market and liquidity risk but retains counterparty risk to the domestic banking system. This risk can be reduced (at the cost of assuming some exchange rate risk) by adding foreign assets to its portfolio.

Second, liberalisation increases the set of investable instruments and potential gains from diversification. The recent performance of a variety of financial instruments suggests that these gains can be very large. For example, in this decade domestic Latin American government securities (GBI-Latin America) earned a shade over 10 per cent annualised return (in US dollars) with an annualised volatility of 10 per cent (Figure 4). However, roughly triple those returns could have been earned by investing in Latin American equities, at the cost of more than doubling volatility.

Returns can be improved not only by diversifying into equities (at home or abroad), but also by diversifying into foreign bonds. For example, adding domestic bonds from other regions to an investment portfolio could be associated with increased returns with less than proportional increases in volatility; indeed, the GBI-EM index has higher returns and lower volatility than the GBI-Latin America index. This reflects diversification benefits resulting from combining assets in a portfolio whose returns have low or negative correlations (see below).

Berstein and Chumacero (2005) provide more precise estimates of the gains from easing specific restrictions on pension fund asset allocations in Chile. Their analysis suggests that by mid-2002, in the absence of the specific pension fund restrictions applied in Chile, pension fund assets could have been higher by between 10 per cent (for a quadratic preference or an efficient value-at-risk portfolio) and 30 per cent (for a minimum variance portfolio) without increasing the volatility of returns (see their Figure 3). Put differently, for a minimum variance portfolio, with the same volatility of returns, returns to the unrestricted portfolio averaged 0.85 per cent a month,

compared to 0.67 per cent per month for the restricted portfolio.[21] This is because the unrestricted optimal portfolio implied a larger allocation to foreign bonds and equities (about a ⅓ share for the minimum variance model) than would have been the case for the restricted portfolio. Thus, for the minimum variance model, the probability of hitting the investment limit for foreign fixed income and equity instruments was estimated at about 62 and 90 per cent, respectively.

4.2.1 How much would pension funds invest abroad?

While steps are being taken to liberalise pension fund investments abroad in a number of EMEs, it is not clear how much pension funds will increase their investments abroad in response. On the one hand, in the case of Chile, or other EMEs, the returns from moving to an optimum share of foreign assets (and corresponding gross outflows channelled via pension funds) could be even higher than suggested by Berstein and Chumacero's (2005) estimates. In their analysis, they only consider developed country fixed and variable income instruments as alternatives to domestic assets,[22] while recent experience suggests that EME pension funds could earn even higher-risk adjusted returns by investing in assets issued in other EMEs. As can be seen in Figure 4, a number of regional (EMBI, GBI and MSCI) indices dominate their developed country counterparts in terms of risk-adjusted returns. Against these advantages is the possibility that EMEs might be more vulnerable to crises, so that a pension fund that is very concerned about the risk of large losses might be less inclined to invest in EME instruments.

Much depends on the diversification benefits provided by EME instruments on average and during episodes of financial stress. As can be seen in Figure 5, equities are not fully correlated across regions over a longer period (2001-07). This highlights the opportunities for diversification benefits from EME pension fund investments in both developed market and other emerging market equities. However, an important concern is that correlations in cross-country equity returns tend to rise during episodes of financial stress. Nevertheless, EM pension funds may be in a better position to manage the risks of diversification (than, say, EM banks) because pension fund liabilities tend to be longer-term. Also, bond investments do not appear to raise such concerns, as correlations in some cases have actually fallen during episodes of financial stress.

On the other hand, diversification could be limited by a number of factors.[23] Even in the absence of restrictions, there is evidence that investors prefer to invest in their own domestic markets (home bias). This is reflected in the fact that pension fund investment abroad is below the ceiling in a number of countries (Table 3).[24] An important reason is that developing monitoring and management capacity to invest abroad *is costly*, particularly for pension funds in EMEs having

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[21] The authors estimate the restricted portfolio by (where applicable) calibrating parameters in the objective function so as to replicate the *ex post* pension fund portfolio returns and volatilities. The unrestricted portfolio is selected so that in each period it is exposed to the same volatility as the restricted portfolio. The return corresponding to that volatility is then estimated. These results vary somewhat with differing assumptions about transaction costs, but the basic conclusions hold; see Berstein and Chumacero (2005), Table 3.

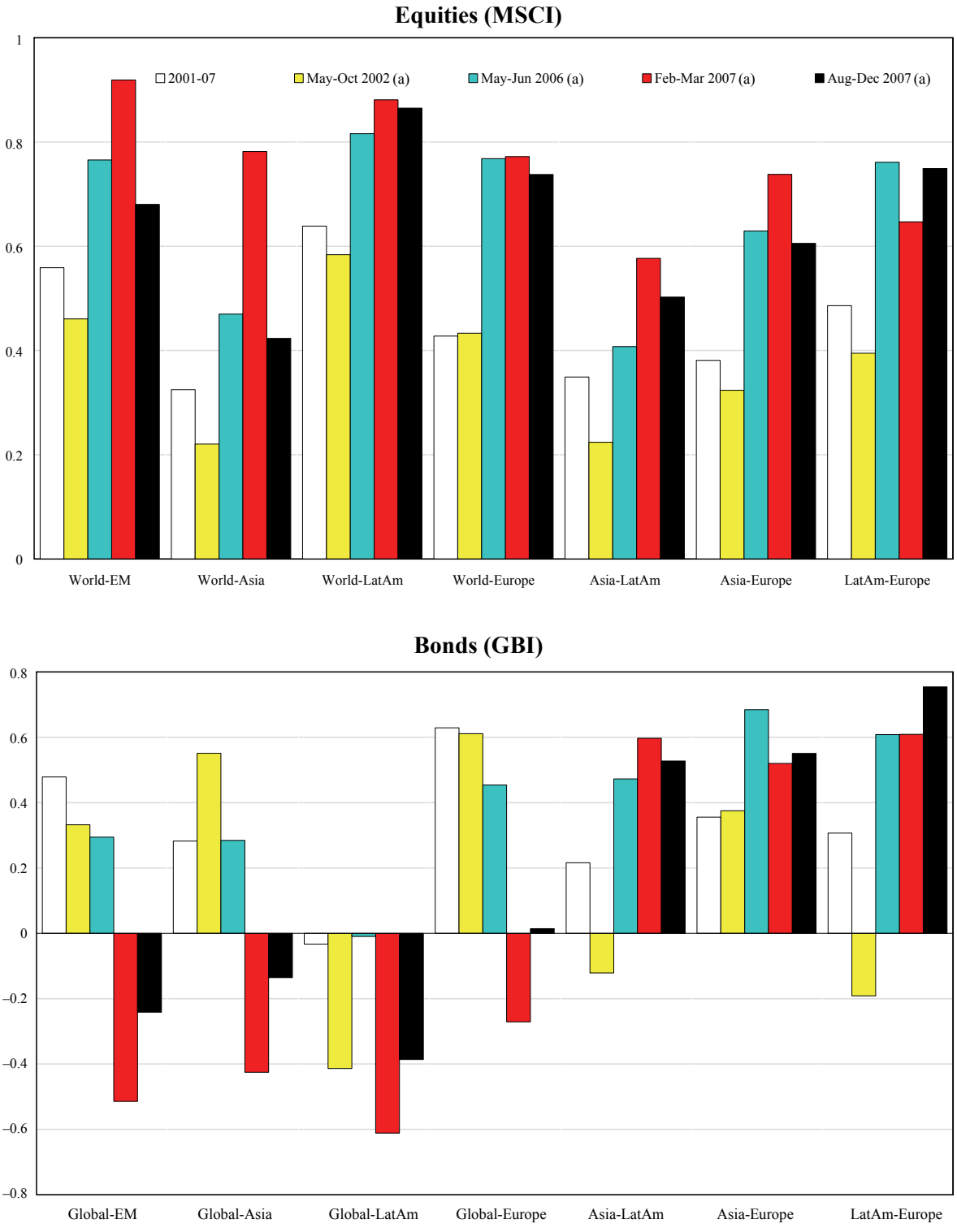
[22] They assume that there are four types of assets: domestic fixed, domestic variable, foreign fixed and foreign variable income (as proxied for, respectively, by promissory notes of the Central Bank of Chile of eight-year maturity, an index of all Chilean variable return instruments, an index based on all US indices, and the Dow Jones Industrial Average).

[23] Limited diversification of pension portfolios has also been observed in countries with higher incomes per capita. Gudmundsson (2001) describes stages in which pension funds in Iceland first invested in domestic bonds, lending directly to members (for housing), and then increased the share of foreign assets and equity in their portfolios over a short period of time (from low single digits to 19-26 per cent between the mid-1990s and 2000), resulting in large increases in returns on assets. In part, this reflected liberalisation, but also awareness by pension fund managers of the need to increase returns.

[24] Actual limits could also turn out to be below the ceiling because the ceiling applies to each fund individually and there are significant penalties for breaching the ceiling (e.g., forced sales). Under those conditions, fund managers would want to stay well below the ceiling to avoid breaches because fluctuations in market prices and mark to market accounting can push restricted asset holdings above the ceiling without any trade taking place.

Figure 5

Correlations in Asset Markets
(daily unhedged returns in US dollars)



[a] Period of increased global market volatility.
Source: Datastream; JPMorgan Chase.

little experience with investments in global financial markets. For example, as pension fund liabilities are denominated in domestic currency pension funds need to develop the capacity to manage currency risks;[25] There is also limited availability of instruments to hedge risks, including those arising from currency or interest rate fluctuations.[26]

There is growing awareness of the need to provide such hedging instruments. For example, in India market participants are now allowed to use foreign exchange forwards, swaps and options. While this is usually only against "crystallised foreign currency exposures", the range of hedging tools available is now to be expanded (Mohan, 2007). However, it is still not clear to what extent pension funds would engage in hedging even were the appropriate instruments to be made available, because hedging would be costly. An additional concern is whether pension funds could contribute to increased volatility of capital flows (Vargas and Varela, 2008), which could reduce risk-adjusted returns or raise broader risk management concerns.

4.3 Deeper financial markets

As pension fund assets have grown, *emerging securities markets have deepened in recent years*. Domestic debt markets, which are largest in Asia, South Africa and Turkey, have generally grown in this decade. However, they have not grown in central Europe (Figure 6 and Annex, Figure 10). There has also been a tendency for stock market capitalisation to rise in EMEs in this decade, reflecting steep increases in equity prices.

However, financial markets in EMEs are still not as deep as in developed countries. This is broadly reflected in (i) still low ratios of market capitalisation in securities to GDP; (ii) high ratios of bank deposits to GDP; (iii) lack of liquidity in securities markets; and (iv) low reliance on securities markets for financing.

Low ratio of securities to GDP. As illustrated in Figure 6, the ratio of debt securities to GDP ranged from less than 30 per cent for CEE to 60 per cent or higher in Asia and Latin America. (Annex, Figure 10 provides country details). However, this ratio was around 200 per cent in the United States and Japan (Annex, Figure 11). With the recent run-up in EME equity prices, stock market capitalisation ratios are more comparable with the 100 and 150 per cent observed in Japan and the United States respectively, although they remain at a comparatively low 50 per cent in Latin America.

Relatively high bank deposits. M2/GDP has recently averaged around 140 per cent in Asian EMEs and 45-60 per cent in other EMEs. Bank deposits are thus relatively more important in EMEs than in the US, where the M2/GDP ratio averaged 50 per cent. However, M2/GDP ratios are about as high in Japan (nearly 150 per cent) as they are in Asian EMEs.[27]

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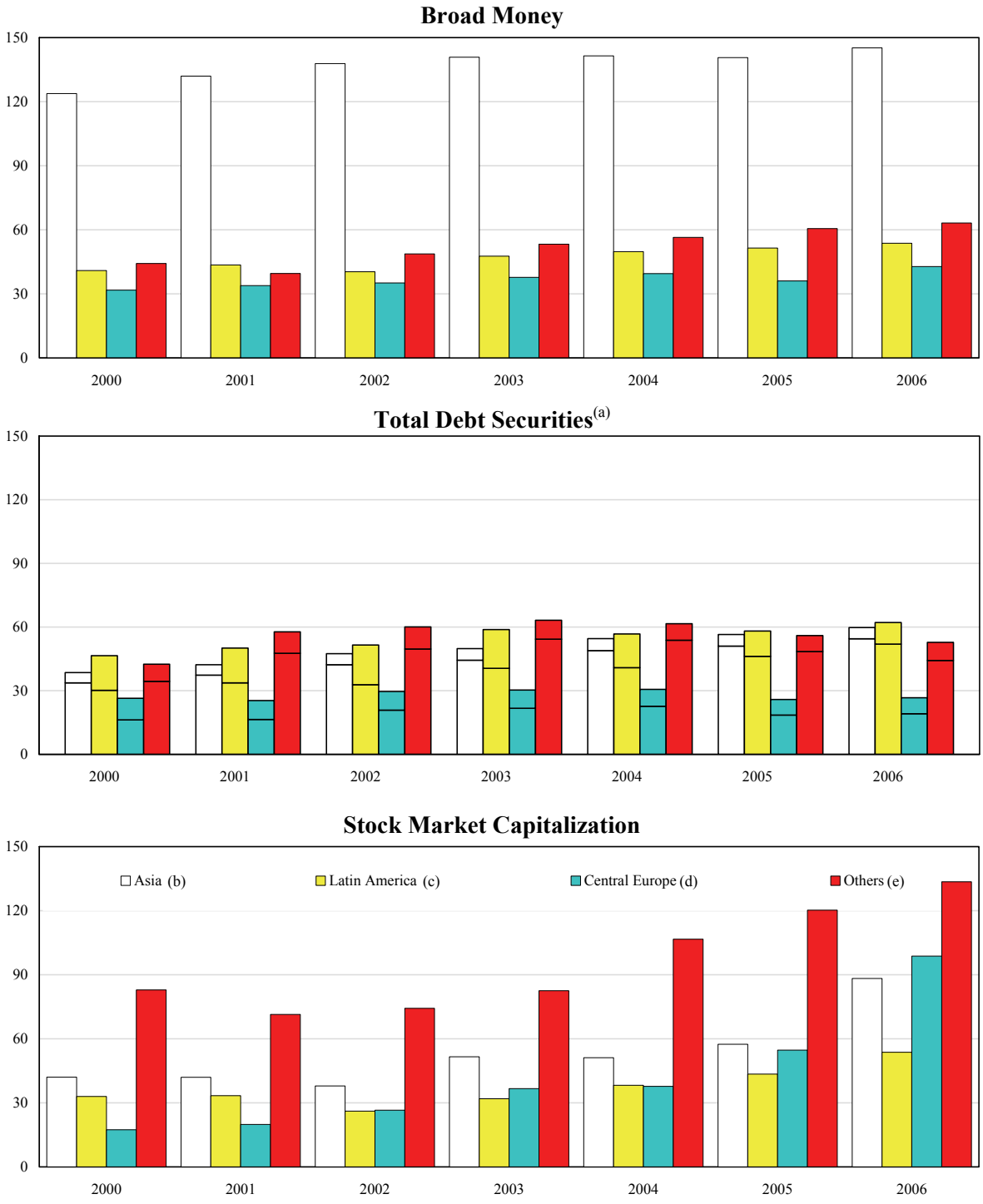
[25] With regard to monitoring investments abroad, pension funds could draw on the risk management capacity of global financial institutions by investing in vehicles such as mutual funds.

[26] See Moreno (2006), Table A6 and Mohan (2007).

[27] One implication is that in countries where pension funds hold a significant proportion of bank assets, bank interest rate liberalisation could significantly increase pension fund returns, particularly where rising inflation is a concern. Bank interest rates have been liberalised in many EMEs, although restrictions are still relevant in certain countries, like China or India. See Mohanty and Turner (2008, Tables 11 and 12) for information on the liberalisation of bank interest rates between 1997 and 2006. In some cases, pension funds could help promote interest rate liberalisation. In the case of India, pension funds could help eliminate distortions in interest rates caused by existing arrangements to support small savers (Mohan, 2007). To compensate for the lack of a social security system, the government gives small savers access to saving instruments (administered through post offices and commercial banks) that benefit from tax incentives and favourable interest rates set by the government. However, to attract deposits, banks competing with these small saving schemes tend to set rates on long-term deposits at levels higher than those which would have been obtained under competitive market conditions. This has been seen as contributing to downward stickiness of lending rates (with implications for the effectiveness of monetary policy). Improvements in the social safety net (including pensions) could address this issue. (A proposed interim solution is to benchmark these administered interest rates to market determined rates).

Figure 6

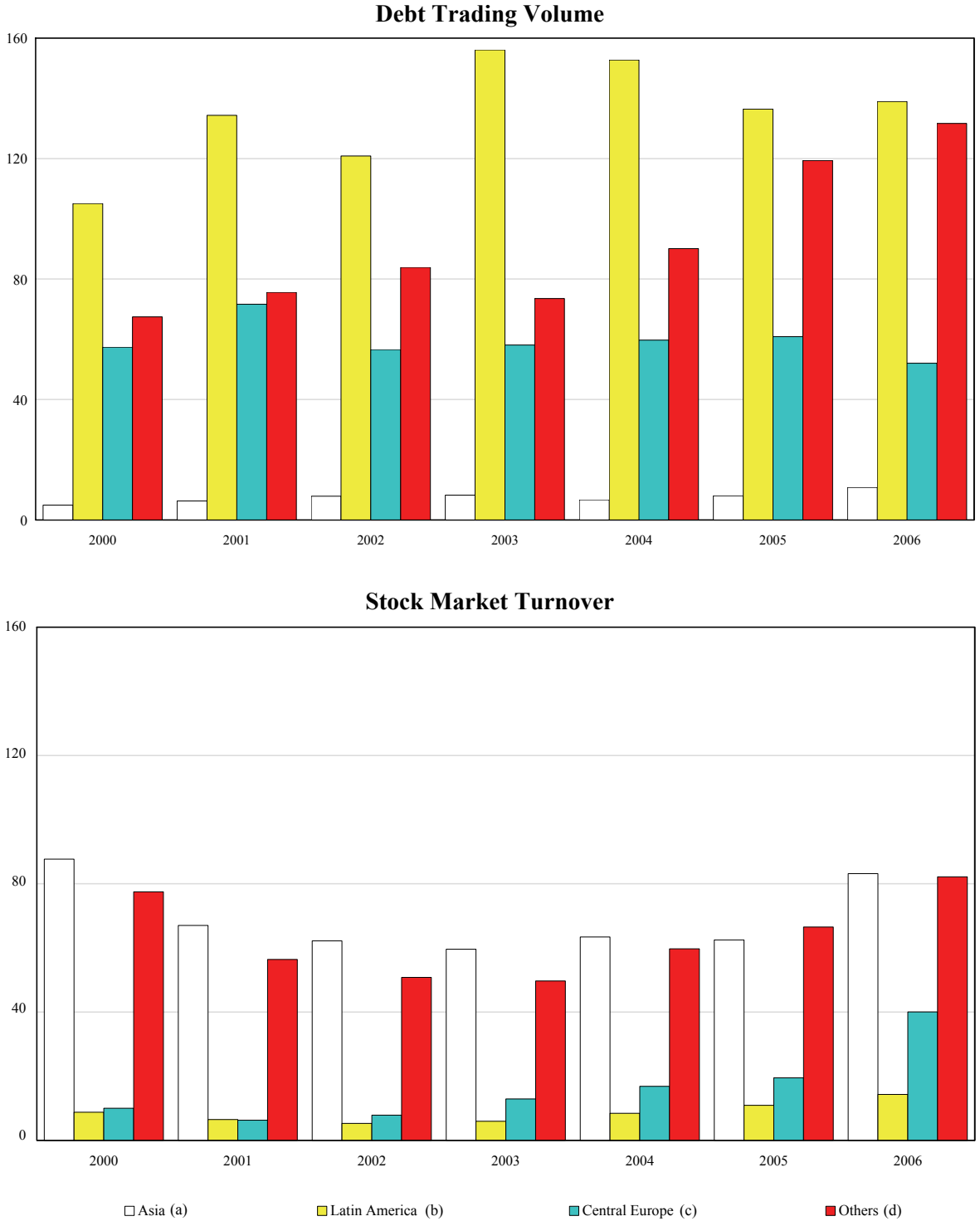
Size of Financial Market
(percent of GDP)



(a) Covers domestic (lower portion of bars) and international (upper portion of bars) debt securities. (b) China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan (China) and Thailand. (c) Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. (d) Czech Republic, Hungary, Poland and Russia. (e) South Africa and Turkey.
Source: IMF; Standard & Poor's, BIS.

Figure 7

Liquidity Indicator
(percent of GDP)



(a) China, India, Indonesia, Korea, Malaysia, Philippines, Taiwan (China) and Thailand. (b) Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. (c) Czech Republic, Hungary, Poland and Russia. (d) South Africa and Turkey.
Source: IMF; EMTA; Standard & Poor's.

Low liquidity. The rate of turnover in financial instruments tends to be lower in EMEs than in developed markets. This can present problems for risk management (and eventual wealth accumulation), by making it difficult for investors to change their positions. As can be seen in Figure 7, debt trading volume as a percentage of GDP ranged from a low of around 10 per cent of GDP in Asia to a high of around 150 per cent in Latin America. By way of comparison, the corresponding ratios for Japan and the US were respectively about 500 per cent and nearly 2000 per cent. As for equity markets, turnover tends to be lower in Latin America (around 10 per cent of GDP) and around 80 per cent in Asia and "other". By way of comparison, the corresponding turnover ratios for Japan and the United States are 150 and 280 per cent respectively (Annex, Figure 12).

Limited reliance on equities for financing. To illustrate, in China stock market capitalisation as a percentage of GDP is quite high (90 per cent), but flow of funds data indicate that between 2003 and 2005 equities accounted for only about 4 per cent of total increases in liabilities, with bank loans and bond financing accounting for much larger shares (61 and 35 per cent respectively). The reasons why higher share prices do not lead to more share issuance warrant further examination.

4.4 Role of pension funds in financial deepening

The developments highlighted above suggest that further pension fund development could contribute to the deepening of financial markets. One indication is that the correlation between financial deepening and pension fund growth is comparatively strong in a number of EMEs. As shown in Table 4, stock market capitalisation is positively correlated with pension fund asset growth in Korea, Argentina, Chile, Colombia, Peru and Poland. In contrast, the correlation is negative in Malaysia and Singapore. As for domestic debt securities, the correlation is positive (in either levels or changes) in most EMEs listed.

The results in Table 4 are broadly in line with Roldos (2007) and OECD (2007), who note that institutional investment (including by pension funds) has been associated with increases in market capitalisation of stocks and bonds. This relationship is particularly apparent in Chile. In line with this, the share of pension funds in government debt markets in a set of Latin American countries rose from 18 per cent in 1998 to 29 per cent in 2005 (Roldos, 2007, Table 4). Pension fund demand is also believed to have helped stimulate the development of new financial instruments. There is also evidence of lengthening maturities in fixed income markets in Chile and Mexico, and institutional investors, including pension funds, are believed to have played an important role in this. Research also suggests that the growth of institutional investors such as pension funds can lower the cost of capital and encourage the creation of new financial instruments (Walker and Lefort, 2002). A pension fund portfolio reallocation to equities could thus boost investment and growth as well as returns for pension fund investors. The importance of this effect would depend in part on the extent to which firms rely on equity for their financing (which as noted earlier, can be relatively little in some EMEs).[28]

4.5 Implications for saving and capital flows

The implications of greater financial depth for capital flows are uncertain, but some research suggests it could affect capital flows by lowering precautionary saving and current account

[28] On the other hand, some commentary suggests that the relationship between pension asset growth and market capitalisation has been weak in some countries over certain periods. Possible explanations include inadequate regulatory and financial infrastructure and a lack of a critical mass in pension fund assets under management.

Table 4

Correlations with Pension Fund Assets/GDP[(a)]

Country	Time Period		Stock Market Capitalisation/GDP		Outstanding Domestic Debt Securities/GDP	
			Ratio	Change in Ratio	Ratio	Change in Ratio
China	2000	2006	0.27	0.04	0.81	–0.60
Korea	1990	2006	0.76	0.41	0.92	0.40
Malaysia	2000	2006	–0.38	–0.09	–0.28	0.65
Singapore	2000	2006	–0.20	–0.65	0.82	0.61
Argentina	1995	2006	0.48	0.34	0.94	0.85
Brazil			n.a.	n.a.	n.a.	n.a.
Chile	1982	2006	0.68	0.79	0.30	0.71
Colombia	1995	2006	0.72	0.38	0.98	0.74
Mexico	1998	2006	0.39	–0.23	0.96	0.54
Peru	1994	2006	0.72	0.44	0.90	0.20
Czech Republic			n.a.	n.a.	n.a.	n.a.
Hungary			n.a.	n.a.	n.a.	n.a.
Poland	2000	2006	0.86	0.33	0.96	0.91
United States	*2001*	*2006*	*0.96*	*0.94*	*0.59*	*0.11*
Japan	*2001*	*2006*	*0.98*	*0.86*	*0.64*	*–0.58*

[(a)] Based on annual data covering the time period shown.
Source: OECD; FIAP; S&P Emerging Markets Database; national data; BIS.

balances. A recent study by Chinn and Ito (2007) finds that a larger financial sector could lower current account balances under certain conditions.[29] This is an issue of interest in a number of EMEs, notably China.

The effects of pension fund portfolio liberalisation on net or gross capital flows are also uncertain. However, the experience of Chile since 1998, reported by Desormeaux *et al.* (2008), suggests that pension fund investments abroad can have a large impact on gross outflows. This impression is reinforced by evidence they cite that an increase of 10 per cent in foreign investment limits on Chilean pension funds is associated with an accumulated depreciation of 2 per cent of the Chilean peso against the US dollar (see Cowan *et al.*, 2008). To illustrate orders of magnitude, at the limit of 30 per cent that prevailed until recently, Chilean pension fund assets invested abroad would be equivalent to nearly 20 per cent of Chilean GDP. Pending legislation contemplates significant easing of these limits which could mean large cumulative gross outflows over time in the pension fund sector. By way of comparison, foreign reserves to GDP in Latin America averaged about 10 per cent in 2006 (13 per cent in Chile) and 35 per cent in Asia.

[29] The conditions are that the economy be less open (ie restrictions on capital flows) and the legal system be less developed (not in the top decile).

An issue of interest is whether outflows channelled via pension funds could help offset large gross capital inflows, thus reducing the incentives for foreign exchange market intervention and reserve accumulation in some countries. While they are not perfect substitutes for foreign reserves, pension fund accumulation of foreign assets could provide a channel for intermediating capital inflows abroad, thus providing some of the benefits that have been sought from foreign exchange market intervention and foreign reserve accumulation without the associated disadvantages. In particular, as pension fund foreign asset accumulation would be financed by domestic saving, it does not raise the issues typically associated with the financing of foreign reserve accumulation, such as the possible loss of monetary control or the carrying costs associated with sterilisation of intervention in foreign exchange markets.

5 Postscript: The impact of the global financial crisis

As noted earlier, some research suggests that it would be optimal to have portfolios that are more heavily skewed towards equities in economies where populations are younger. One reason is that returns on equity investments tend to outperform returns on fixed income investments over the medium to long-term. However, this proposition is being tested by the sharp deterioration in the performance of equity investments resulting from the crisis that broke out in the second half of 2007. Annualised returns on equities fell from a range of around 5 to 35 per cent (depending on the index) for 2002-07 (shown earlier in Figure 4) to about –1 to 20 per cent for 2002-09 (not shown),[30] while volatility over these periods increased from about 10-25 per cent to around 20-30 per cent. By comparison, the decline in the range of annualised returns for bonds was much more moderate; falling from around 5-20 per cent to 5-15 per cent, with volatility rising from 3-10 per cent to 5-15 per cent. These differences are reflected in pension fund performance of some EMEs. For example, returns in pension funds holding a large proportion of equities in both Chile and Hong Kong experienced large losses. Looking ahead, a question of interest is how long it will take for returns on equity investments to recover as the global financial system emerges from this crisis. At this writing, equity returns had improved significantly in 2009, reducing very large losses on equity investments that had been recorded earlier.

[30] This reflects the fact that for 2008-09 (negative) returns on various equity indices shown in Figure 4 ranged from –20 to –40 per cent.

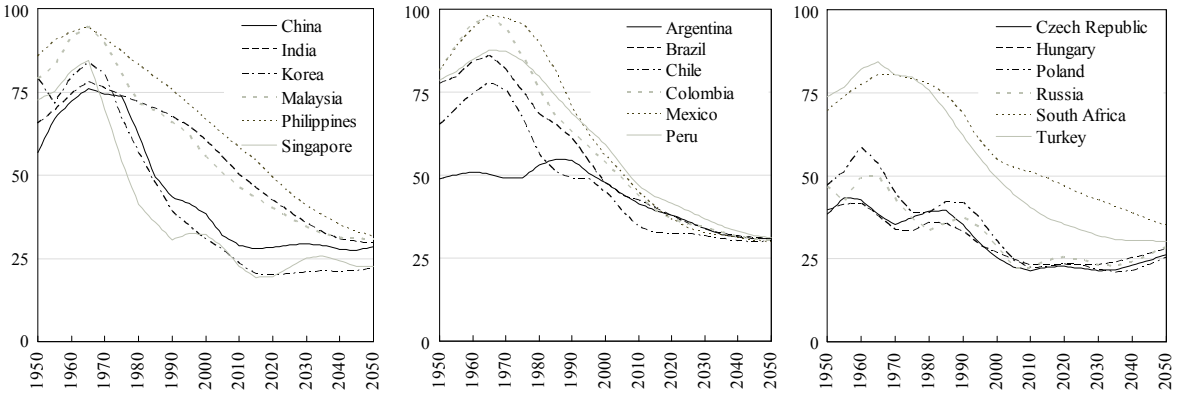
Annex

Figure 8

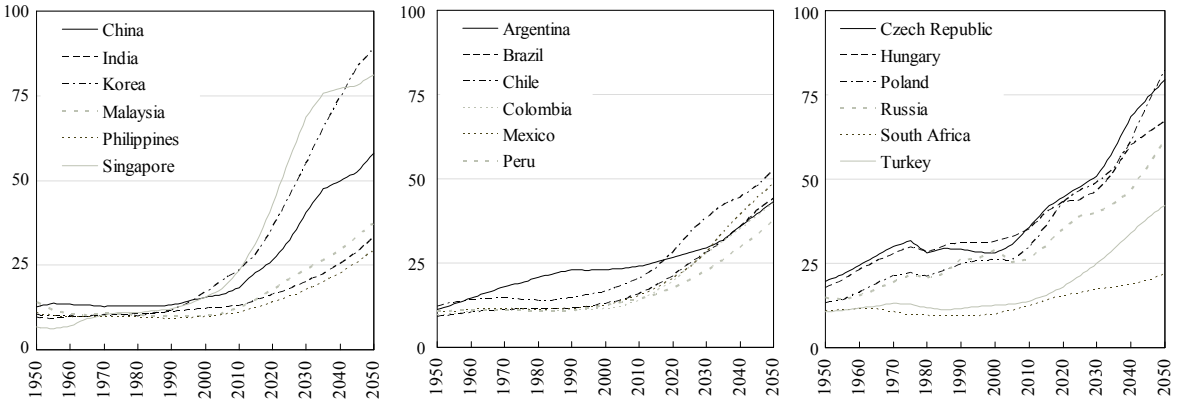
Dependency Ratios by Country

(percent)

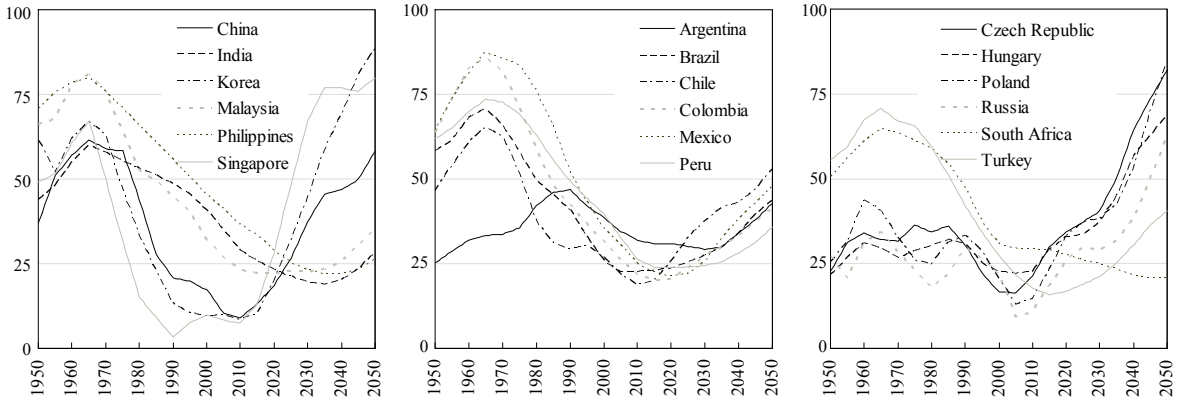
Child Dependency Ratios[(a)]



Elderly Dependency Ratios[(b)]



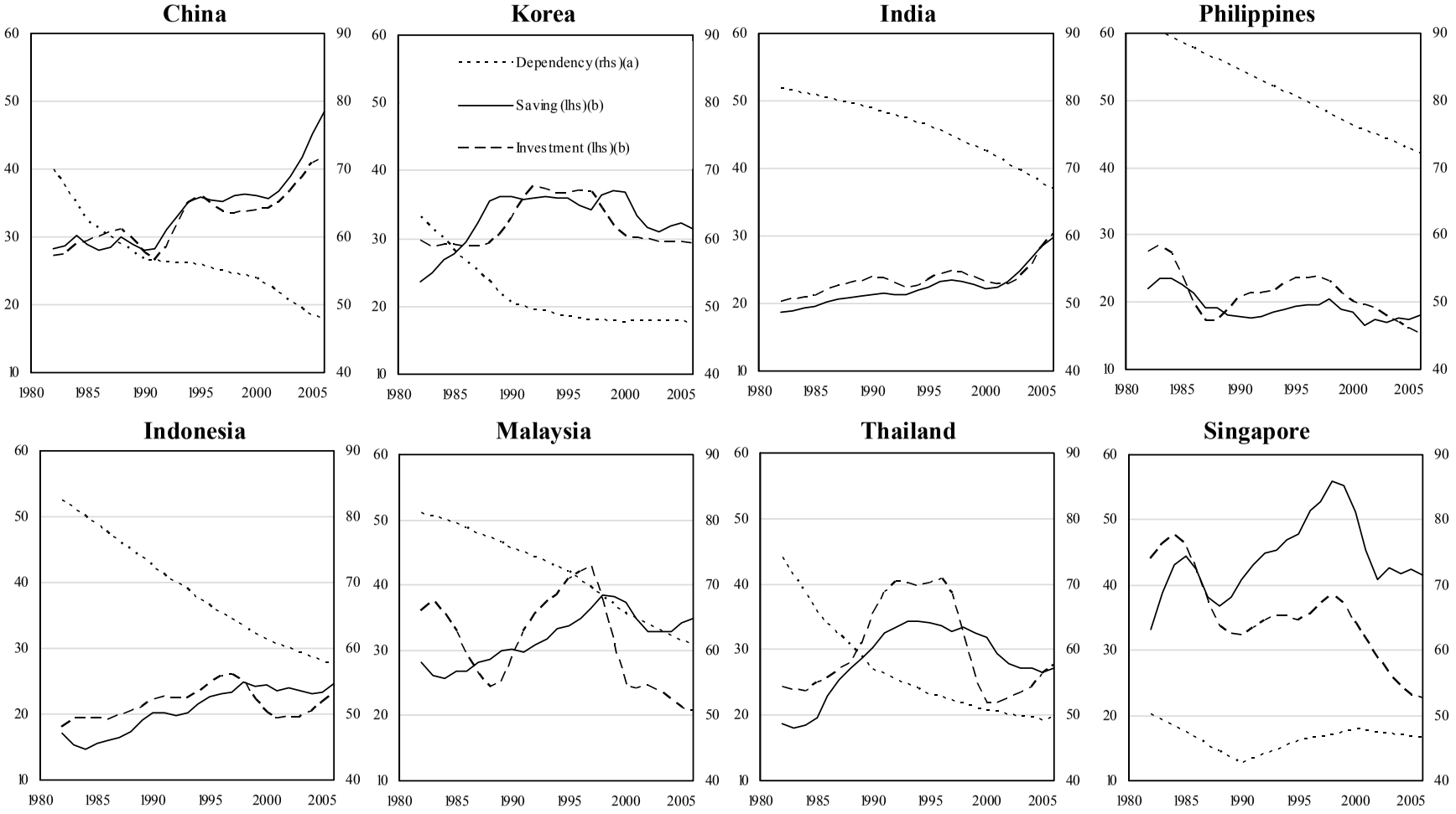
Overall Dependency Ratios[(c)]



[(a)] Population less than 15 years of age / population 15-59 years old. [(b)] Population 60 years or older / population 15-59 years old. [(c)] Population less than 15 years of age plus population 60 years or older / population 15-59 years old.
Source: IMF; United Nations, *World Population Prospects*.

Figure 9

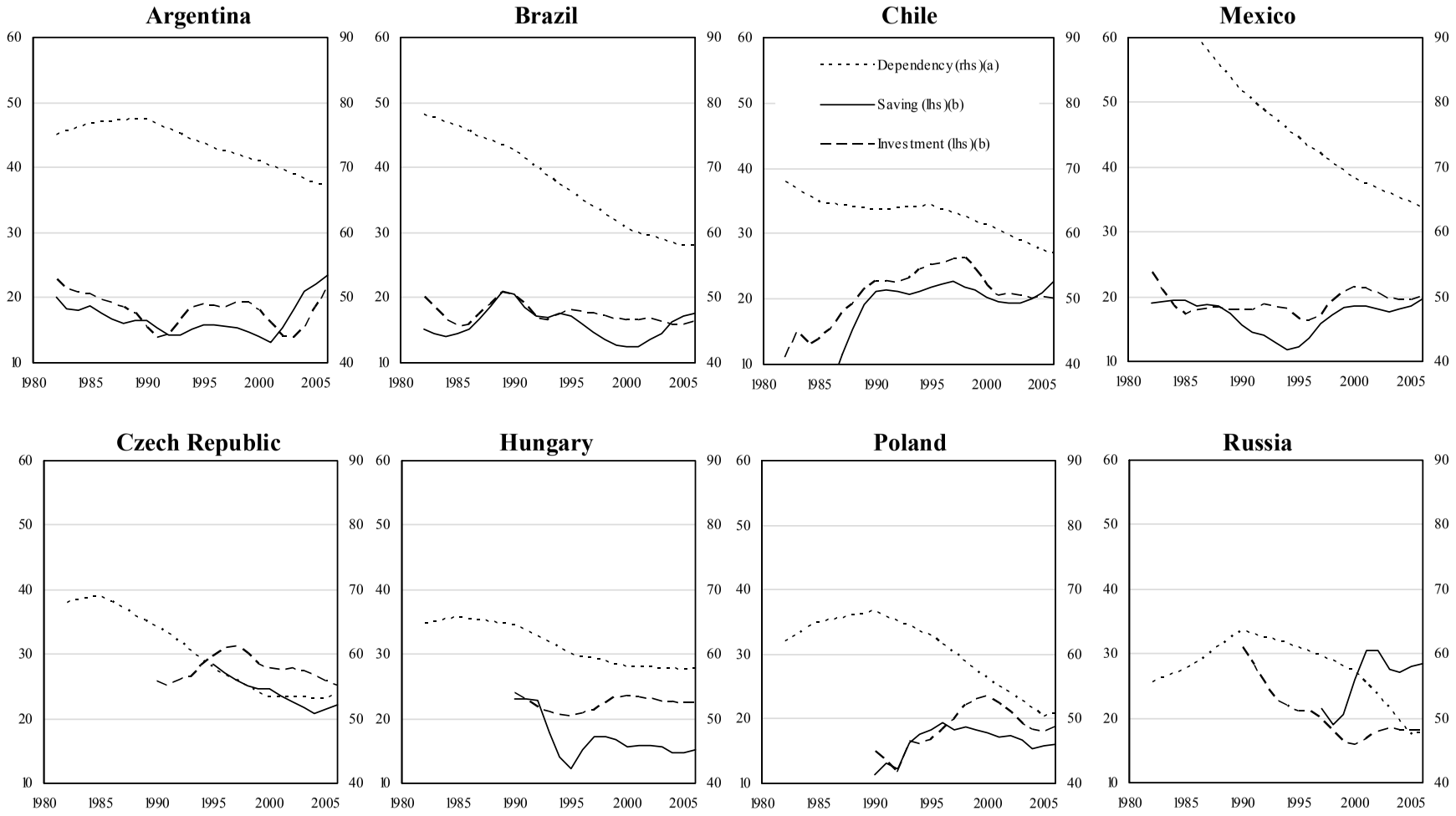
Saving, Investment and Dependency Ratios
(percent)



(a) Population less than 15 years of age plus population 60 years or older / population 15-59 years old. (b) Relative to GDP, three-year moving averages.
Source: IMF; United Nations, *World Population Prospects*.

Figure 9 (continued)

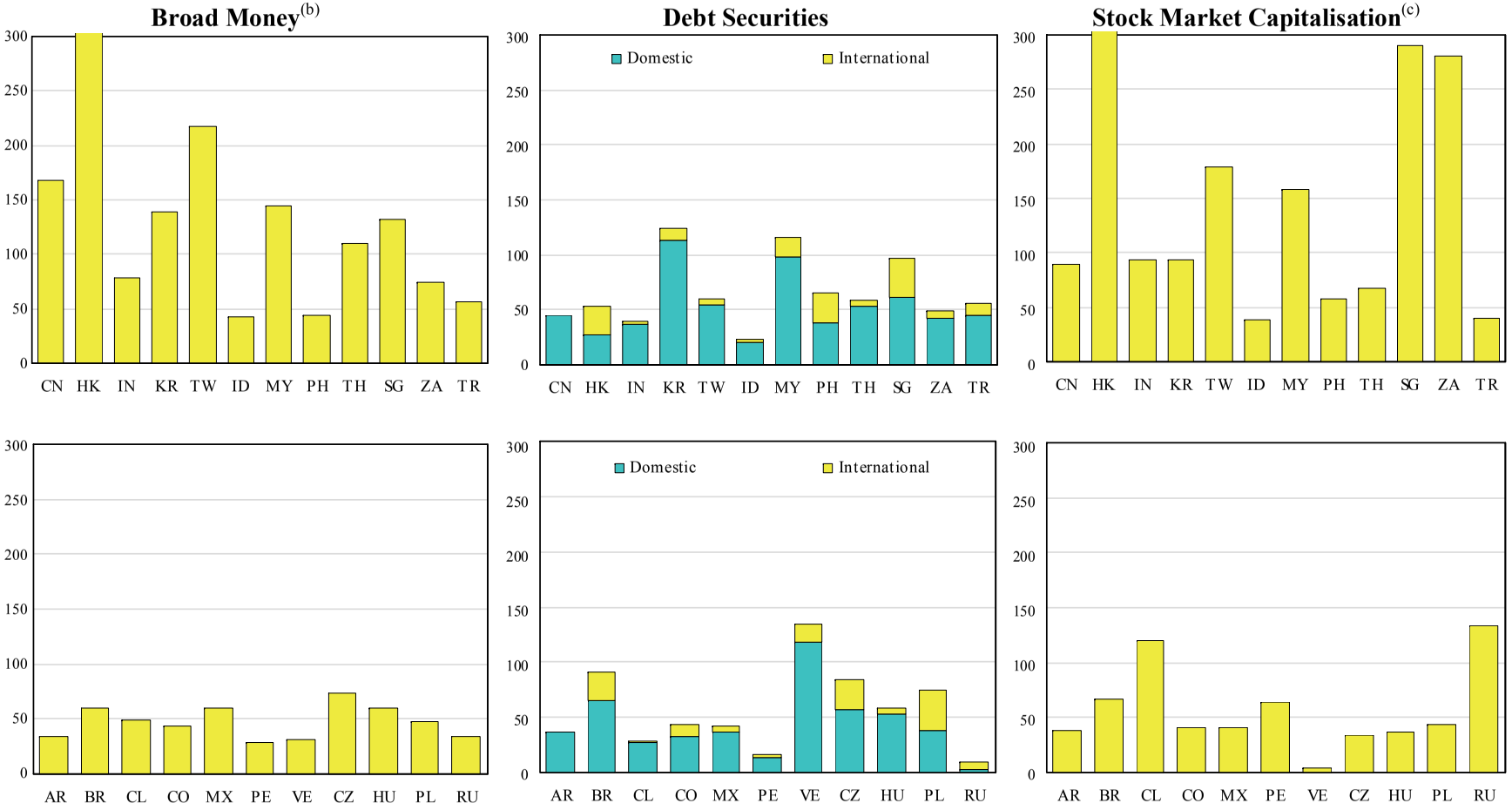
Saving, Investment and Dependency Ratios
(percent)



(a) Population less than 15 years of age plus population 60 years or older / population 15-59 years old. (b) Relative to GDP, three-year moving averages.
Source: IMF; United Nations, *World Population Prospects*.

Figure 10

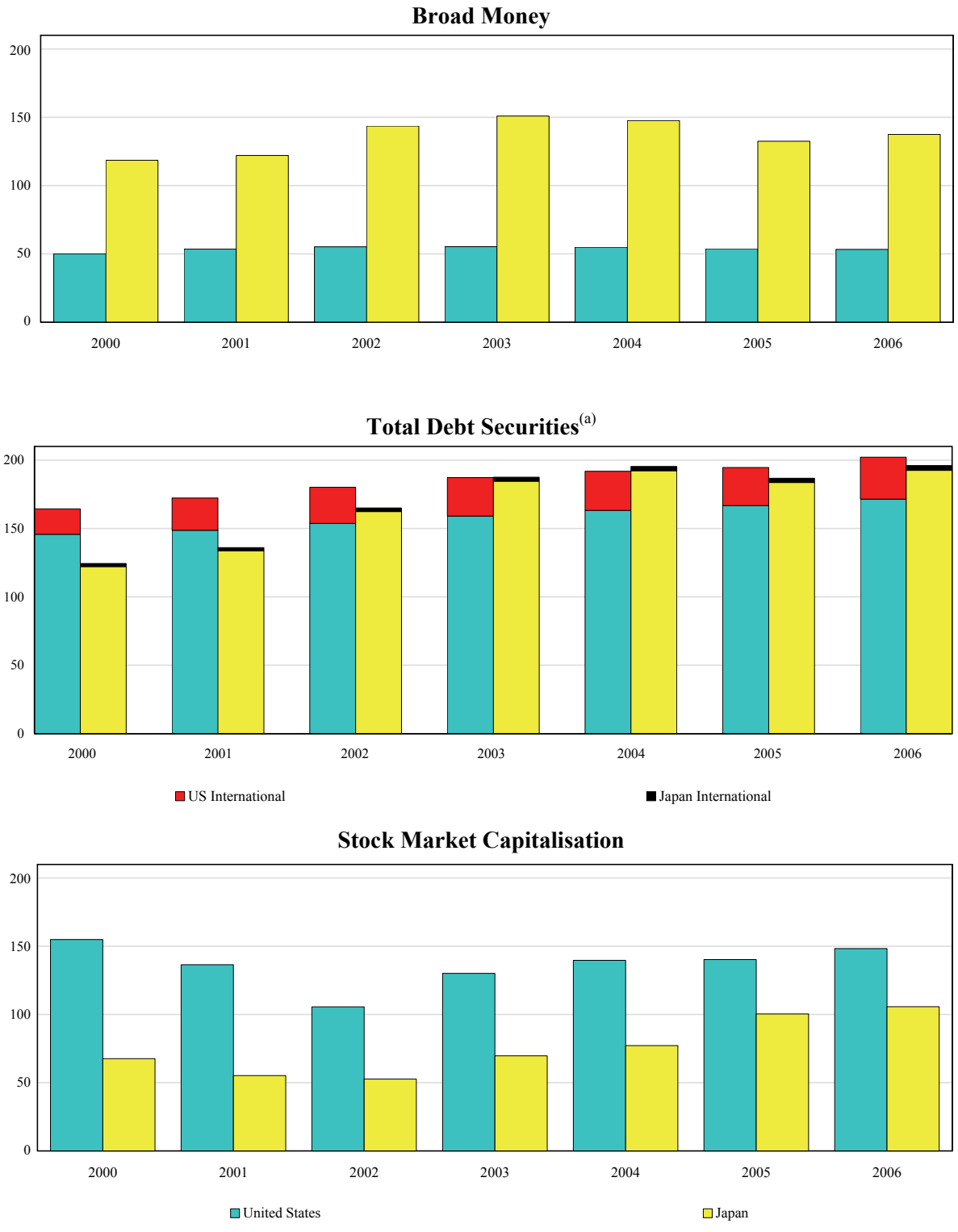
Size of Financial Market[a]
(percent of GDP)



AR=Argentina; BR=Brazil; CL=Chile; CN=China; CO=Colombia; CZ=Czech Republic; HK=Hong Kong SAR; HU=Hungary; ID=Indonesia; IN=India; KR=Korea; MX=Mexico; MY=Malaysia; PE=Peru; PH=Philippines; PL=Poland; RU=Russia; SG=Singapore; TH=Thailand; TR=Turkey; TW=Taiwan (China); VE=Venezuela; ZA=South Africa.
[a] End-2006 figures. [b] 345% for Hong Kong SAR. [c] 904% for Hong Kong SAR.
Source: IMF; Standard & Poor's; BIS.

Figure 11

Size of financial market
(percent of GDP)

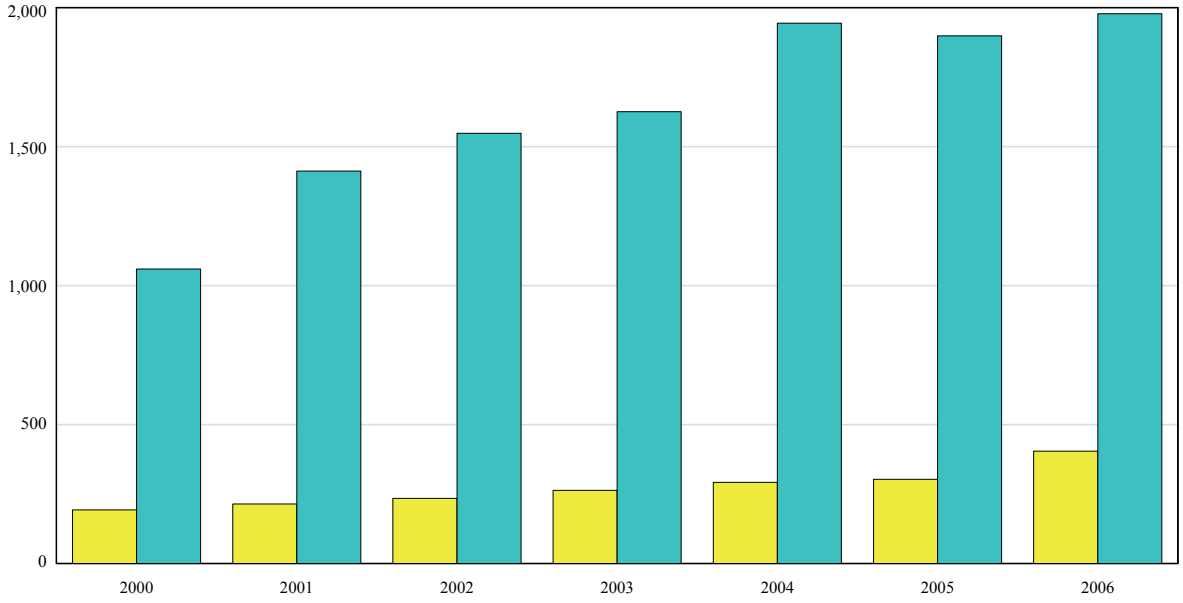


(a) Covers domestic and international debt securities.
Source: IMF; World Federation of Exchanges; BIS.

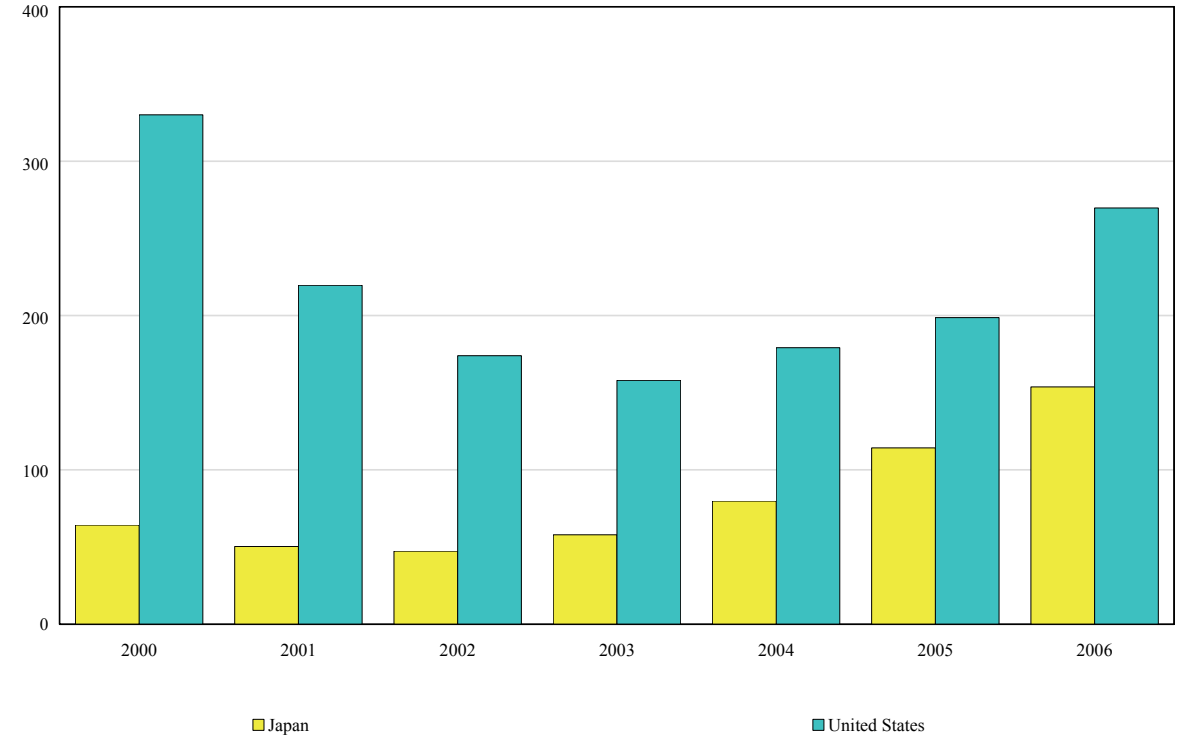
Figure 12

Liquidity Indicator[(a)]
(percent of GDP)

Debt Trading Volume



Stock Market Turnover



[(a)] Estimates of the annual value of secondary transactions in equities and bonds.
Source: National data.

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REFORMING THE PENSION REFORMS: THE RECENT INITIATIVES AND ACTIONS ON PENSIONS IN ARGENTINA AND CHILE

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This paper describes the recent reforms of pension policies adopted by Argentina and Chile. The structural reforms in the 1980s and 90s were targeted on improving the long term fiscal sustainability of the system and their institutional design, while transferring part of the economic and social risks from the State to participants. However, in recent years authorities in both countries coincided on identifying insufficient coverage among the elderly and adequacy of benefits as the most critical problems. As a result of differences in political economy and institutional constraints, responses were different. In Chile, a long and participatory process resulted in a large reform that focuses on impacts on the medium term, through a carefully calibrated adjustment. In Argentina, instead, reforms were adopted through a large number of successive normative corrections, with little public debate about their implications, and immediate impacts on coverage and fiscal demands.

1 Introduction

Argentina and Chile, two of the pioneering countries in Latin American pension reform trends of the 1980s and 1990s, have recently embarked in a new wave of revisions and adjustments of their pension systems. The motivation, process and results of these reforms are not similar, although they share some characteristics. This paper describes the most relevant components of these reforms, explaining why and how they were introduced, discussing their likely impacts and remaining challenges.

While the systems in both countries as of the early 2000s were not identical, they shared a number of characteristics. Chile was the first country in the region to introduce a structural reform to its pension system, creating a fully funded, privately managed scheme in the early 1980s. This system covered salaried workers on a compulsory basis, and independent workers could voluntarily join. While the system was designed as a defined contribution scheme, retirees had the right to receive a minimum benefit as long as they had contributed at least 20 years to the system. The minimum was financed with general revenue funds, and had a clear redistributive effect.

In Argentina, the 1993 reform introduced a similar funded scheme, although it did not fully eliminated the pay-as-you-go, defined benefit component. All workers (including independent workers) were required to participate, and their contributions would finance a multipilar scheme. At retirement, the benefit would include a defined contribution component, but also a defined benefit flat amount, that would act as a universal basic transfer received by all retirees with at least 30 years of contributions. Furthermore, Argentine workers were given the choice to opt out of the funded scheme, and continue to participate in a fully PAYG scheme. In a sense, the Argentina reform was considered at the time to be an improvement over Chile's experience. The design and

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approval process (Argentina's reforms went through a long debate in Congress, with many reforms introduced by Senators and Deputies, while in Chile it was introduced through a "Decree Law" approved by General Pinochet), and several aspects of the new system were thought to be better designed and more sustainable.[1]

Sharing some design characteristics, the systems in Argentina and Chile also had some basic problems in common. Lower than expected coverage, administrative costs that were considered too high by some analysts and authorities, too much uncertainty for participants, and equity issues were perceived as the main problems of pension systems on both sides of the Andes. Some of these problems originated in the macroeconomic and labor market performance of both countries, others from design aspects.

Many authors, analysts, and policy makers wrote and discussed about these problems in the last decade or so. While some remedial actions and small reforms were taken, deep changes were postponed, mostly due to macroeconomic and political restrictions. However, the stronger fiscal situation of both countries in recent years, and a changing political climate that brought up concerns about the effectiveness of these programs to provide adequate income security for the elderly created conditions for a new wave or reforms.

The reforms enacted in Argentina and Chile in the last couple of years recognize similar origins (the concerns about coverage, equity, and efficiency of the systems, as well as a renew interest in defining the role of the State in the system) but measures and processes were very different. These differences seem to originate mostly on political and institutional disparities. In Chile, there was a strong consensus about the adequacy of the basic design of the pension system, and efforts were focused on improving it through a process that could guarantee political sustainability and fiscal predictability. In Argentina, on the other hand, the basic design of the pension system introduced in the 1990s was under strong criticism, and many of the existing problems were blamed on it. Also, the reform processes were different, possibly reflecting these differences in approach. While in Chile there was a wide public debate, with ample participation, lengthy analyses, and a slow construction of an almost universal consensus, in Argentina reforms were enacted through decrees or through laws that were briefly analyzed by Congress with little or no dissent about its contents and goals.

As a consequence of these differences, the expected results of recent reforms are also different. The paper discusses the impacts that these reforms are expected to have on coverage, benefits, fiscal accounts, and the operational and financial operation of the systems.

Interestingly, the reform processes in both countries were conducted in a relatively isolated manner from other social policy and fiscal debates. While there are many differences between the two countries, as discussed in this paper, both reforms share two clear aspects: they increased the coverage of pension systems among the elderly, at a fiscal cost. Discussions on whether increasing old age coverage was a priority for the social policies (as opposed, for example, to larger spending in education, health, or children's benefits) were mostly absent. Similarly, there was little if any debate regarding the implicit costs of these reforms in terms of requiring additional fiscal resources (that will eventually come from new taxes or reallocation of current expenditures). While these debates exceed the context of this paper, they are evidently relevant and should be considered within a wider analysis.

This paper presents a short description of the pension systems in each country as of the early 2000s, to then describe the stated motivations for reform and the main changes introduced in the

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[1] For example, Arenas de Mesa and Bertranou (1996) indicated that the Argentinean model has "*(a)… more inter- and intra-generational solidarity; (b) relatively lower transition costs to be covered by the State; (c) higher coverage of self-employed workers; (d) a more comprehensive regulatory framework; and (d) less gender inequality*".

systems since 2005, to finally identify some pending challenges. The fourth section discusses in more detail the political process, considering how and why differences in the political process between these two neighboring countries may result in important differences in outcomes. Finally, section five presents the conclusions.

2 The reforms in Argentina

Argentina's pension system is one of the oldest in the world, as it started to develop in the early years of the twentieth century. While the first programs providing income to elderly and retirees originated in colonial times, it was only in 1905 when a large program, covering railroad workers, was created. A slow process followed this, as new occupational pension systems, usually designed as funded schemes, were introduced. In the late 1940s a strong push by the new Peronist government resulted in a quick expansion of coverage, and a few years later nearly all workers in Argentina, including salaried and self employed, were covered by relatively generous, partially funded schemes.

An important reform in the late 1960s consolidated the different schemes into three programs, and gave the National Government authority to manage them. The financial scheme was explicitly defined as a pay-as-you-go scheme, and most parameters, including contribution rates, vesting period, minimum retirement age, and replacement rates were unified. This scheme ran into financial problems as its parameters became unsustainable in a context of growing unemployment and informality, and by the late 1980s it was clear that a new reform would be necessary.

In 1993, amidst serious concerns about the medium term fiscal sustainability of the system, looking for tools to energize the local capital markets and expecting that private management would make the system more transparent and efficient, a structural reform was introduced.

In this chapter, we discuss the situation of the system as of the mid-2000s, considering the design of the system, its performance, and the social and political context. We then describe the main reforms introduced in recent times, discuss their expected impacts, and identify some of the pending challenges that authorities will confront in the future.

2.1 The situation as of 2005

2.1.1 Quick description of the system

After the 1993 reform, Argentina's pension system became a multipilar scheme, with funded and unfunded components, private and public participation in its management, and a combination of defined benefit and defined contribution model to determine the benefits paid to retirees.

The changes introduced almost 15 years ago were, by no means, a "definitive" reform. Since the original law was passed in October 1993, nearly eight hundred fifty new regulations about the pension system were approved, including thirty four laws and one hundred and thirty five decrees. While many of these norms were adopted to implement or supplement the system, there was a clear tendency to introduce short term corrections to the system.

As designed in 1993, the pension system in Argentina includes two basic pillars. First, contributions from employers (at 16 per cent of salaries) would be used to finance a flat benefit of approximately 28 per cent of average salaries to all retirees that satisfy the minimum age and vesting requirements. The second pillar would consist on a defined contribution scheme, where workers make personal contributions of 11 per cent of their salaries and receive benefits after retirement.

The law established that there were two options for the second pillar. By default, workers would be enrolled in a funded scheme, managed by privately owned, commercial companies. Contributions (net of fees and insurance costs) would accumulate until retirement, when workers could get their benefit in the form of an annuity or as a scheduled withdrawal from their individual accounts. The second option was a smaller PAYG scheme, where workers would get a benefit proportional to their pre-retirement wage and the number of contributions to the new scheme. This benefit would be entirely managed by the Government' Social Security agency. Workers could chose to join this scheme when entering the labor force, and were free to switch to the funded scheme at any time, but it was not possible to move from the funded to the PAYG scheme.

In addition, a transitional benefit was established to compensate workers who had contributed to the system before the reform but would retire later. This benefit was also proportional to the pre-retirement salary and the number of years with contributions to the old system, and was subject to the same indexation rules as the other PAYG benefits.

A minimum retirement age of 65 years (60 for women) was established. Also, at least 30 years of contributions were required to receive any of the government financed benefits. These requirements meant increases of five years in minimum age and ten years in contributions, as compared to the previous law. To avoid sharp impacts on individuals close to retirement, the new minimums were to be implemented progressively, in a period of nearly 15 years after the reform.

Nearly all formal workers in Argentina were expected to participate in this new system. The three national pension schemes created in the 1960s were merged and all private workers, civil servants, and self employed would become part of this new system. Furthermore, a number of "special" regimes, designed over the year to provide a more favorable treatment to groups of workers that were supposed to be in a disadvantageous situation, were eliminated. The list of this regimes included school teachers, academic researchers, diplomats, railroad workers, judiciary employees, etc. Only one exception was maintained at the national level: the military and security forces, who continued to have their own, independent schemes. Also, provinces continued to manage independent systems covering provincial and municipal civil servants, and had the right to authorize the operation of occupational funds to cover some professional activities, such as lawyers, engineers, accountants, etc. Between 1994 and 1997 almost half the provinces transferred their systems to the national scheme, but others have continued to run their own programs to this date.

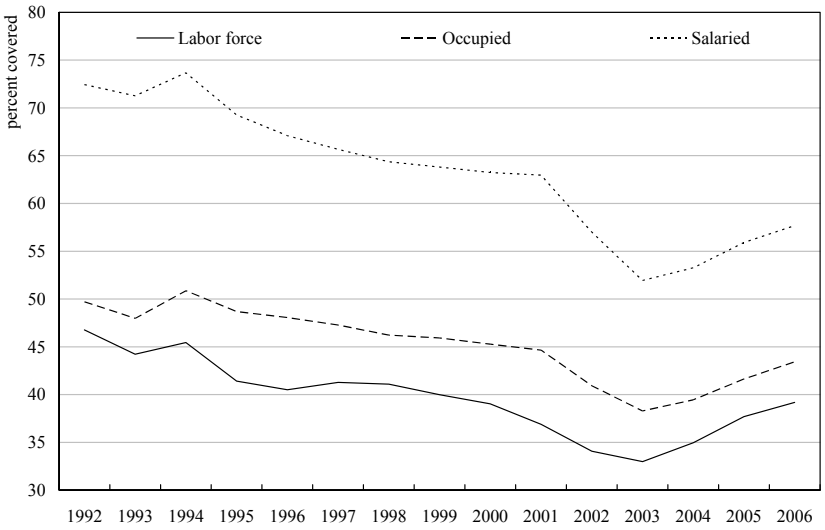
Finally, a non-contributory pension system provides basic income to poor elderly. The program, originally introduced in the 1940s, offers a flat monthly transfer to individuals aged 70 and more with no other income sources. This benefit is part of a set of seven non-contributory pension schemes, which also cover some poor disabled individuals, mothers with seven or more children, veterans of the Malvinas war, relatives of victims of the military dictatorship of 1976-83, and other groups. After the 1993 reform, these programs were formally transferred to the Social Development Secretariat, although payments continued to be managed by ANSES. The number of beneficiaries of these pensions has been limited, at around 40 thousand for old age in the late 1990s, and benefits were approximately 66 per cent of the minimum pension.[2]

On the institutional design, the PAYG components would continue to be managed by the National Social Security Administration ("ANSES"), while the funded scheme would be managed by commercial firms, mostly owned by banks and insurance companies. One managing company was fully owned by the "Banco Nación", a state owned bank, but still operated as a profit business. These companies would compete for affiliates, under a strictly regulated marketing system. They

[2] For a detailed discussion of the non-contributory pension system in Argentina, see Bertranou and Grushka (2002)

Figure 1

Argentina: Pension Coverage of Active Workers, 1992-2006



Note: Household surveys in Argentina inquire about pension coverage of salaried workers only. Thus, the coverage rate of occupied workers is somehow underestimated, as all self-employed workers appear as uncovered.
Source: Rofman and Lucchetti (2007).

were supervised by an autonomous Superintendency, which operated under the control of the Ministry of Labor and Social Security.

2.1.2 Recent trends

After the 1993 reform, the pension system's performance in Argentina was closely linked to macro trends. On coverage, contributors slightly grew in the early years, but the declining situation in the labor market had a strong negative impact. Benefit levels for retirees were slowly growing during the 1990s, when there was no indexation of existing benefits but new beneficiaries received higher transfers, to then suffer a sharp loss in real values with the 2001-02 crisis and start a recovery afterwards. The fiscal situation reflected the benefit trends, since the average benefit is the strongest determinant of the financial balance of the public system. Finally, the evolution of the financial situation and performance of the funded scheme evolved unevenly, with sharp changes due to the crisis and normative adjustments.

Argentina has been one of the countries in the region with highest pension coverage throughout its history. This situation began to decline as unemployment and informality grew since the 1980s. Figure 1 shows that the percentage of the labor force covered by the system declined from over 45 per cent in the early 1990s to below 40 per cent by the year 2000 and then to nearly 30 per cent with the crisis.[3] Part of this decline was caused by rising unemployment, but the impact of the weakening economic situation on compliance was also important. By considering the coverage of workers occupied (either as salaried or self employed), it becomes clear that the trend was important among them as well, since coverage declined nearly 10 percentage points during the decade. The effect was significant among those salaried (that is, excluding the self employed), showing that it affected all sectors of the economy.

Coverage began to improve after the worst of the crisis and, by 2006, the levels have recovered to those of the late1990s. However, these trends did not impact all social groups in the same way. Figure 2 shows the evolution of coverage among occupied workers in the first quintile of income per capita and that of workers in the highest quintile. It is clear that the decline in the 1990s and even the crisis had little effect on the richest groups of the population, while, on

[3] Coverage of active workers in Figure 1 and other parts of this paper refer to the ratio of contributors to the pension system in a given month and the labor force, occupied workers or salaried workers at the same time, as measured by a household survey.

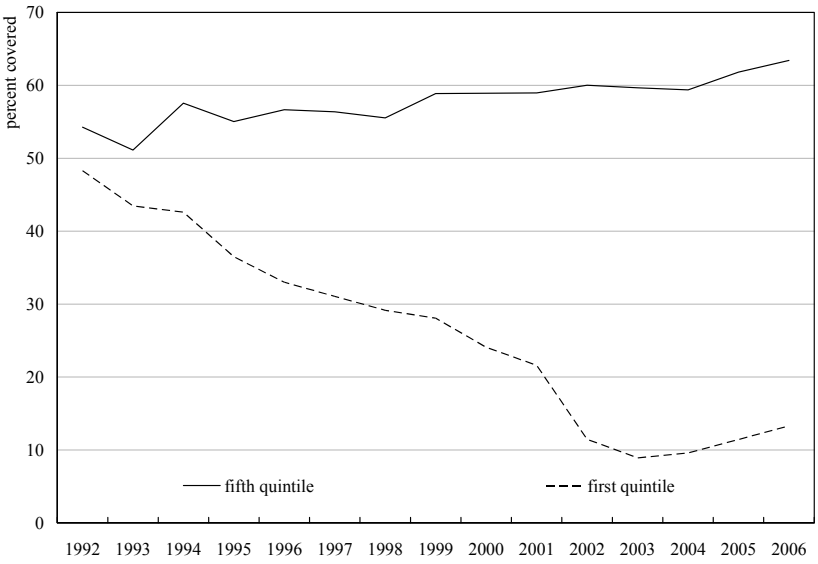
the other hand, it was catastrophic for the poor and most vulnerable. This group showed a dramatic drop of 40 percentage points in coverage between 1992 and 2003, and the recovery since them amounted to barely five points.

Part of the sharp decline in 2002 was caused by the introduction of the workfare program "Heads of households", which provided income transfers to nearly 2 million individuals that were previously unemployed, informal or inactive. This produced a quick growth on the labor force participation rates of the poorest groups, but did not necessarily increased their pension coverage, as the workfare participants do not contribute to the pension system.

While coverage of active workers fell during the 1990s due to unemployment and informality, this drop had a limited impact on coverage among the elderly. Due the basic design of any contributory pension scheme, changes in participation of active workers have very little effect on old age coverage in the short term, as most beneficiaries have been

Figure 2

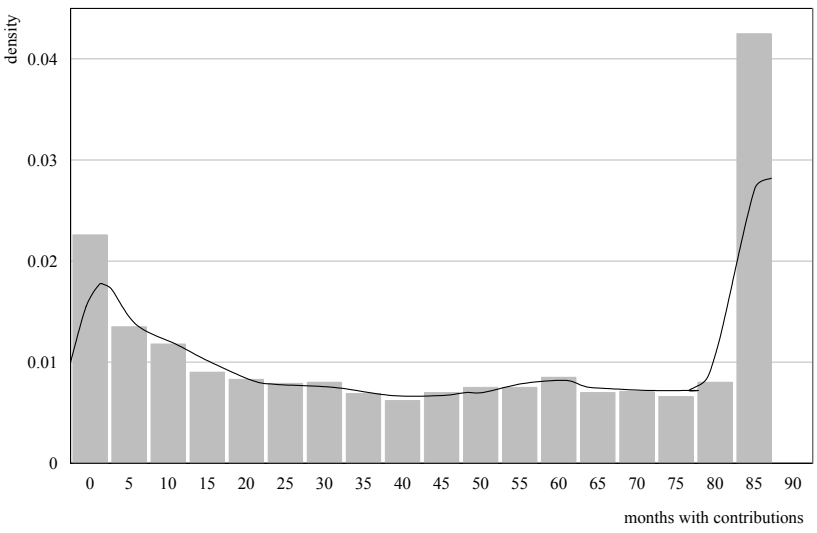
Argentina: Pension Coverage of Occupied Workers, by Income Quintile, 1992-2006



Source: Rofman and Lucchetti (2007).

Figure 3

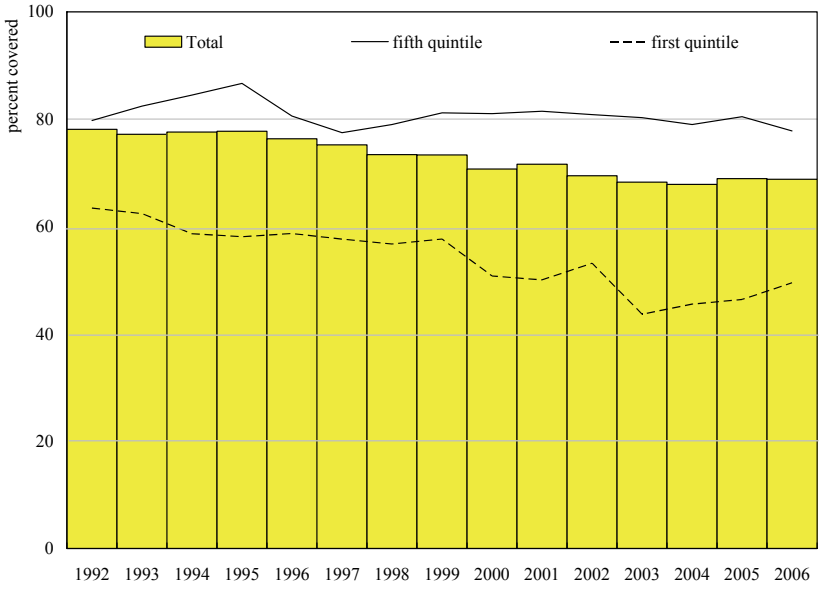
Argentina: Distribution of Contribution Densities



Source: Farrall *et al.* (2003).

Figure 4

Argentina: Pension Coverage among the Elderly (65+)
Total and by Income Quintile, 1992-2006



Source: Rofman and Lucchetti (2007).

retired for years and many new retirees completed their vesting period long before the reforms or economic conditions changes.

As relevant as coverage in any given month, contributions densities of full career workers determine whether they will be able to retire once they reach the minimum age or not. Datasets on density are more difficult to build and analyze, as records of contributions for long periods are necessary but not always available. An analysis for Argentina was prepared by a team at the Social Security Secretariat in 2002, considering the contribution densities in the previous decade for workers with at least one contribution. Analyzing that data, the team showed that there is a wide dispersion in densities. While some workers present an almost full compliance record, many others have incomplete contribution histories, which might eventually result in their exclusion from pension benefits.

On the other hand, short term changes in coverage among the elderly were linked to the legislation reforms. By increasing the vesting period to 30 years, in a context of declining labor markets, the reform excluded many workers from the social security system. Administrative data from ANSES shows that the flow of new beneficiaries dramatically dropped after the reform: while in 1992-93 ANSES was granting an average of 8900 new benefits per month, five years later this figure had dropped to around 3600 cases. This decline had an impact on the total number of beneficiaries. Retirees under the national system went from 2.1 million in late 1992 to 1.6 million in 2005.

The decline in total number of retirees can be seen when considering the coverage rates of the population aged 65 and more. In 1992, there were nearly 80 beneficiaries per 100 individuals in Argentina. This figure slowly declined to 68 per cent by 2003. The decline was not similarly distributed across the income distribution: while retirees of the first quintile maintained coverage rates of more than 80 per cent during the full period, those of the poorest group lost significant ground, going from 63 per cent in 1992 to twenty percentage points less by 2003. A small recovery since 2003 was probably caused by a flexibilization in access restrictions to the non-contributory pensions program. Between 2003 and 2006 the number of beneficiaries of this program grew from 40 thousands to almost 90 thousand, due to the relaxation of entry restrictions.[4]

[4] Data from the website of Comisión Nacional de Pensiones Asistenciales.

While coverage of the elderly slowly declined during most of the 1990s, the value of benefits in real terms grew by more than 3.5 per cent per year between 1994 and the end of 2001. Interestingly, no general increases of benefits were granted during this period, but the combination of ad-hoc adjustments of individual benefits (caused by judicial decisions) and the higher level of new benefits had an important impact. On the other hand, the minimum benefit for retirees, established at $150 in the early years of the decade, was not modified. As a result, the minimum benefit went from representing nearly 60 per cent of the average in 1994 to below 50 per cent in early 2002, and the proportion of beneficiaries receiving the minimum benefit went from nearly 40 per cent in 1994 to approximately 16 per cent in 2001.[5]

Beginning in 2002, the Government implemented an aggressive policy to increase the minimum benefit, to compensate for inflation and also to increase its real value. After a sharp drop in 2002 due to the inflationary impact of the crisis and the peso devaluation, the minimum had recovered its previous real value by mid 2003 and, by late 2005, the real value of the minimum benefit was 60 per cent higher than four years before. Meanwhile corrections for other benefits were very limited. As a consequence, by late 2005 the minimum represented 85 per cent of the average benefit. This trend continued in 2006 and 2007 and, by June 2007, the ratio of the minimum to the average benefit had reached 90 per cent.

The rapid increase in minimum benefits after 2002 increased the average, but many retirees have not recovered their benefits purchasing power of the 1990s. The core problem behind this has been the absence of an automatic indexation system for benefits, as all corrections are made on a discretionary basis. While Argentina's constitution indicates that pensions must be adjustable, the legislation in place since 1995 established that there would be no automatic indexation of any variable or parameter in the system. This restriction only applied to benefits from the PAYG scheme (including those of beneficiaries retired before the reform), as benefits from the funded scheme were adjusted through the returns of invested assets. The lack of indexation not only affected benefits of those already retired, but it also impacted benefits at retirement. The multipilar system established in 1993-94 granted benefits from several components. First, the basic, flat benefit known as "PBU" was designed to represent approximately 28 per cent of current average wages. Since this benefit was not revised after 1995, its value has declined, especially in recent years as salaries increased. As of late 2007, PBU represented less than 15 per cent of the average wages. On the other hand, benefits from the second pillar PAYG scheme (known as "PAP") and from the transitional component (known as "PC") were defined as a proportion of the "base income", the average wages of the last ten years of work before retirement. Since these wages were not indexed, an inflationary process might have an impact on them. In the early years of the new system, workers saw their base income affected by the inflation registered in 1989-1991, but these effect declined as time passed. However, the new inflationary process that began in 2002 had again an impact on these components.

Figure 5 shows the trend in pension spending since the early 1980s. As these data come from budget accounts, it includes all pension expenditures, including non-contributory, special regimes (such as the military), etc. The sustained growth between the mid 1980s and early 1990s explains the government efforts to introduce a reform, which had a clear impact as total spending stopped growing in 1993, and became stable at 7.5-8 per cent of GDP during most of the decade. This stability was the combined result of a growing average benefit, shown in Figure 4, and a declining coverage, shown in Figure 3.

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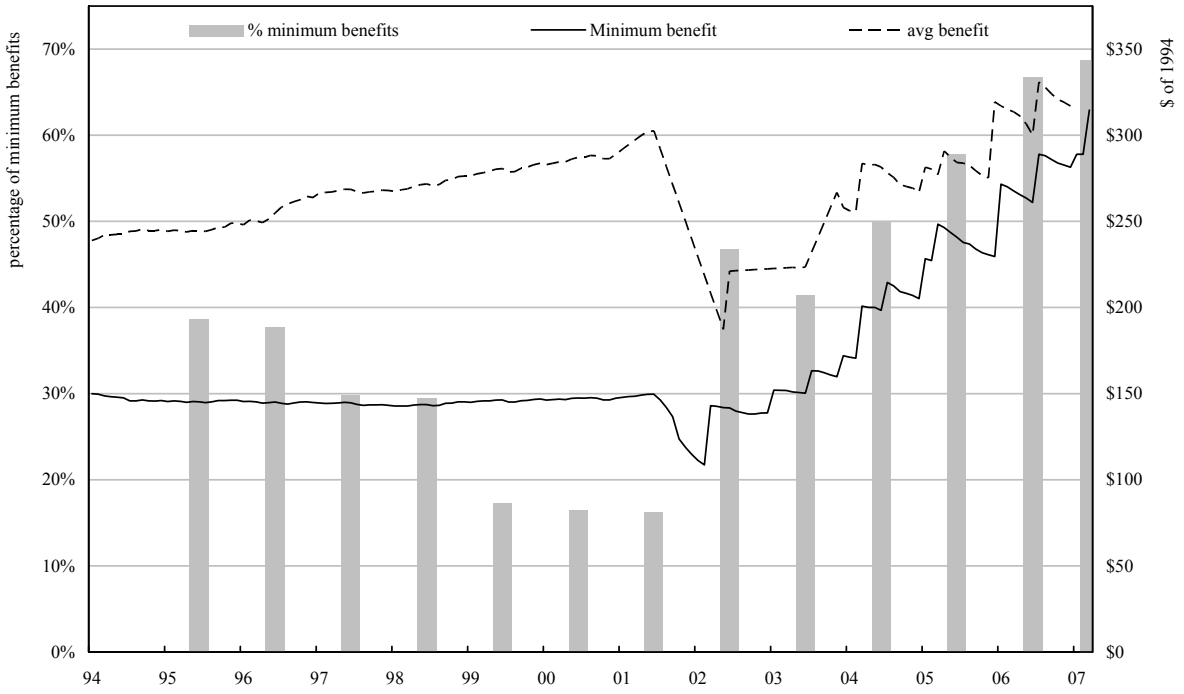
[5] Beginning in 1992, additional transfers were granted to older beneficiaries earning the minimum benefit to bring its value to $200. The number of beneficiaries included in this provision grew during the nineties, reaching 750,000, or nearly all beneficiaries at the minimum.

Figure 5

Argentina: Average and Minimum Benefits, in Real Terms, and Percentage of Beneficiaries Earning the Minimum, 1994-2007



Source: Moreno (2008).

The figure also shows the sharp decline in spending produced by the 2002 crisis. As average benefits suffered a drop of nearly 40 per cent in that year, the slow recovery in real terms (together with the rapid growth of GDP since 2003) explain that, by 2006, total spending in pensions was still 20 per cent less than before the crisis. However, expenditures at the national level presented a sharp increase in 2007, as a consequence of the recent reforms.

2.1.3 The political environment: Motivations for the reform

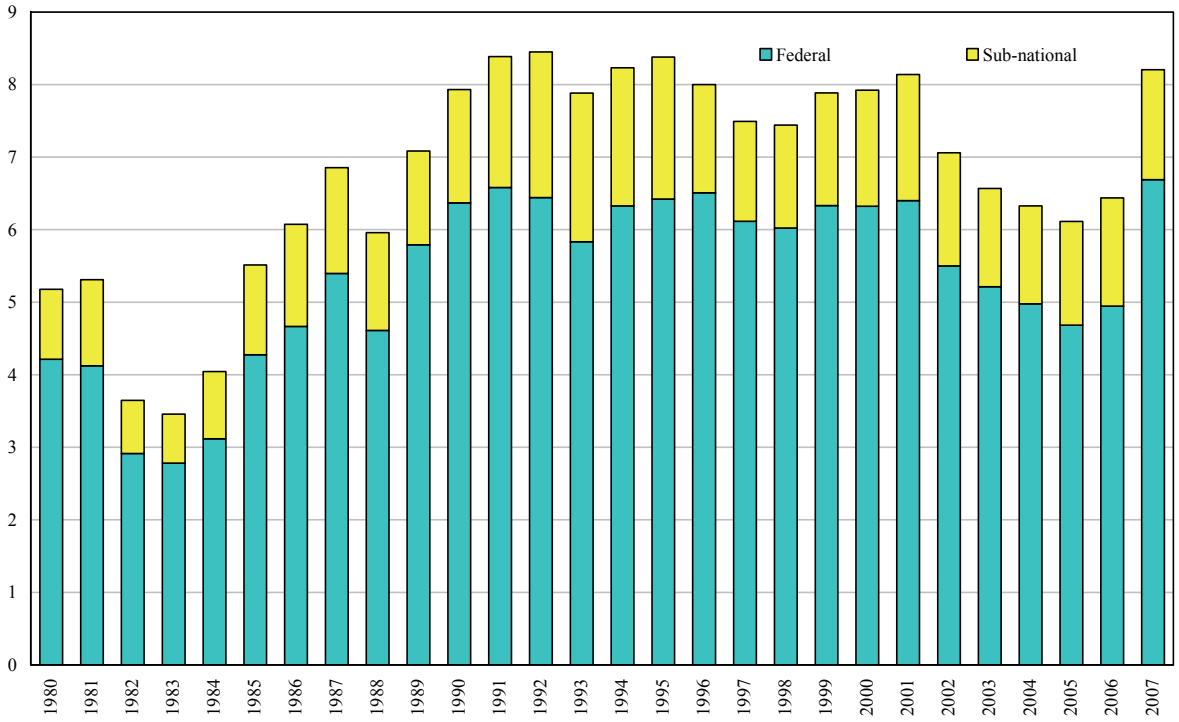
Argentina' successive governments have been aware of the need to review its pension system for nearly a decade now. After the 1993 reform, authorities were not fully satisfied with the new model and pushed forward for new revisions, first through a law called "Pension solidarity law", that eliminated indexation in the system, and then through other legislation to review aspects of the funded scheme.

In 2000 a report published by the Ministry of Social Development (Secretaria de la Tercera Edad, 2000) indicated that the most critical problem of the pension system in Argentina was the declining coverage among active workers and the elderly. Later that year, a system reform that would provide coverage to elderly with less than the minimum vesting period was enacted through a decree, but never implemented.

In 2002, the Social Security Secretary organized, through a consultative process with experts, representatives of interest groups, and government officials, the preparation of a "white

Figure 6

Argentina: Pension Expenditures by Government Level, 1980-2006
(percent of GDP)



Source: MECON (2007) and Goldschmit (2008).

book" (SSS, 2002), that would define the medium term strategy for the pension policy. More public and private debates followed these efforts, and legislators introduced several pieces of draft legislation to Congress, but no action was taken.

The recent reforms in Argentina appear to have been the result of a closed-door process, where a few policymakers defined the path to follow in successive and not always coordinated steps, and little if any participation of sector authorities. At the normative level, there were five main actions taken since 2005 that resulted in the system design and performance as of the end of 2008.

First, authorities decided to reinstate the special pension scheme for teachers, which had been eliminated (although this had been, in turn, successfully challenged in court). This decision was important regarding this particular group (which comprised approximately 5 per cent of contributors to the system) but also as a precedent. The decree issued by the government established that the old special system for teachers, diplomats, members of the judiciary and other small groups that had been eliminated in 1994 were valid and, consequently all contributions to the funded scheme by these workers had to be transferred back to the public system.

The second, and most important, reform was enacted through a series of laws and decrees, as it resulted in a massive increase in the number of beneficiaries of the system. The legal system in Argentina allowed independent workers, since 1995, to pay contributions owed before the 1993 reform in installments, through a scheme known as "moratoria". A new law, passed in December 2003, included in this provision contributions corresponding to the new system, and set relatively

generous financial terms. Later on, as part of a law passed in December 2004 to allow some workers to apply for an early retirement scheme, it was established that independent workers applying to the "moratoria" could retire immediately, and pay the debt while receiving pension benefits. In other words, this law enacted, implicitly, a scheme to pay reduced benefits to individuals who had not contributed enough in the past.[6]

The institutional process that resulted in this major reform was also interesting; as the last law was a project originated in Congress, and was discussed and approved within one day, in December 16, 2004. The new law did not catch the attention of the press, or even authorities, as no public announcement of the new system was made. Only a year later, after a decree enacted in November 2005[7] regulated the process the program began to operate.

A third step was taken by the end of January 2007, when the government announced its intention to reform the pension system. On February 1st a draft law was sent by the President to Congress and, after short discussions, it was approved on February 27th. The focus of this reform was to revise the balance between the funded and unfunded schemes in the multipilar model. The message of the Executive Branch to Congress made explicit eight goals in this reform, as an indirect way to explain its motivation. These were:

i) to improve coverage,
ii) to guarantee citizen' freedom of choice between the funded and unfunded schemes,
iii) to improve the equity and transparency of the system,
iv) to increase the replacement rate of the system,
v) to ensure a genuine financing of the system,
vi) to reduce the administrative costs of the privately managed pension funds,
vii) to deepen the role of the State,
viii) to guarantee a minimum benefit to all beneficiaries, without distinction between the two schemes.

The fourth measure was taken in July 2008, when authorities submitted draft legislation to Congress to introduce an automatic indexation rule for benefits in the PAYG scheme. This law, approved and enacted in October 2008, established that all benefits in the PAYG scheme would be adjusted following a combined index, that includes wages and earmarked taxes growth.

Finally, a fifth measure was announced in late October 2008, and enacted as law in early December 2008. This law eliminated the funded scheme, transferring all contributors, beneficiaries, and assets to the PAYG program. The debate in Congress was short, as the law received support from different political sectors, and became effective as of December 1st, 2008.

2.2 The reforms

If considered as a group, the reforms enacted in the pension system in Argentina in the last few years aimed at changing the system coverage and adequacy of benefits, its fiscal parameters, the role of the State and the private sector in its management and some regulations of the operational and investment regimes of the funded scheme. This section describes in more detail each of them, and indicates, when possible, the expected impacts they might have in the short and medium term. Table 1 summarizes the main reforms, and the following subsections discuss some of their most relevant aspects.

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6 The three laws referred in this paragraph are 24476, 25865 and 25994.

7 Decree 1454/2005.

Table 1

Main Aspects of the 2005-07 Argentina Pension Reforms

Topic	Reform	Description
Coverage: Distribution of workers among schemes	Special retirement schemes were reinstated	Teachers, diplomats, researchers and judiciary employees can retire with 82 per cent of reference wages, and different age or vesting periods. Their current and accumulated past contributions are compulsory directed to the PAYG scheme
	Affiliates to funded scheme allowed to switch back to PAYG	Workers with less than 10 years to retirement and low balances in their accounts switched by default back to the PAYG scheme All other workers allowed to switch, once every five years
	Default scheme choice to PAYG	New workers are enrolled by default into the PAYG scheme, unless they explicitly join a pension fund.
Coverage: Elderly access	Access to Non-contribut. Pensions	Quotas limiting the number of Non-contributory pensions were eliminated.
	Moratoria	Individuals with minimum retirement age allowed to recognized debt for past contributions as self-employed to complete vesting period and retire immediately.
	Early retirement	Individuals with less than five years to retirement age and complete vesting period can retire with reduced benefits (50 per cent of penalty, until the statutory age of retirement)
Benefit level/adequacy	No indexation scheme	Benefits in the PAYG scheme continue to have no automatic indexation scheme.
	Discretional increases with focus on the minimum	Authorities continued the policy initiated in 2003 to increase the minimum benefit, and smaller increases were given to other beneficiaries
	Benefits from new PAYG scheme increased	Retiring workers with contributions to the new PAYG scheme will receive higher benefits (from 0.85 per cent of base salary per year to 1.5 per cent)
	Benefit indexation	Benefits from the PAYG scheme will be adjusted twice a year, considering wage and earmarked taxes evolution
Funded Scheme: Administrative costs, insurance, and investment	**Change in cost definition and maximum**	Pension Fund managers no longer responsible for cost of disability and survivors insurance Maximum administrative cost set at 1 per cent of taxable wage
	Consolidation of system, pooling all risks	Elimination of insurance companies' role. New scheme based on collective self-insurance of all participants in pension funds
	"Productive and infrastructure projects" allowed	New regulation establishes that pension fund assets can be invested on this new type of asset. A minimum investment of 5 per cent of total assets is required, departing from previous practice when no minimums were used
Multi-pillar scheme	***Funded scheme closed***	The funded scheme will be closed as of January 1st, 2009, and all contributors, beneficiaries, and assets, will be transferred to the PAYG pillar

Note: Reforms in bold are part of Law 26222. Reforms in italics are part of Law 26417. Reforms in italics bold are part of Law 26425. Others are the result of lower level regulations (decrees and resolutions).

2.2.1 Coverage

2.2.1.1 Enrollment reforms for active workers

Two aspects of the system were modified in recent times with regards to coverage. First, active workers were moved from the second pillar funded scheme to the PAYG scheme, through both voluntary and compulsory procedures. At the same time, changes in requirements to obtain a retirement benefits had an immediate impact on the number of beneficiaries, although these were temporary. On the adequacy aspect, actions (and inactions) regarding benefit levels also had an important impact.

The first element of the trend to switch contributors from the funded to the PAYG schemes was the reinstatement of special schemes for teachers, researchers, diplomats, and judiciary employees. These schemes had been eliminated by a decree in 1994, and it had been repeatedly (and successfully) challenged in court. Beginning in 2001 with the diplomats' scheme, the authorities progressively reinstated the schemes, and by March 2005 the four programs were active. In May 2007 it was decided that all workers of these schemes would have to direct their contributions to the public system. Approximately 174,000 contributors,[8] 1.5 per cent of the total number participating in the funded scheme, were transferred to the PAYG through this process in May 2007.[9]

A second group of active workers transferred to the PAYG scheme was composed by those aged more than 50 years (women) or 55 (men) with less than AR$20,000 in their individual accounts. Law 26222 established that these workers would be switched to the PAYG scheme unless they make an explicit request to remain in a pension fund. Nearly 1.1 million affiliates were transferred through this process between July 2007 and March 2008, approximately 10 per cent of the total number of affiliates (unfortunately, there is no official data available indicating how many of these were regular contributors). This same law allowed all workers to switch between the schemes once every five years, opening the first period until December 2007. In those months, almost 1.3 million affiliates switched from the funded to the PAYG schemes.

These three measures implied that nearly 2.5 million affiliates, or 21 per cent of the affiliates to pension funds by the end of 2006, were switched to the PAYG scheme by early 2008. Many of them may have had highly irregular contribution histories, but unfortunately there is no official data to verify how many were regular contributors.

An additional reform implemented through law 26222 was about enrolment of new workers. The original 1993 law established that new workers had to enroll in a pension fund or explicitly join the PAYG, with a default option for the funded scheme. Most workers (between 80 and 90 per cent) were assigned to pension funds through this mechanism. The new law reversed the default option, and established that, unless an explicit choice is made, new workers will now be enrolled in the PAYG scheme.

A final reform in this area was introduced by Law 26425, in December 2008. This law eliminated the funded scheme, forcing all contributors to switch back to the PAYG as of January 1st, 2009. The switch included beneficiaries, unless they were receiving benefits through an annuity, and accumulated assets were also transferred to the public system, which will manage them in the future.

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8 SAFJP (2007).

9 While 174,000 workers were transferred in May 2007, the actual number of contributors to these programs was apparently lower, but many were transferred by mistake. The final number of workers enrolled in these special programs has not been officially reported.

2.2.1.2 Coverage reforms for the elderly

Interestingly, none of the reforms that directly affect coverage of the elderly were part of the three main reform laws, approved between February 2007 and December 2008. On the other hand, it could be easily argued that this group includes the most important changes to the system. Three major reforms were implemented in recent years: (i) a relaxation of restrictions to access non-contributory benefits, (ii) the "moratoria" program, that allowed many elderly with insufficient or no contributions to retire immediately, and (iii) an early retirement program.

Argentina has had non-contributory benefits for many years, as part of its old age income security scheme. During most of the 1990s, these benefits were limited both in terms of access (as they were rationed and qualified applicants had to join a waiting list to receive the benefit) and adequacy. As coverage of the formal pension system among the elderly declined, the pressure to review this scheme and make it more accessible increased.

In March 2003 the National Government created the "Plan Mayores" ("Elderly Plan"), a program that, as part of the workfare scheme "Heads of Households" that was providing basic income to nearly 2 million households, would provide a basic income to individuals older than 70 years old and no other sources of income. This program began to slowly enroll beneficiaries in the poorest provinces of the country.

A few months later, in August 2003, the restriction in the number of non-contributory pensions was eliminated, and new beneficiaries were admitted to the program. This resulted in a sustained increase in the number of beneficiaries, which had more than doubled by 2006. Monthly benefits were also adjusted, by 2003 they had recovered to the pre-crisis levels and, three years later, they were approximately twice the real value of 2001.

The second, in chronological order, but most important change was the introduction of the "moratoria" program. This program allowed all individuals with the minimum retirement age to apply for a benefit, after recognizing a past debt to the system. As discussed in the previous section, this program was created by a combination of successive laws and decrees, but was never formally launched or announced. While the core law of this scheme was approved in December 2004, there were barely any new benefits under this scheme until May 2007, when the number of new beneficiaries reached 50,000. After that, a rapid acceleration of the application and processing trends resulted in a total of nearly 1.7 million new beneficiaries by late 2007, a dramatic change in the long term trends. Figure 7 shows how the number of beneficiaries of pension and survivors benefits had a rising trend since the early 1970s until the early 1990s, when the reform broke the tendency and the number began to decline. This declining trend continued until the early 2000s (with an exception in 1996-97, when beneficiaries from 10 provincial schemes were incorporated into the national scheme), but then had a sharp increase as the moratoria was implemented in 2006-07.

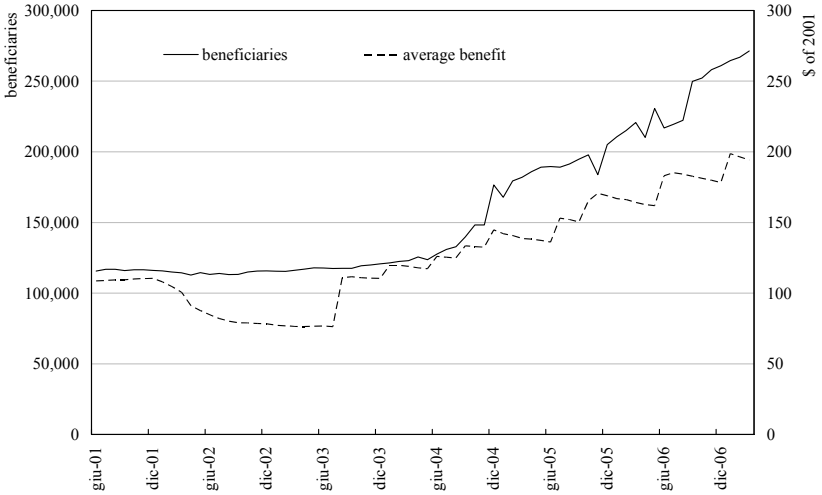
While data to assess the impact of this increase on overall old age income support coverage is not available, it is reasonable to expect that the immediate effect must have been a sharp increase in coverage. Estimating this figure is difficult, since there was no provision in the moratoria program precluding individuals already receiving a benefit (especially in the case of survivors' benefits) to apply, and an important number of duplication of benefits may have resulted from this. Citing administrative data and authors' estimations, Bodou *et al.* (2007) indicated that total coverage of the elderly in 2007 was around 85 per cent, up from 69 per cent observed in 2006.

The third reform affecting coverage of the elderly was the introduction of an early retirement scheme, in December 2004. This program allowed workers who had reached the minimum vesting requirement, but were at most five years younger than the minimum retirement age, to retire earlier,

with a reduced benefit. The program was designed to target individuals with long working careers that lost their jobs during the 2001-02 crisis and were having problems to return to the labor force. While there is no official data available on the number of new beneficiaries under this program, an indirect estimation indicates that there should be no more than 15,000 beneficiaries under this program.

Figure 7

Argentina: Non-contributory Pensions: Beneficiaries and Real Value, 2001-07



Source: ANSES, 2007.

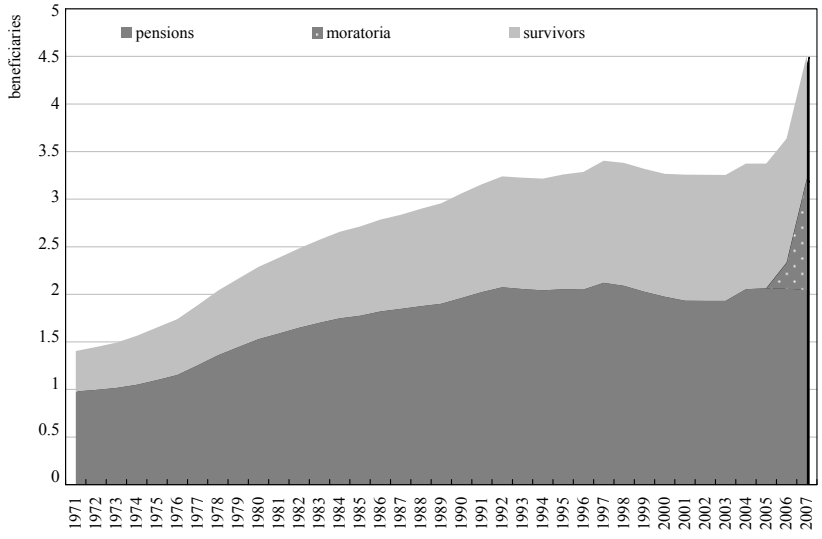
2.2.2 Benefit level and adequacy

With regards to benefit levels and adequacy, authorities implemented actions in three areas in recent years. The first area refers to the decisions taken to increase the minimum and other benefits, the second is about changes in the expected benefits for affiliates to the PAYG scheme, and the third is the introduction, after 13 years, of an automatic indexation system for benefits paid by the PAYG scheme.

The main policy regarding benefit levels in recent years was the sustained increase of the minimum benefits and, more recently, some discretionary adjustments in other benefits. Figure 4 showed how

Figure 8

Argentina: National Pension System: Number of Beneficiaries of Pensions, Survivors Benefits and Moratoria Program, 1971-2007
(millions)



Source: Moreno, 2007.

minimum benefits continued to grow, in real terms, through 2006 and 2007. By the end of this year, this benefit was four times the value corresponding to six years before, in nominal terms. Meanwhile, inflation between 2001 and 2007 was slightly over 100 per cent, resulting in a real increase of almost 100 per cent. Other benefits were also increased, but at a much lower rate, resulting in a rapid compression of the benefits pyramid, weakening the contributory nature of the system.

Several provisions in Law 26222 should result in changes of benefit levels in the future. First, the new law changed the benefits to be paid to those who in the PAYG second pillar scheme – known as "PAP" for its Spanish acronym – increasing the benefits of this component by 76 per cent.[10] While this change has limited effect in the short term (the PAP component of new pensioners will be small for most individuals), it could be more important in the future. Second, as workers with less than 10 years to retirement age and low balances were transferred, their expected benefits will also change. Had they stayed at the funded scheme, they would probably receive no benefit from the PAYG system, as they would never reach the minimum 30 years of contributions, and would get back, in the form of a scheduled withdrawn, their individual account balances once they reach the retirement age. As they move to the PAYG scheme, they would still not qualify for the standard benefits, nor would they get their account balances, and they will probably have to wait until they are seventy years old to apply for an old age pension (a benefit they could request without switching to the PAYG scheme).

Finally, and regarding indexation, after years of political and legal controversy the Government introduced an automatic scheme in 2008. As Argentina's Constitution establishes that pensions should be "mobile", thousands of lawsuit have been won by beneficiaries in the last thirteen years, after a 1995 reform eliminated the automatic indexation scheme. As a result of one of these lawsuits, in August 2006 the Supreme Court, in an uncommon departure from its tradition of considering each case individually, unanimously ruled that the National Government (including the Executive Branch and Congress) should define an automatic indexation system for pension benefits within a "reasonable" time. Unexpectedly, the draft law send by the Government to Congress in February 2007 (which then became Law 26.222) did not include any reference to this topic. On the other hand, the 2008 National Budget Law, approved on December 2007 established that the Executive Branch should prepare new legislation regarding the indexation of benefits.

Unexpectedly, in July 2008 authorities announced that they were submitting draft legislation to congress to introduce a new indexation system. This new system established two semi-annual adjustments, where all benefits of the PAYG scheme will be increased following changes in a combined index, which considers both wages and social security collection. The formula to be used was included in Law 26417, and while it has some technical problems,[11] it is supposed to combine changes in wages (including formal and informal workers) and in taxes earmarked for social security, in equal proportions, provided that this index cannot grow more than 3 per cent faster than total social security collection. It will be first applied in March 2009, using data from the second semester of 2008, and then every six months. The law indicates that, in the future, the same index will be used to adjust reference wages to calculate the initial benefit of retiring workers.

2.2.3 Administrative costs and insurance in the funded scheme:

Law 26222 defined two important changes in the way the costs of the system are accounted,

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[10] According to the law approved in 1993 and applied until 2008, retiring workers received 0.85 per cent of their base salary (the average of the last 10 years), per year of contributions to the new PAYG scheme. The new law increased this percentage to 1.5 per cent.

[11] These problems include a confusion between annual and semi annual periods. If applied literally, the law indicates that the semi-annual increase in benefits will be calculated considering annual increases in tax collection.

financed, and charged. On one hand, the law eliminated the original 1993 provision that made pension fund managing companies responsible of paying disability and survivors' benefits, and required them to buy an insurance to cover these costs. Under the new scheme, a special reserve will be build with contributions from the pension funds (thus reducing the individual account balances) and benefits will be paid from these reserves. Hence, managing companies will not longer be responsible of financing them. On the other hand, a maximum administrative fee was established, at 1 per cent of taxable wages. This level was slightly lower than the average registered before the reform, when the fees, net of insurance costs, were around 1.2 per cent of taxable wages.

The reform in the insurance model eliminated the role of external insurance companies in financing survivors' and disability benefits, as the funded scheme will now self insure. The new system does not accumulate reserves. Instead, beneficiaries of disability and survivors benefits will receive a lump sum payment (which will have to be converted into an annuity or a scheduled withdrawal) from the pension fund, and adjustments across the different funds will be done on a regular basis to ensure that costs are equally supported by all participants. Benefits will continued to be paid in the form of annuities, provided by a separate set of insurance companies, or through scheduled withdrawals, paid directly by the pension funds.

These reforms were short-lived, as Lay 26425 eliminated the funded scheme, and, consequently, made these regulations redundant.

2.2.4 Investment of pension funds assets:

The final area or reforms included in this discussion is the regulation of the pension fund investment portfolios. Law 26222 created a new category of investments, called "productive and infrastructure projects". The new regulation requires a minimum investment of 5 per cent of the fund in this category (a departure from previous and international practice, where there are no minimum investments) and a maximum of 20 per cent. While this seems to be a minor reform, its implications could be significant in the future, depending on what type of instruments are considered as part of this new category.

On the other hand, the implementation of laws 26222 (which transferred assets of a number of contributors to the funded scheme to ANSES) and 26425 (which transferred all contributors and their assets to ANSES) created a large portfolio of financial assets to be managed by the public social security agency. A decree approved in mid 2007 had created a "Sustainability guarantee fund", where ANSES would deposit all surplus assets not used to pay benefits. This fund would be managed by ANSES, with support from the Ministry of Finance. Law 26425 established that all transferred assets would be added to this fund as well, and created some additional regulations, including a new overseeing congressional committee, and a council with representatives from the government, workers associations, retirees associations, and business associations. Regulations regarding investment policies were not fully detailed in the law.

2.3 Expected fiscal impacts

As a consequence of the policy making process adopted for these reforms, there have been no formal assessments of their fiscal impacts, either in the short or medium term. None of these policies was adopted citing fiscal concerns or need, nor were these concerns present in public debates or presentations. As of late 2008, no public institution has published a document discussing the potential fiscal implications of these reforms, and public statements made by officials and policy makers have been very broad and unspecific regarding the fiscal impacts.

Among the different policies, the changes of affiliation from the funded scheme to the PAYG and the moratoria seem to be the two most relevant in fiscal terms. The changes in affiliation had an immediate impact on revenues for the public system, in the case of the workers from the special schemes and those close to retirement, as the balances of their individual accounts were transferred. This one time transfer of funds to the public system amounted to AR$8.35 billion, nearly 20 per cent of the annual expenditures in benefits by the public system, in 2007 and early 2008, and a second transfer of approximately AR$85 billion, by the end of 2008. Additionally, the future flow of contributions of these workers and those who chose to switch should represent additional revenue for the public system, for approximately AR$15 to AR$20 billion per year.

On the other hand, the cost of the moratoria program should be close to AR$11 billion in the short term, although this figure should decline in the future as access to the program was closed for most workers.[12] The national government spent, in 2007, nearly 1.75 percentage points of GDP more than one year before, an increase that can be attributed mostly to the moratoria. For 2008, the national budget estimates that pension expenditures will be nearly twice those of 2006, in a context were prices have grown at 10-20 per cent and GDP at 8 per cent per year. As a result of these increases, expenditures in social security in Argentina will probably reach historical record levels in 2008, at over 9 per cent of GDP.

Building a model to project medium and long term fiscal trends for the pension system in Argentina is a difficult task, mostly because several variables, such as the real value of average and minimum benefits are unknown and will be defined in a discretional way. The fiscal impact of moratoria should decline over time, as beneficiaries die, and unless new opportunities to join the program are offered in the future, its effect should tend to disappear in 15-20 years. On the other hand, the positive effect of the switch of workers should be more stable, as new workers joining the labor force will be enrolled in the PAYG scheme. However, benefits paid to these workers might be actuarially unbalanced, which could eventually result in negative impacts.

2.4 Pending challenges

The most critical pending challenge that the pension system has in Argentina after the recent reforms is, by far, its predictability. This problem arises from some specific issues, (such as the implementation challenges of the recently approved laws, or the uncertainty about investment policies for the new publicly managed pension fund), but also from an evident weakness on the institutional processes related to the design and regulation of the system. A second core challenge is about coverage. While the "moratoria" program included most elderly in the pension system, this was supposed to be an exceptional measure, and no long term solution to the question of informality has been implemented. A third problem is the still existing fragmentation between the national system and provincial or professional schemes, and the inequities, inefficiencies and fiscal problems created by this situation.

The lack of a transparent and reliable indexation scheme to adjust all variables in the system (including all PAYG benefits, minimum benefits, maximum taxable wages, reference wages, etc.) resulted in countless lawsuits and case-by-case responses in the last two decades. The new legislation might solve this for the future, but since it did not include any provisions regarding past indexation of benefits or reference wages, there is a significant space for further legal disputes. Furthermore, the compulsory switch of all workers contributing to the funded scheme to the PAYG system might result in additional lawsuits, if some of them consider their property rights affected by this decision.

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[12] The program remains open only for workers that can claim contributions made before 1994.

The institutional problem is equally relevant. Formally, pension policy in Argentina is designed by the Social Security Secretariat, at the Ministry of Labor, Employment, and Social Security. However, the role of the Secretariat has been diminished by the high level of autonomy of the Social Security Administration (supposedly, an executing agency) and, until recently, the Superintendency of Pension Funds. Furthermore, the roles of all these institutions have been weakened by an increased centralization of the decision making process, with little inputs from the technical sectors.

The second challenge is about coverage. While no definite data is available, it was estimated that the moratoria program resulted in an increase of coverage among the elderly, which might have reached 85 per cent. This improvement appears to have been achieved at a high cost, as many of the new benefits granted under the new program went to those who were already receiving a pension benefit. Still, two important questions remain. First, if this figure is correct, it is not clear whether the remaining 15 per cent represent those who are relatively better off and thus decided not to apply for benefits, or, on the contrary, they are so excluded from the system that weren't able to apply for this program. If that were the case for most of them, then it would be important to find ways to reach these individuals and include them in the system.[13] Second, the prevalence of high informality rates among current workers indicate that, in the future, retiring cohorts will find the same problem that those who obtained a benefit thanks to the moratoria. However, since access to this program is now limited to those who can claim contributions made before 1994, many of those currently working as informal workers will not be able to obtain a benefit in the future.

The response to this problem in the future could be to introduce new moratoria laws (although this approach would generate negative incentives for those who contribute to the pension system); to adopt a more structural approach, defining and integrated model that includes non-contributory benefits for those with no contribution histories, proportional benefits for those with some contributions and full benefits for those with complete contribution records; or to simply ignore it, forcing individuals and families to find alternative income sources on their own.

The third challenge mentioned in this section is the question of fragmentation. As defined by the Constitution, provinces have the right to set up their own pension schemes for civil servants, and to authorize the operation of occupational pension funds. While legal, the existence of multiple pension schemes in Argentina creates problems of inequities (as some provincial schemes are much more generous than the national system), and efficiency (as there are multiple problems of coordination between the different schemes). This fragmentation also has fiscal implications, because some schemes are unsustainable and require continues subsidies from provincial or national funds.

After the 1993 reform, national and provincial authorities began a process to consolidate the pension systems. Between 1994 and 1997, ten provinces transferred their schemes to the national system, thus reducing the fragmentation. However, this process was stopped at that point due to fiscal restrictions and, since then, new occupational schemes have been created throughout the country, increasing the number of independent agencies in charge of managing the programs. In this context, it is apparent that efforts to integrate the programs, either by consolidating them or introducing reforms to make the parameters of the programs consistent across jurisdictions are necessary. Also, most occupational funds are run with little or no supervision, exposing their participants (and, ultimately, the provincial and national governments) to serious financial risks.

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[13] Traditionally, non-contributory pensions in Argentina have been rationed and access was limited to some of those who applied for them. Thus, there is little experience in launching public effort to reach those excluded from the system.

3 The reforms in Chile

Twenty eight years after the pioneering pension reform that replaced a traditional PAYG system by one based on individual accounts, market capitalization and private management, the Chilean Congress approved in January 2008 the second largest comprehensive reform to its pension system.

In this chapter, we describe the social and political context that gave rise to this second generation reform, we provide a detailed overview of its main contents and we identify some of the pending challenges.

3.1 The situation as of 2005

3.1.1 Quick description of the system

The current Chilean pension system can be decomposed into three main pillars: a poverty prevention pillar, a contributory pillar and a voluntary pillar.

The poverty prevention pillar, before the 2008 reform, was based on two components: a means-tested assistance pension (the PASIS) and the Minimum Pension Guarantee (MPG) for individuals who contributed for at least 20 years to the individual capitalization scheme, but that were not able to finance a minimum amount for their retirement. Together, these two programs corresponded to the main government programs aimed at avoiding old age poverty, and were financed by general revenue.[14]

The contributory pillar was drastically reformed in 1980. The previous system was based on a number of PAYG schemes, that provided defined benefits calculated as a proportion of the wages received during the last period of working life. Theses schemes were running increasing deficits, caused by large imbalances between the benefits that were promised and the contributions that were made into the system. In 1980, the military government created a unique national scheme that was based on individual accounts where each worker's savings are deposited and invested in financial instruments by professionals firms, the Pension Fund Administrators (the AFP system).[15] These firms can freely set an administrative fee in exchange for the different services they provide (collection, record-keeping, investment, benefit calculation and payment, and customer service) and individuals can switch at any time between AFPs.

Individuals are not allowed to withdraw funds from their individual accounts until they retire, which can happen at any point after the legal retirement age (65 years for men and 60 for women) or before that (early retirement) if they have accumulated enough funds in their account and they receive a minimum replacement rate. When the individual retires, he or she can choose between buying an annuity from an insurance company or receiving a programmed withdrawal stream from the AFP. In both cases, benefits are actuarially calculated as a function of the individuals savings accumulated over the lifetime, the potential beneficiaries and (age- and gender-specific) life expectancy.[16]

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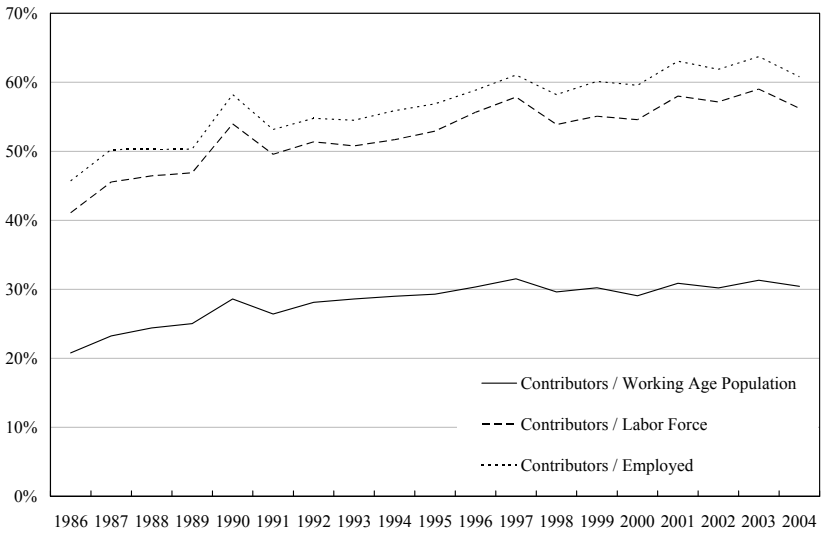
[14] One could argue that there is another important component of the old-age social protection network: free and guaranteed access to the public health system. However, this is not discussed in this paper as it concentrates on the pension system.

[15] Only the armed forces, military and police, remained in their previous PAYG schemes.

[16] A detailed description of the current AFP system can be found in Berstein (2007), available in the English section of www.safp.cl. A number of articles have been written about the impact the 1980 Chilean pension reform may have had on social security coverage, financial development, national savings and economic performance. For instance, see Corbo & Schmidt-Hebbel (2003), World Bank (1994) and Holzmann *et al.* (2005).

Figure 9

Historic Contributory Coverage in Chile



Source: Figure 1, Berstein, Larrain and Pino (2006).

To complement the compulsory savings made into the contributory scheme, tax incentives are provided for individuals who make additional voluntary savings in a special set of financial products: voluntary savings accounts managed by the AFPs, mutual funds offered by banks, insurance-plus-savings products provided by insurance companies, etc. The scheme is set so that the part of the individual's income that is allocated into these special products is exempt from income taxes during the years the deposits were made. Interest income from these savings is also tax-exempt, but pensions financed by these savings pay regular income taxes when they are received by the worker. Individuals are allowed to withdraw funds before retirement, but with a penalty, and in addition to the income taxes that ought to be paid at the time of this withdrawal.

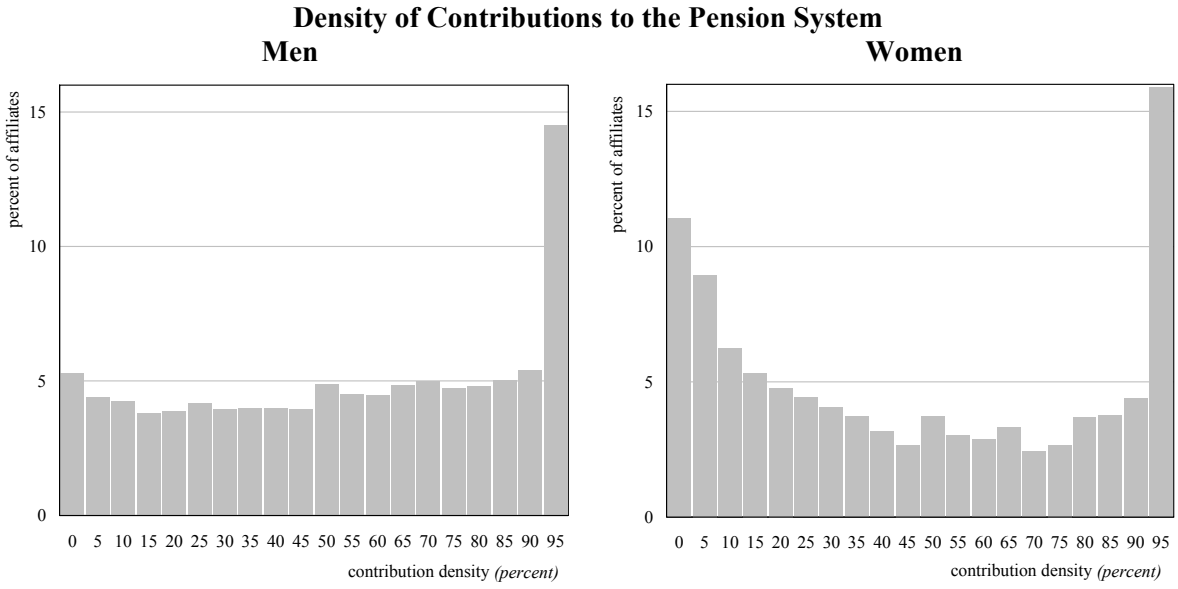
3.1.2 Recent trends in pension coverage

As the Chilean pension system has been largely based on contributions from formal salaried workers, contributory coverage is one of the most important determinants of pension coverage. Since the early system of the 1930, between 60 and 70 per cent of the labor force has been enrolled in the pension systems in Chile (Arenas de Mesa, 2000). The indicator shows some variance, depending on the economic cycles and labor markets conditions. After the 1981 reform, available data provides information about actual contributors, and not just enrolled workers. The ratio of contributors to labor force, as shown in Figure 9, has slowly increased in the last two decades.

It has been argued, however, that more important than contributory coverage is the density of contributions of workers, *i.e.*, the fraction of working life during which a person makes contributions to social security. Figure 10 presents the distribution of this measure for Chilean men and women, making evident the high degree of heterogeneity in contribution histories: from individuals who contribute all of their available time to individuals who barely contribute during their lifetime and all the possibilities in between. This heterogeneity is particularly strong among women, who show a strongly bimodal distribution, with significant mass in the two extremes (0 and 100 per cent).[17]

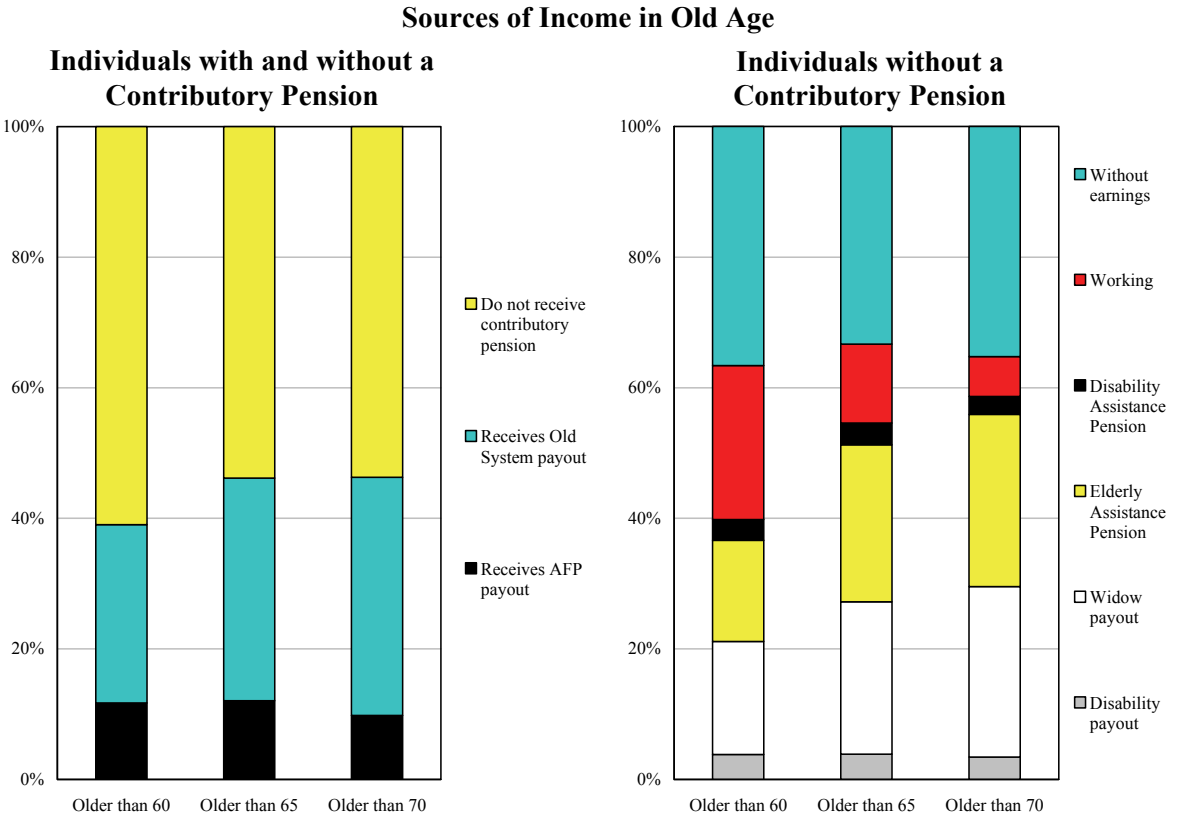
[17] The estimation of contribution densities was prepared considering actual data for 24,000 workers, active between ages 16 and 59.

Figure 10



Source: Figure 2, Berstein, Larrain and Pino (2006).

Figure 11



Source: Figure 5, Berstein, Larrain and Pino (2006).

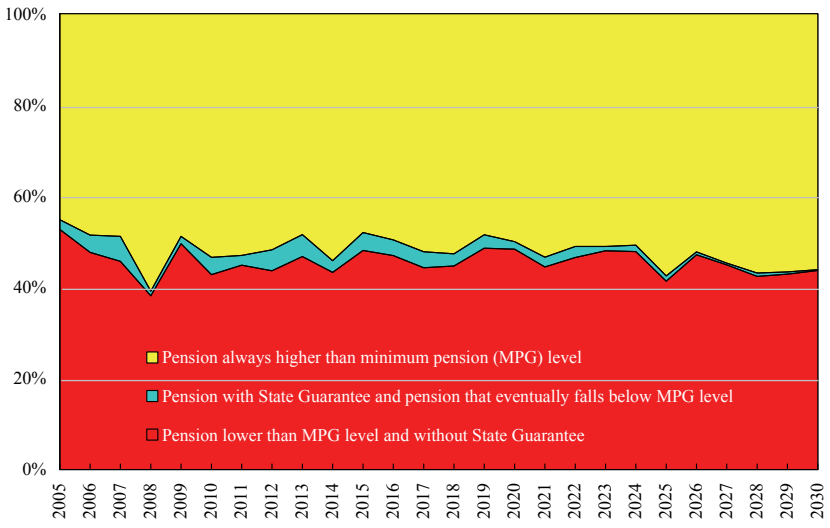
Finally, Figure 11 shows the distribution of old age coverage in the Chilean population. Approximately half of the population over 70 receives a benefit from a contributory scheme (currently, most of this coverage is provided by pensions from the PAYG regimes but their importance is decreasing every year as the AFP system matures). The bottom graph shows the different sources of income for those individuals who do not receive a direct benefit from a contributory scheme: assistance pensions, widow pensions and disability payments provide some form of coverage for close to 60 per cent of this group.

3.1.3 The political environment: Motivations for the reform

A number of factors may have contributed to the adoption by presidential candidate Michelle Bachelet, of pension reform as one of the main campaign promises for the 2005 election. Since Chile's return to democracy, a center-left coalition had won three consecutives elections taking in each case, at least one important reform to the policies or institutions created during Pinochet's 17 year ruling period: President Aylwin's period (1990-1994) was centered on creating a stable political environment for a successful return to democracy; President Frei's period (1994-2000) concentrated its efforts on education and infrastructure reforms and President Lagos' (2000-06) main achievements were a reform to the private health insurance system created by Pinochet and the creation of a privately run unemployment insurance scheme based on individual accounts. Pension reform, especially a reform to the non-contributory component was clearly one of the pending debts of the governing coalition. This demand for a coverage enhancing reform was partly justified by the first coverage studies that were published in 2005 and 2006, suggesting that large fractions of the population were not going to be able to finance a minimum pension and would not qualify for the minimum pension guarantee (that required 20 years of contributions).[18] Figure 12 shows the results of one of these projections, in terms of the projected level of coverage for the affiliates to the Chilean pension system (before the current reform).

Figure 12

Pension Projections for the Chilean Pensions System
(before the reform)



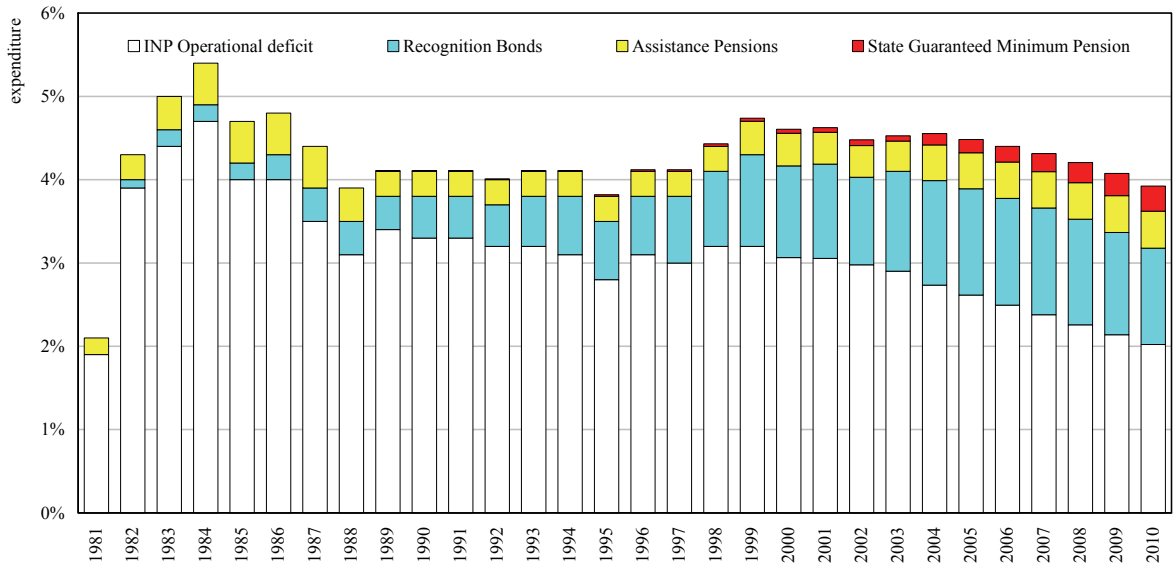
Source: Figure 7, Berstein, Larrain and Pino (2006).

A second important factor that must have been considered in the decision to undergo a concentrated and the combination of extraordinary profits over

[18] See Berstein, Larrain and Pino (2005) and Arenas de Mesa *et al.* (2006).

Figure 13

Pension-related Fiscal Expenditure in Chile
(percent of GDP)



Source: ECLAC (2006).

strong pension reform is the fiscal space that was being created by the gradual reduction in the transition costs generated by the original pension reform of 1980. As Figure 13 shows, both the operational deficit associated with the phased-out PAYG system and the recognition bond obligations made to workers who switched to the new system were, by 2005, starting to decline. This represented an opportunity to introduce a broad social safety net for old age.

Finally, a certain consensus was reached that the AFP industry was becoming increasingly assets with lack of entry over a long period were symptoms that price competition was not working properly in this particular market. These were certainly some of the factors in President Bachelet's decision to take pension reform as her main contribution to the social and economic development of the country.

3.2 The 2008 Chilean Pension Reform

In March 2006, newly elected President Michelle Bachelet appointed a presidential committee of 15 professionals, experts in the different areas related to the pension system, to draw a report with reform recommendations for the pension system.[19] Two years later, a comprehensive bill was approved by Congress, representing the most significant reorganization since the original 1980 reform that created the AFP pension scheme. The scheme was essentially maintained in its original form but significant improvements are introduced to increase the coverage of the poverty prevention pillar, to improve gender equality in the pension system, to intensify the scope of competition in the AFP industry, and to introduce a more flexible investment regime for the AFPs.

[19] See Consejo Asesor Presidencial para la Reforma Previsional (2006).

In this section, we review the main elements of the reform (summarized in Table 2), its expected impacts and fiscal sustainability. We conclude the section with some of the expected challenges to be addressed in the future.

3.2.1 Description of the reforms

3.2.1.1 Measures to increase extension and quality of coverage in the pension system

The individual nature of the AFP system creates a direct link between the frequency, timing and amount of the contributions made by an individual and the benefits he/she obtains. Pensions tend to be smaller when individuals face long periods without contributions, caused by occupational choices or informality, make a late entry into the formal labor market or make contributions that are not proportional to their actual income. Furthermore, actuarial calculations imply that life expectancy increases require higher savings to allow for reasonable replacement rates, either in the form of higher voluntary savings, extended working lives or reduced pension periods. The Chilean 2008 reform addresses these concerns in a number of ways: replacing the poverty prevention pillar with a strong New Solidarity Pillar, making participation compulsory for a large group of self employed workers, facilitating the creation of employer-sponsored voluntary savings plans, creating direct incentives for voluntary savings from low and middle income workers, and a number of measures that improve gender equality in the system, which will be discussed in the next section.

The New Solidarity Pillar (NSP)

Previous to the reform, poverty in old age was partially addressed by two main programs: the minimum pension guarantee, that provided a floor for pensions for individuals who contributed for at least 20 years, and the Assistance Pensions program (PASIS) for poor individuals with no pension entitlements.[20]

The 2008 reform replaces these programs with a unique scheme that guarantees that all individuals in the 60 per cent less affluent fraction of the population will have a guaranteed basic pension, regardless of their contribution history.[21] This new program provides old age and disability subsidies, financed by general revenues of the State.

Individuals with no contributions are entitled to an old-age Basic Solidarity Pension (PBS), once they reach 65 years of age, and fulfill the affluence and residence requirements.[22] Individuals who made contributions but will receive a pension below a certain threshold are entitled to a

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[20] As of March 2008, the minimum pension guarantee is equivalent to US$222 (US$242 after age 70 and $257 after age 75) and the PASIS program provides old age, disability or mental deficiency benefits equivalent to US$110 before age 70, US$117 after age 70 and US$128 after age 75 (all US$ figures based on an exchange rate of 435.10 pesos per dollar, existing as of March 12, 2008, the day the reform was officially promulgated). For an analysis of this poverty prevention pillar and alternative designs, see Fajnzylber (2006).

[21] The scheme will be introduced gradually: in the first year, beginning in July 2008, the Basic Solidarity Pension will be equivalent to US$137 and restricted to the 40 per cent less affluent population. This benefit will increase to approximately US$172 in July 2009, and cover up to the 45 per cent poorest individuals. The final schedule of benefits will be in place in July 2012, covering up to the 60 per cent poorest individuals.

[22] The affluence test is a form of means-testing applied to determine that a person does not belong to the 40 per cent richest fraction of the population (60 per cent in the first year). Initial implementation (2 years) will be based on the *Ficha de Protección Social*, a means-testing instrument that calculates the vulnerability of the members belonging to a household, based on information about their capacity to generate income, self-reported earnings, administrative data on pensions and need adjustments based on age and disability status. More information about the instrument can be found in www.fichaproteccionsocial.cl. The residence test requires that individuals must have resided in Chile for at least 20 years since the age of 20, and at least 3 in the 5 years prior to requesting the benefit.

Table 2

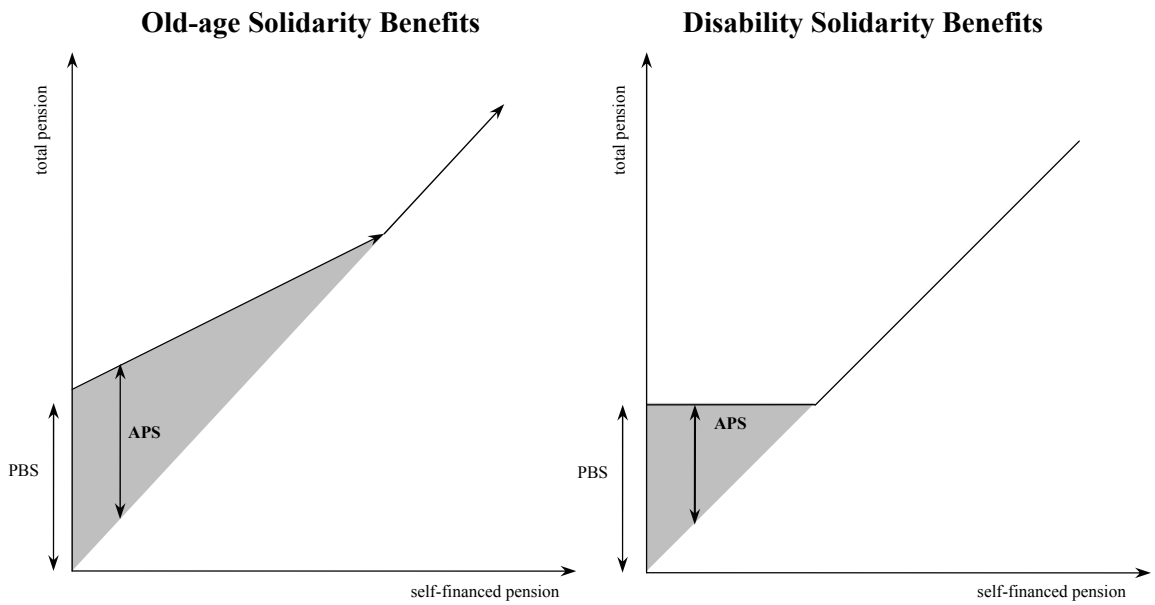
Main Aspects of the 2008 Chilean Pension Reform

Topic	Reform	Description
Coverage through poverty- prevention pillar	Creation of a New Solidarity Pillar	* Provides a Basic Solidarity Pension (PBS) to individuals with no pension earnings, belonging to the 60 per cent poorest individuals in the population * Provides a Pension Solidarity Complement (APS) to individuals who were able to finance a small pension
Coverage/adequacy through contributory pillar	Compulsory contributions from self-employed workers	* After a transition period, self employed workers in certain tax categories will be required to make contributions into the AFP system, through their annual income tax statement
	Subsidy to contributions from low income young workers	* The first 24 contributions of low income workers aged between 18 and 35 will be partly subsidized by the State and an additional contribution will also be financed for these contributions
	Additional contribution for women	* Women and men will be charged the same fee for the disability and survivorship insurance but men have higher risk rates. The difference will be deposited in women's account
	Additional tools for the supervision of contribution payment	* Circumstances where employers stop making contributions without formal reporting will be automatically considered as "declared but not paid" * Employers who will be allowed 3 additional days if they file contributions electronically
Coverage/adequacy through voluntary pillar	Legal framework for Collective Voluntary Savings Plans	* Provides tax incentives for firms to set up collective plans where workers contributions are matched, to some extent, by the employer, subject to a minimum vesting period
	Tax incentives for middle income workers	* Allow for tax exemptions either at the time of contribution or at the time of withdrawal * There is a bonus set by the State to low-income individuals who make voluntary contributions on an individual or collective basis
Gender equity in the pension system	Bonus for every live birth	* The State will either deposit a bonus in the woman' account or increase the amount of the PBS in the annuity-equivalent for every live birth or adopted child. The amount of the bonus is equivalent to 18 months of contributions at the minimum wage rate, plus the average rate of return of the pension system between the birth of the child and the moment the woman turns 65
	Savings redistribution in case of divorce or annulment	* The judge can order, as a means of economic compensation, to redistribute savings between the two accounts, up to 50 per cent of the funds that were accumulated during the period they were married
	Symmetric treatment of men and women in the pension system	* Women can now leave, in case of death, pensions to their surviving spouse * Separate contracts for men and women are set for the disability and survivorship insurance

Topic	Reform	Description
Increase price competition in the AFP industry	Competitive bidding for new members	The Superintendency of Pensions will set, every 2 years, a bidding process: The AFP who offers the lowest fee will automatically receive all new participants in the system for a period of 24 months. This fee applies to all members of AFP
	Incentives for separation of AFP functions though outsourcing	* AFPs are now allowed to outsource most of their functions * Tax disadvantages of outsourcing are eliminated
	Separation of disability and survivorship insurance	All AFPs must set up, together, a bidding process to obtain disability and survivorship insurance. Today, each AFP hires its own policy
	Simplification of fee structure	Facilitates cost comparison by allowing only one type of fee (as a fixed percentage of taxable income)
	New actors in the industry	* Insurance companies are allowed to create an AFP subsidiary but maintaining the sole purpose nature of the regulation
Investment regime	More flexible investment limits	* Only structural limits are fixed by law: other limits are set by secondary regulation, with advice from an Investment Technical Committee * This increased flexibility is accompanied by greater responsibility from the AFP, who must now set up special Board Committees for investments and conflicts of interest and explicit investment policies * Eventually, investment limits may be replaced by risk measurement and control
	Higher limit for foreign investment	The maximum investment limit can be increased to up to 80 per cent of the value of the Pension Fund. The Central Bank will set it within a 30-80 per cent range
Participation, Information and education	Creation of an AFP Users' Committee	* Representatives of workers, retirees and administrators will make evaluations and propose improvements
	Creation of Pension Education Fund	* Financed by State transfers and private donations * Funds will be invested in promotion or education campaigns, selected through a competitive process
	Creation of Pension Advisors	* Individuals who offer independent advice on the different choices faced by workers, and that are paid from the individual's fund, with a lifetime maximum
Social security institutional framework	Creation of new institutions	* The Social Security Institute is created to manage the New Solidarity Pillar (NSP), as well as remaining participants in old regime * Integral Pension Assistance Centers (CAPRIs) are created throughout the country to receive applications to the NSP * Superintendency of Pensions replaces the current Superintendency of AFPs, with a broad oversight over private and public participants * The Pension Advice Committee is created to assist the Labor and Finance Ministries in issues related to the NSP

Figure 14

Subsidies and Final Pensions under the New Solidarity Pillar



Pension Solidarity Complement (APS), with the same affluence and residence requirements.[23] The disability program provides benefits under similar conditions, but for individuals between the ages of 18 and 64. Once disabled individuals reach the age of 65, they are eligible for old-age solidarity benefits.

The schedule of subsidies is best described in Figure 14, which presents solidarity subsidies and total pensions, as a function of self-financed entitlements.

It is worth noticing two particular elements of this design: the strong integration between the contributory system and the solidarity pillar and the concern for contributory incentives that this integration raises. Integration allows guaranteeing that everybody in the first three quintiles will receive a pension equivalent to, at least, the PBS. If the benefit had been established with a cap (as in the disability case), there would be strong disincentives to contribute for low income individuals, as their retirement income would not increase with the number or amount of contributions. With the chosen design, old-age total pensions are monotonically increasing with self financed savings, *i.e.* every dollar saved always increases retirement income, but not by a full dollar.

This is certainly the most important component of the 2008 reform, both in terms of extension of coverage and assurance that every old person in Chile will have access to some form of protection. Current projections show that this program alone will drastically reduce income inequality in the years to come. The main challenge is, of course, the ability to develop sound fiscal policy to be able to finance the additional cost of the reform over the next decades, during which the country will be exposed to a significant increase in its demographic dependency ratio. This challenge will be partially compensated by the gradual reduction in the fiscal pressure generated by the transition from the PAYG system to the AFP scheme. Since the 1980 reform, the government

[23] The Pension Solidarity Complement will be first paid to those whose contribution financed benefits are below US$161 and belong to the poorest 40 per cent of the population in July 2008, to progressively grow until 2012, when the benefit will reach those receiving less than US$586 on contribution financed pensions and belong to the poorest 60 per cent.

has been financing the fiscal deficits generated by the previous regime (deprived of most of its contribution revenue) and the obligations contracted with the workers who switched to the new system. These obligations are now starting to phase-out leaving fiscal space to finance the new pillar.

Compulsory contributions from self-employed workers

Benefits from the New Solidarity Pillar will be paid to eligible individuals, regardless of the reason that originated the lack of contributions. In particular, self-employed workers are not required to make social security contributions for their old age. Consistent with the extension of coverage brought by the introduction of the NSP, the reform requires all self employed workers who receive income subject to income tax to make social security contributions on their annual earnings.[24] The introduction of this requirement will be gradual, starting with an information period of 3 years, followed by a period of 3 years during which workers will be required to make contribution unless explicit manifestation not to do so (the default option will be to participate in the system). During this interim period, the fraction of taxable earnings subject to this requirement will be increased, from 40 per cent during the first year, to 70 per cent during the second and to 100 per cent during the third year. Starting in 2015, compulsory participation will be fully implemented.

The main challenge involved in this reform will be the ability of authorities to enforce its application. Experience in other countries in the region has shown that self employed workers tend to have much lower level of compliance than wage earners. While the situation in Chile seems to be better than in neighboring countries (as shown by the high levels of compliance with income tax regulations), this will still be a difficult process. On the other side, this component of the reform is only targeted to self-employed workers subject to regular income tax regulations, leaving outside most informal sectors of the economy: agricultural workers and fishermen, small-scale producers and retailers, etc.

Collective Voluntary Savings Plans (APVC) and incentives for low and middle income workers

As in many other countries, voluntary savings for old age can benefit from tax exemptions in Chile. This type of savings is known as a Voluntary Pension Savings plan (in Spanish, an APV plan). This type of savings can be done through a special account in one of the AFP, through special mutual funds offered by banks or other financial institutions and through life insurance-plus-savings contracts. By construction, this type of exemption mostly attracts voluntary savings from high income individuals, as these are subject to the highest marginal income tax rates. For most low and middle income workers, who are not even subject to income tax, regular tax exemptions provide no incentive to participate.

The reform makes two attempts to increase voluntary savings from dependent workers in general, but especially for those who do not benefit from regular tax exemptions. On the one hand, it creates the figure of Collective Voluntary Savings Plans (known is Spanish as APVC plans), a scheme that provides tax incentives for firms who provide matching-contributions plans for their

[24] More precisely, these workers will have to contribute approximately 12.5 per cent (10 per cent savings plus 2.5 per cent corresponding to administrative fees and the disability and insurance premium) of their annual taxable earnings. Taxable earnings for self employed workers are equivalent to 80 per cent of the annual earnings received under that status. There is a minimum contribution amount equivalent to the contribution rate applied to one minimum salary, and a maximum level, equivalent to the contribution rate applied to the maximum taxable earnings for social security that applies to dependent workers. This new requirement also includes making contributions to a public or private health insurance program.

workers.[25] On the other hand, the reform provides two additional incentives for individual voluntary savings: i) workers can choose between tax exemptions when contributions are made or tax exemptions when they are withdrawn, and ii) workers can benefit from a State-financed 15 per cent bonus on voluntary contributions (individual or collective) that are used to increase retirement benefits or apply for early retirement, with an annual maximum.

Following the experience of developed countries, there is enormous growth potential in the amount of old age wealth that can be accumulated through voluntary savings schemes. The creation of APVC plans is particularly interesting as a new form of non-pecuniary compensation that can be used by employers to attract and retain good workers, increasing the incentives for on-the-job training, while at the same time improving the amount of old age savings from middle income workers. It remains to be seen if tax incentives are enough to induce firms to create these plans and seize the opportunity to move towards this modern form of compensation.

Subsidized social security contributions for young workers

One particular aspect of defined contribution systems is that, due to the effect of compound interest over a long period, early contributions can have a great impact on final pensions. For this reason, and the interest to decrease youth unemployment, a special subsidy is created to pay for part of the social security bill of employers who hire workers between the ages of 18 and 35. More specifically, employers will be subsidized in an amount equivalent to 50 per cent of the pension cost (contribution included commission) of a minimum wage worker, for the first 24 contributions of young workers earning less than 1.5 minimum wages.

Additionally, a State-financed bonus equivalent to the hiring subsidy will be directly deposited in the worker's individual account, for the first 24 contributions between the ages of 18 and 35 that were made for a covered wage below 1.5 minimum wages.

Additional tools for the supervision of contribution payment

A key role for increasing contributory coverage is placed on the tools available to enforce employer's obligations to make contributions on behalf of their workers. Before the reform, when an employer stopped making contributions for a particular worker, it was difficult to verify whether the employment relationship had stopped or whether the employer was no complying with the law.

The Reform introduces a legal change under which circumstances where employers stop making contributions without formal reporting will be automatically considered as "declared but not paid". The AFPs will then be responsible for verify compliance and pursue all legal resources to make the employer pay for the absent contributions, if necessary.

Another recurrent source of verification problems is the use of paper declarations from the part of employers. These are often associated with collection mistakes and delays in accreditation of the contributions. It also makes difficult to prosecute faulty employers. The reform introduced an incentive to the use of more efficient filing mechanisms by allowing employers 3 additional days for fulfilling the legal requirement if they file contributions electronically.[26]

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[25] APVC follow the same principle of 401K plans in the United Status or other defined contribution occupational plans in other countries. Employers can establish savings contracts with any institution that provides APV individual plans (AFP, banks, mutual funds, and insurance companies), make matching contributions as a function of worker's contributions, and establish vesting periods. Conditions must be the same for all workers and, under no circumstances, can employers restrict benefits to certain groups.

[26] Obligation will remain on the 10th of every month for contributions not filed electronically.

3.2.1.2 Measures to improve gender equality in the pension system

Special attention was given in the reform to introduce measures that could increase gender equality between men and women. In general, women tend to i) have long periods without contributions, usually associated with caring duties over children or other dependent relatives, ii) be hired in low remunerated occupations (relative to men with similar educational background), iii) retire earlier and iv) live longer.[27] All these elements, combined in a pension system that provides no gender redistribution during the retirement phase, create significant differences in the benefit distributions of men and women.

On the other hand, retirement and disability benefits under the AFP scheme inherited many of the asymmetric design elements of previous regimes: women cannot provide survivorship benefits to their husbands (or the fathers of their children), unless they are disabled. This means that they are entitled to lower benefits from the workers´ disability and survivorship insurance program while paying the same premium. At the same time, pension formulas do not have to reserve funds for husbands in case they outlive their wives, a regulation that increases women's benefits. In addition, mortality tables used to calculate benefits under a programmed withdrawal schedule are gender specific (which is consistent with this self-insured option) and insurance companies are allowed to make differentiated offers to men and women.

Introduction of the New Solidarity Pillar

To address these differences, the reform considers a number of measures. The main one is certainly the introduction of the New Solidarity Pillar, which, by design, will be more beneficial for women, as they are more likely to never have contributed or done so with less frequency than men. In addition, benefits are gender neutral, therefore benefiting women because their higher longevity.

State financed Bonus to mothers for every child born or adopted

The reform introduces a subsidized bonus to mothers, for every child born or adopted. The subsidy is equivalent to the contribution of a full time minimum wage worker for 18 months, and receives an annual rate of return (equivalent to the net average return of AFP's Fund C) from the day of birth until the mother reaches the age of 65. This benefit is subject to the residency requirement but is not means tested.

Since Chile is among the countries with the longest maternity leave regulations in the region (18 weeks) and at the same time with one of the lowest female labor force participation rates, the introduction of this bonus is extremely important to achieve decent retirement income, particularly among low income workers. But beyond the financial benefit, the measure is extremely valued by the population, as a form of social recognition to the (non-remunerated) activity of giving birth and taking care of children during their first months of life.

Economic compensation in case of divorce or annulment

In addition, the reform introduces the legal concept of pension related economic compensation in case of divorce or annulment. Under this figure, a judge can instruct, if required, the transference of retirement funds between individual accounts, as a form of economic compensation to the part that presents a loss during the period they were married. This transference

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[27] Minimum retirement age is 60 for women and 65 for men. The report from the Presidential Committee for Pension Reform suggested increasing female retirement age to 65 but this recommendation was not included in the reform bill sent to Congress.

cannot exceed 50 per cent of the resources accumulated in the account of the contributing part, during the period the two persons were married.

Separation of disability and survivorship insurance contracts between men and women and transference of the difference in premia to the low-cost group individual accounts

The premium that is charged to participants in the AFP system for the disability and survivorship insurance (SIS) was, before the reform, the same for men and women, despite the fact that these are less likely to become disabled and do not generate survivorship benefits to their spouses, unless they are disabled. To avoid this cross-subsidy, the reform requires AFPs to obtain separate insurance contracts for men and women, to charge affiliates for the higher of the new premia (most likely the men's contract) and deposit the difference for the other group in the savings account of the less risky group (most likely, women). As a result, women's final contribution to their pension funds will be slightly higher than the 10 per cent prescribed in the law. This can be seen as a way to maintain a unique insurance cost for all participants, while increasing the amount of savings available to women at the time of retirement.

Widower pensions

As mentioned earlier, one of the main gender asymmetries prevailing in the pension system is the impossibility of generating survivorship pensions to widowers, unless they are disabled. As part of the reform, the requirement of reserving part of the accumulated funds at retirement for paying survivorship pensions and the coverage under the survivorship insurance are now applicable to both men and women. In the first case – retirement calculation – the inclusion of widowers will actuarially decrease the pension of the retiring woman in exchange for the additional benefit. In the second case, the additional coverage will be financed by a unique insurance premium corresponding to all women in the system, therefore eliminating the current cross-subsidies from insured women to insured men.

The measures described in this subsection account for most of what can be done to improve pension equality between men and women through pension system design.[28] Clearly, however, most of the pension inequality is associated with cultural factors governing the distribution of labor at the household level and the labor market distortions that occur through occupation or wage discrimination. These factors cannot be appropriately addressed through pension reforms.

3.2.1.3 Measures to increase competition in the AFP industry[29]

One of the main pillars of the reform introduced in 1980, was the introduction of competition between AFPs, as the central disciplining mechanism to ensure good performance, good quality of service, at a low cost. As participants could freely move between pension managers, expensive or underperforming AFPs would be punished by market forces. Reality has shown that competition in an industry where the service provided is compulsory and extremely complex for the average consumer and where benefits are only perceived in the long term, does not always take the form that was intended. In fact, during the 1990s, competition was strong, but based on an expensive system of sales personnel and presents for transferring from one AFP to another. This inefficient

[28] Some have argued that one further measure that could greatly improve women's pensions was not included in the reform: the equalization of retirement age at 65. In a defined contribution context, however, it is not clear whether this is a significant improvement in women's welfare, as the increase in retirement income is directly compensated by the delayed retirement age, with no additional wealth being saved or transferred to women.

[29] For a comprehensive analysis of these measures, see Reyes (2008).

period of high cost marketing competition was replaced by a short period of mergers and acquisitions that resulted in the current state of affairs, characterized by a concentrated industry (6 firms manage funds equivalent to 60 per cent of GDP), high returns on assets and no entry in the last 9 years.[30]

The interpretation of this phenomenon is both related to demand considerations (the low elasticity of demand caused by the characteristics of the product and the limited product or price differentiation between providers) and supply considerations associated with a number of regulations that affect the industrial structure of the market. AFPs are required to provide a number of services: collection of contributions, record keeping, investment, customer service, as well as benefits calculation and payment. This creates in practice a multiple barrier to entry. This problem is exacerbated by regulations that limit the scope and benefits of outsourcing some of these activities: AFPs are not allowed to outsource record keeping or customer service and they are not allowed to provide services other than those stipulated by law. In addition, they do not collect value added tax (VAT) from the fees they charge to participants but they must pay VAT on the services contracted from outside providers, therefore generating a significant cost to outsourcing.

Competitive bidding process for new members

The reform addresses these issues affecting both the demand and supply side.[31] On the demand side, elasticity is substantially increased by the introduction of competitive bidding process for new members. All new participants in the pension system will be automatically enrolled in the AFP that offered the lowest commission during the last bidding process. These affiliates will be required to stay in that AFP for a minimum period.[32] The winning AFP will therefore receive a constant inflow of participants for a period of two years, without having to incur in marketing or sales force costs. This measure creates an attractive starting point for potential new entrants, as incumbent firms cannot charge a different commission to different groups of participants (current affiliates or new workers).

Fee structure

Another explanation for the low sensitivity of demand, especially to the fees charged, is the complexity of comparison between firms that can charge multiple fees (some are constant in absolute terms and some are a fixed fraction of covered earnings). In an attempt to facilitate price comparison between AFPs, the commission structure was simplified by the reform to the point where AFPs can only charge a unique commission, expressed as a fixed proportion of covered earnings.

Requiring or facilitating the outsourcing of certain functions of the AFP

On the supply side, a number of measures tend to facilitate outsourcing of certain functions of the AFP. The range of services that can be outsourced is extensively broadened, and the AFPs receive a tax credit for the VAT paid to subcontractors.

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30 See Valdes and Marinovic (2005) for a detailed accounting procedure of the return on assets exhibited by AFPs.

31 The reform bill sent to congress included a measure to allow local banks to enter the AFP industry by creating subsidiary firms. This measure was not approved by opposition parties, arguably to avoid the creation of a public AFP, as a subsidiary of the Banco del Estado de Chile.

32 The affiliate can transfer to another manager if the winning AFP does not comply with the regulation or is consistently underperforming other administrators in a way that cannot be compensated by the difference in commissions.

One of these services, the disability and survivorship insurance (SIS) is now required to be contracted by the AFP system as a whole, instead of the previous situation under which each AFP had to take its own insurance and these contracts were designed in a way that most of the risk was born by the AFP itself.[33] This created a strong incentive to compete in the ability to attract low risk individuals only, in detriment of good portfolio investment, cost reductions or quality of service. By requiring a system-wide insurance contract, the risk is effectively born by insurance companies and the incentive to out-select riskier individuals is eliminated. The design of the insurance bidding process will be subject to detailed regulation issued by the Superintendency of Pensions and the Superintendency of Insurance and Securities. By law, insurance coverage will have to be auctioned separately for men and women, and randomly assigned groups could be created and assigned to different firms to avoid excessive concentration of risks.

This measure implies an important change in the way the disability and survivorship insurance system is managed. While its mandatory separation will greatly reduce barriers to entry into the AFP industry, some have argued that it will greatly reduce their incentive to contain fraud, potentially causing an important increase in the insurance cost of the service. This is not a minor issue, considering that this component accounts for about 1 per cent of covered earnings in the economy and careful consideration should be taken to maintain appropriate controls in the system.

Permission for Insurance Companies to create AFP subsidiaries

Looking to increase contestability in the AFP industry, insurance companies are now allowed to create subsidiaries as Pension Fund Administrators, subject to the regulation established in the Decree Law 3.500. These subsidiaries must strictly follow the sole purpose requirement for any AFP, *i.e.*, it can only offer the services and products stipulated by law. Furthermore, the insurance company cannot its subordinate services or products to joining or staying in the AFP subsidiary or offer improved conditions for individuals in such circumstances.

3.2.1.4 Flexibilization of the AFP investment regime

To limit the absolute exposure of investment portfolios, the original regulation included a complex set of quantitative limits: limits by issuer, by emission, by asset class (including limits to variable income), by source of funds (domestic or foreign), etc. Most of these limits were written in the law that regulated the system, with little scope for interpretation or flexibility. The reform transferred most of these limits from the law into secondary regulations and a created a special investment council (the Investment Technical Council) whose function is to make recommendations regarding the investment policies and regulations of the Pension Funds.[34]

Increased flexibility will be accompanied by increased transparency requirements in terms of explicit investment policies, as well as public policies to deal with conflicts of interests. The reformed law includes the possibility to establish limits based on portfolio risk measures instead of quantitative limits by assets classes.

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[33] Insurance contracts included ex-post adjustments that were equivalent to a risk transfer between the insurance company and the AFP, leaving insurance coverage only for extreme events.

[34] Only the main structural limits remained in the law, subject to a general upper bound, under which the Central Bank has the authority to set the actual limitation: A variable income limit for each type of fund; An overall foreign investment limit (which could reach up to 80 per cent of the funds) which can substituted by specific limits for each type of fund; fund specific limitations to the amount of uncovered investment made in foreign currency; and finally, a limit to investment in financial instruments issued by institutions with less than 3 years of operation.

3.2.2 Expected impacts

The reform described in this section is certainly one of the most comprehensive efforts undertaken in the region to both complement the contributive pillar with a strong poverty-prevention component and introduce a number of innovative solutions to improve, after 27 years, a second pillar based on individual capitalization accounts and market provision.

The introduction of the New Solidarity Pillar will greatly reduce income uncertainty in old age, by providing minimum coverage for everybody who does not have other means of financing. This will also reduce income inequality both among adults and in the population as a whole. In fact, it is not uncommon to see older individuals living in the same household with relatives. The new benefits will therefore improve the situation of the individuals, together with the families they live with.

The extension of coverage provided by the poverty-prevention pillar should be complemented by the increased contributions made by young and self-employed workers, as well as the additional voluntary savings that should be raised through collective voluntary savings arrangements. The experience in other countries, particularly developed ones, show the great potential that this type of firm related coverage can imply for a large segment of the population.

It is also expected that the measures taken to improve the industrial organization of the industry should reduce costs and facilitate entry of new competitors, by providing new firms access to a large critical mass of new workers without having to incur in marketing costs and by providing incentives for the external provision of certain activities. The separation of the disability and survivorship insurances will greatly reduce the uncertainty associated with having to provide this service for a firm that is just entering the market.

3.2.3 Fiscal sustainability of the reform

As the benefits from the New Solidarity Pillar were designed as entitlements to the population, the reform implies a significant commitment from the State to future generations of pensioners. While detailed information about the medium and long term impacts of the reform is limited, available data indicates that they might be relevant. The reform bill was accompanied by a financial statement, including estimations of fiscal costs from 2008 until 2025 (Table 3). This table presents the expected impacts of all provisions incorporated in the reform law, including some that might not be considered part of the pension reform in strict sense. In any case, the projections indicate that the fiscal cost of the reform should be below 0.5 per cent of GDP in the first few years, to reach almost one per cent of GDP by 2025.

Financing of the reform was designed to maintain fiscal discipline and a rigorous application of fiscal policy based on structural surpluses. The main sources of financing are the following:

- the Pension Reserve Fund (created in 2006, and funded with fiscal surpluses),
- reduction of fiscal liabilities originated in the transition from the PAYG to the fully funded system: reduction of the operational deficit of the National Pension Institute[35] and the interest accrued from recognition bonds issued by the State to workers from the previous system who switched to the new one,
- resources originated in reallocations, expenditure efficiency and economic growth,

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[35] The INP is the institution in charge of administering the PAYG regimes that are still in place for workers who decided to stay in their previous schemes. With the reform, pension related activities of the INP are transferred to a new institution, the *Instituto de Previsión Social*, responsible for the administration of benefits under the New Solidarity Pillar.

Table 3

Fiscal Cost of the Pension Reform
(million of Chilean pesos of 2007)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2025
1 - Solidarity Pension System	38,898	177,225	322,283	432,019	565,631	656,718	701,641	751,587	804,330	860,079	1,415,454
2 - New Institutional framework	6,413	3,914	2,243	2,467	2,547	1,048	1,043	1,034	863	851	2,552
3 - Bonus to women for every child	0	7,049	14,946	23,537	33,054	44,596	49,121	53,181	57,558	62,310	109,847
4 - Subsidy to young workers	6,657	27,853	28,979	44,989	61,835	63,502	64,977	66,256	67,158	67,639	75,592
5 - Family allowance for independent workers	0	0	0	4,937	10,270	12,815	15,541	18,455	21,566	24,882	49,926
6 - Voluntary savings plans (individual and collective)	6,450	26,243	27,004	27,734	28,467	29,195	29,910	30,604	31,272	31,919	36,491
7 - Fund for pension education	689	1,378	1,432	1,437	1,469	1,503	1,539	1,597	1,615	1,656	2,072
8 - Contribution for insurance of public servants	0	21,060	42,660	42,696	42,732	42,767	42,803	42,839	42,875	42,911	43,200
9 - Worker's compensation for self-employed workers	381	392	403	413	424	434	444	453	462	470	478
10 - Deduction of VAT on outsourced services by AFPs	775	3,133	3,164	3,196	3,228	3,260	3,293	3,326	3359	3,392	3,673
TOTAL	**60,263**	**268,247**	**443,114**	**583,425**	**749,657**	**855,838**	**910,312**	**969,332**	**1,031,058**	**1,096,109**	**1,739,285**
percent of GDP[(1)]	*0.07%*	*0.30%*	*0.47%*	*0.60%*	*0.73%*	*0.80%*	*0.81%*	*0.83%*	*0.84%*	*0.86%*	*0.96%*

[(1)] Percentages of GDP estimated considering Chile's Central Bank estimation for 2007 and projections for 2008 and 2009, and 4.5 per cent medium-term growth.
Source: Dirección de Presupuestos (2008).

- during the first few years (the transition period), part of the interest earned on financial assets owned by the State.

3.3 Pending challenges

The most important aspect of the reform described in this section is that, rather than replacing the AFP system created in 1980, it improves it by integrating a State-financed poverty prevention pillar, extending the voluntary pillar to middle income workers and introducing a number of measures to increase coverage and competition in the AFP industry. It is the result of a two year long participatory process, preceded by extensive research and evaluation efforts.

A number of challenges remain to be addressed in the years to come, both regarding the implementation of this reform and longer term aspects. In the first group, the progressive implementation of the new solidarity pillar will probably face risks. On one hand, the actual number of potential beneficiaries is not clearly known, as it partially depends on future trends of wages, compliance, and pension fund returns. Also, organizing the new institutions, setting up the conditions to fully integrate the self employed workers into the system, and organizing the systems to identify beneficiaries of the new solidarity benefits and make the payments will demand a serious commitment by the government.

On longer term challenges, not necessarily addressed by recent reforms, the most important seems to be shared by most middle and high income countries in the planet: the uncertain increase in life expectancy and medical costs in old age. With the technological progress of the last decades came dramatic increases in life expectancy, based on ever more sophisticated medications and equipment. We currently have a reasonable idea of how long the current pensioners are going to live but little is known about life expectancy of the individuals who are just entering the labor market. It is quite possible that the current 10 per cent contribution rate will be insufficient to fund adequate benefits for this increased life expectancy and it is not clear that generational differences will allow workers to remain on the labor market long enough to compensate. Most of the burden will be put in the ability of individuals to foresee these shortcomings and increase their voluntary savings but, if pension systems were created to avoid myopia, it is not obvious that this reaction will have the adequate timing and strength. More efforts must be put in place to improve predictions over this uncertain future and the necessary – often unpopular – measures must be taken to increase contribution rates or retirement age.

4 Institutions and policy making processes

4.1 Motivations for focusing on the policy-making processes

Up to this point this paper has described the design and performance of the pension system in Argentina and Chile, and it has examined with some detail the reforms recently adopted by both countries. This section will no longer concentrate on the specific content of these reforms, but rather it will introduce a discussion on the institutional and political patterns under which those policy changes have been accomplished. In this sense, this section focuses on the importance of policy-making processes and their influence on the features of policies and, more specifically, on pension policy.

Why is it relevant to discuss this in a paper regarding pension reform? To state it briefly, it is because the workings of the political institutions and the characteristics of policy-making processes play a role in pensions as they do in other areas of complex public policy. In general terms, looking at the characteristics of political processes gives recognition to the influence of those processes on

public policies; in other words, public policies require policy-making capacity to be effective. More specifically, several significant features of public policies depend on the ability to strike and enforce intertemporal political and social agreements. The dissimilar capability of achieving these agreements will affect some critical attributes of policies, such as their stability, adaptability, sustained credibility, and coordination and coherence. In this manner, whether the workings of the policy-making process tend to facilitate or discourage cooperative outcomes in the political transactions game becomes a central question (Spiller, Stein and Tommasi, 2003).

As will be discussed afterward, there are some particulars of pension policy which seem to aggravate the possible consequences stemming from the lack of adequate policy-making capacity and cooperative political environments. In the context of the market-oriented reforms in Latin America, the discussion concerning pension policy was frequently articulated around the "public vs. private" controversy, as if that choice on its own could solve all the complexity involved in this policy. Focusing on the institutional determinants behind pension policy highlights the potential influence of some permanent characteristics of the policy-making process that are beyond the "big title" of public system or private system.[36]

As stated previously, the different characteristics of the policy-making processes play a significant role in the performance of public policies. However, while measuring social outcomes from public policies is relatively simple, measuring institutional features is much more difficult. More over, in the case of pension policy, even if these institutional indicators were readily available, showing a clear causal effect between them and the policy outcomes would still be very complex, partly because many of these outcomes can be fully observed over several decades after the adoption of policies, and partly because other primary determinants – such as a long term economic growth, labor market performance, or overall fiscal development – may have stronger short term impacts.[37]

Section 4.2 advances with an exploratory approach, analyzing in what way political institutions and policy-making processes could matter for pension policy performance. After that, in Section 4.3, some general attributes of the policies and the policy-making process of Argentina and Chile are explored; even if it is a very limited account, it will illustrate some key features of the institutional and political patterns in both countries. Section 4.4 presents some aspects of the recent pension policy-making processes in Argentina and Chile. But before moving on, we will briefly attempt to make two concepts more clear: intertemporal political cooperation and the characteristics of policy-making process.

Policies (at least complex policies, such as pensions) can be visualized as dynamic processes that involve multiple actors through their life cycle. This concept of policy (and consequently of policy reform) goes up against the more stereotypical one-shot policy implementation account, which implicitly assumes some kind of magical moment of special politics in order to produce effective policy results (Tommasi, 2004). In a dynamic approach to the concept of policy, the recurring specific responses required from political, social, and economic agents have to be considered. Therefore one must contemplate the various forms of regular interaction required among them. Only if this interaction is supported by positive beliefs in the workings of the

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[36] In the context of the shift toward pension private administration that took place in Latin America during the '90s, it was frequently argued that "privatization" would eliminate political risk (defined as the risk of any type of wrong use of funds or inadequate interference in pension system by the government). However, with the reforms in place, it was quite evident that things were more complicated (see Kay 2003) for an analysis of Argentine case). As in other areas of policy reform, the weakness of oversimplified messages dealing with problems of high institutional and political complexity came out into the light; these problems inevitably require political cooperation on a regular basis. In other terms, it seems to be clear that it is not possible to get the government out of the pension system (Barr 2002).

[37] For simplicity, since this is a paper concerning pensions and not political or institutional theory, we mention here the role of central economic concepts, such as growth and labor market performance, as if they were totally free from any institutional or political influence.

policy-making game as well as some attributes of the policy itself (such as its credibility and expected durability), can it become a "cooperative" interaction. At the same time, the policy-making game is conditioned by the workings of a set of political institutions (such as Congress, the party system, and the judiciary). These institutions, in turn, rely on some more basic institutional features of historical nature (Spiller and Tommasi, 2003, broader develop this causality).

Concentrating on the characteristics of policy-making process leads to scrutinizing the connection between the kind of transactions that political actors are able to undertake and the possibilities provided by the institutional environment. The dynamic behavior of political actors (in accordance with the dynamic approach to policies that was emphasized before) will primarily depend on the actors' preferences. But, at the same time, their behavior will depend on their incentives, the constraints they face, and on the expectations they have regarding the actions of other players. Therefore, to delineate some characteristics of the different policy-making scenes, it is important to analyze who the key actors are that participate in the process, their powers, their preferences and incentives, their time horizons, the arenas in which they interact, and the nature of the transactions they undertake.

In political environments that encourage intertemporal agreements, public policies will tend to be more consistent, less sensitive to political shocks, and more adaptable to changing economic and social conditions. In contrast, in settings that hinder cooperation, policies will be either too unstable (subject to political swings) or too inflexible (unable to adapt to socioeconomic shocks) and they will tend to be poorly coordinated (IDB, 2006).

4.2 The specifics of pension policy and its political implications

Pension policy has some particular characteristics that make the process of designing and implementing it prone to trouble – and much more so in countries with limited institutional capacity for credible commitment.

Measured by the proportion of public expenditure it usually represents, pension policy is now the largest component of social policy in most developed economies. By the year 2000, pensions represented an average of 12.5 per cent of the EU members' GDP (Eurostat, 2002). That same year, the U.S. spending on pensions explained a third of the whole federal government expenditure (U.S. Census Bureau, 2004). Even if they do not reach the magnitude of the more developed world, pension expenditures in several Latin American countries are very substantial as well, and they have shown persistent growth during the last few decades. As it is well-known, there is a demographic determinant behind these expenditure patterns. As populations age, the elderly represent a growing proportion of the population, creating heavier demands on the working-age population, and so, pension policy becomes a more complex subject to deal with.

Secondly, pension policy has been characterized by a multiplicity of goals, which exhibit some inherent degree of trade-off. Policymakers who design pension systems have to simultaneously provide the best possible benefits to the largest possible number of beneficiaries at the lowest possible cost (Rofman, 2003). In more theoretical terms, even the proper definition of pension policy seems to be a frequent subject of disagreement. Nobody denies that it is in itself an explicit distributive policy; however, there is no such consensus concerning what constitutes the main matter of redistribution, in which way this redistribution has to be accomplished, and among whom the policy is supposed to redistribute. In practice, the distributive function that most pension schemes usually perform is multifaceted, meaning it operates simultaneously on different levels. Probably, the most recognized of these levels is the redistribution of monetary income, which in turn works through multiple stages: intertemporally from an individual point of view, between generations and, most often, intra-generationally. But the design of the pension system also

determines the distribution of rights (access to the system) and a set of risks (demographic, economic, financial, labor market). It has been suggested that pension systems also play a key role in the redistribution of jobs; in an overview of some empirical facts released by 89 pension systems in the mid '90s, Mulligan and Sala-i-Martín (1999) found that three-fourths of them explicitly encouraged retirement in order to be eligible for a pension benefit (including compulsory clauses in half of the cases).

Finally, there is an aspect of pension policy that is unique. It should be taken into account that any pension system, in being a mechanism for distributing rights over the future social output, is inevitably based on some kind of promise (Barr, 2002). The temporal compromise that underlies this promise is absolutely exceptional. From an individual perspective, we are facing the longest time-cycle a single public policy can possibly run. Novice formal workers in their twenties are having money taken from them, in exchange for the promise that the money will be returned in around 40 years. As it is easy to visualize, this cycle fits perfectly with our previous reference to the set of risks pension policy has to manage; there are so many things that could go wrong along those 40 years, that it is no wonder that pension systems are such hot political problems in almost any country.

In short, we are dealing with a policy that i) handles huge relative amounts of money, wherein ii) implicitly resides a sort of "agreement" of outstanding durability, and that iii) must arbitrate several distributive dilemmas of an atypical degree of complexity. In this sense, pension policy (much more than any spot-transactional policy) seems to be particularly suitable in reflecting the significance of having good capacity to perform intertemporal agreements.

But it should be highlighted that the political challenge behind pension policy goes beyond the fulfillment of some specific and well-defined long-term promise. In being such a complex distributional issue, the concrete form adopted by the pension arrangement needs to be politically and socially reshaped over time. Thus, the real challenges reside in having appropriate political configurations to articulate, channel, and control that dynamic process. These political configurations can exhibit a broader or more restricted "institutional density": they can display a different degree of inclusion of relevant actors; they can offer dissimilar time-horizons for these actors (longer time horizons make it easier to enter into the intertemporal agreements necessary to sustain effective policies); they can exhibit either more adequate or more deficient political arenas for interaction; they can assume or exclude more representative and democratic mechanisms of articulating interests; and they can contemplate more or less credible enforcement technologies (such as an independent judiciary, or a strong bureaucracy to which certain public policies can be delegated).

4.3 A general picture of the main political characteristics in Argentina and Chile

This sub-section introduces some generic characteristics of policies in Argentina and Chile and presents some aspects of their policy-making processes that are significant to pension policy. The purpose here is not to demonstrate but simply to illustrate a fact widely accepted in literature – that both countries show different characteristics in their policy-making processes as well as dissimilar abilities to generate and sustain cooperative political games.

What probably constitutes the most notable aspect in differentiating public policy in Argentina and Chile is its degree of stability, reflected both in particular policy areas as well as in the core of their economic strategies. Both from international data sets and from comparative studies, it is quite visible that in the last decades their economic models have exhibited a different degree of constancy. After a comparable pro-market turn realized in the mid-'70s, Chile continued to follow that path while Argentina appeared much more volatile in its central economic decisions.

The unpredictability of economic policy in Argentina has been found to produce high uncertainty costs from economic agents. The greater the volatility of the most important variables, the greater the propensity of the economy to create systematic disequilibria. An economy with such characteristics induces some microeconomic behaviors that would otherwise be absent and, as a result, the harmful influence of macro determinants on micro-structure will be much more permanent and visible (Fanelli and Frenkel, 1994).

At times, volatility in Argentina has impeded the enforcement of policies the country had enacted and has led to self-imposed rigid routines as a means to achieve a little political credibility. An example of this mechanism is the management of inflation. By the late '80s, this problem spun out of control driving the economy toward hyper-inflation episodes – episodes with huge social and political consequences. The new administration, after a couple of failed attempts to control inflation, established the so-called Convertibility regime. The Convertibility was an extremely strict monetary rule that kept the domestic currency tied to the dollar, taking money supply totally out of the policymaker control (with the obvious purpose of positively influencing people's expectations about monetary policy). After some years of apparent success, the rigidity and limitations of this regime became evident and the Convertibility plan blew up in late 2001 in the middle of another huge crisis, with another government leaving office prematurely. In this way, extreme rigidity ended up being a (very high) price to pay for extreme volatility.[38]

Stability is not the only aspect that differentiates policies in both countries. For instance, Stein and Tommasi (2005) have categorized eighteen Latin American countries in accordance to several other features of public policies such as their adaptability, quality of implementation, coordination, public-regardness and efficiency. In that research, as well as in several studies dealing with the measurement of the characteristics of policies in Latin America, Chile consistently ranks at the top of the scale, while Argentina is at the lowest third of the ranking.

Even if it is not possible to achieve a full understanding of any country's political process choosing single "pieces" from its institutional map, we will briefly comment on certain aspects of the policy-making in Argentina and Chile.

The anatomy of political parties, the role of Congress, and the actual influence of governors compose an intricate triangle, which differs profoundly in both countries. Chile has two well-defined major coalitions, the *Concertación* (in office since 1990) and the *Alianza*. The electoral rules highly enforce intra-coalition discipline by reducing the incentive of single parties to leave them, which in turn reduces the number of relevant political actors. In a recent study on the policy-making in Chile, its political party system (and its links with the rest of the political game) was identified as the essential foundation for political cooperation (Aninat *et al.*, 2006).[39] On the other hand, Argentina has also presented two major parties in recent decades. However, the real workings of its political party scene are much more intricate. This is related to the fact that Argentina (unlike Chile) is a federal country made up of 24 provinces with substantial constitutional powers. This difference is far from representing just a formality since the workings of Argentine federalism are extremely complex and constitute a central part of its political scenario.

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[38] As stated, inflation is a recurring source of trouble in Argentina. In 2007, in the context of rising prices, the government carried out a controversial "intervention" in the National Bureau of Statistics (INDEC) with the aim of changing the way inflation was being measured. Every top and middle official in charge of the price indexes and other related surveys was replaced and the methodological changes have not been clarified to this day by the government. This episode suffered high repercussions in the media and the credibility of INDEC data notably decreased.

[39] The authors sustain: "Repeated interaction between the parties not only makes it possible for them to make (and keep) policy deals, but it more importantly creates an incentive for the parties to maintain their ideological "brand names" with the voters – thus constraining the sort of policy changes they align themselves with". (ibid., p. 40). In Argentina, in contrast, ideological brand names of parties have been much more confusing and ambiguous. Perhaps, the most notable image of this was the "switch" performed by President Menem (who belonged to the Peronista Party) in the early '90s when, once in office, surprised everybody – particularly his voters – with a widespread pro-market reform.

Provincial governors have proved to be key political actors, not just in their local territories but in the national political game.

The political weight of Congress is also unequal in both countries. Argentine legislators face high rotation, resulting in a lower level of experience and specialization, and little incentives to become more professional (Jones *et al.*, 2002 and 2003). In consequence, Congress in Argentina has not worked as a crucial arena in policy-making process. The Chilean Congress, in contrast, has been described as unusually professional and competent by Latin American standards, becoming a place in which the relatively prolonged trajectory and expertise of legislators turn into institutional competence (Montecinos, 2003; Santiso, 2006; Aninat *et al*., 2006). A strong Congress, besides being a reservoir of technical skills, clearly becomes a privileged arena where intertemporal cooperative practices can be developed to make public policies more effective and reliable.

The workings of civil service and the judiciary could be seen as another two major institutional nodes in which both countries have shown disparities. A qualified bureaucracy can be important both in its role of implementing public policies and as an additional channel for the intertemporal enforcement of political agreements. Argentina, however, in part due to past political instability, but also to the current incentives of key political players, has not achieved such a professional bureaucracy. Civil service policies in Argentina during the last few decades have been considered erratic; the political views regarding the employment regulation regime have largely fluctuated. In contrast, since the turn to democracy, Chile has carried out civil service reforms through a more gradual and "additive" criterion, in which the different initiatives have strived to combine with their previous accomplishments – causing fewer policy swings compared to other countries experiences (Iacoviello and Zuvanic, 2005).

The judiciary, habitually recognized as a major enforcement technology overseeing a country's political system, seems to also have presented different characteristics in both countries. Iaryczower *et al.* (2002) analyze the decision-making patterns of the Argentine Supreme Court over decades and conclude that it tended to be too aligned with the executive branch, generating a loss of credibility. In a comparative study using Latinobarometer data from 1997, Malone (2003) found that Chileans generally regard their judiciary as more accessible than Argentineans, and that differences about perceptions of efficiency were minor.

Going back to the more conceptual approach used at the beginning of this section, what have been briefly described here are parts of two dissimilar institutional and political configurations that seem to foster cooperative behaviors to a very different degree. Key actors in Argentina seem to have had shorter horizons and worse incentives. Political agreements are weaker, which results in weakened incentives to work towards those agreements in the first place. In addition, the political weakness of Congress has frequently moved the center of the political scene away from the national legislature and toward other informal arenas – ones that have not been structured for the institutional enforcement of bargains (Spiller, Stein and Tommasi, 2003). On the other hand, since the return of democracy, Chile has exhibited stronger mechanisms in its policy-making process. Policy changes have been incremental and, in general, they have resulted as the outcome of a relatively intense and institutionalized political process. In sum, Chile seems to have a policy-making process that tends to facilitate cooperative outcomes in the political transactions game, a dynamic that Argentina has found more difficult to build.

4.4 Some concluding remarks

This section concludes looking at some highlights of the recent pension policy-making in Argentina and Chile. The latest reforms were adopted under quite different mechanisms in both countries. Those different mechanisms seem to match closely with the divergent characteristics of

political processes that have been considered. For that reason, some previous aspects of pension policy in both countries (and the "atmosphere" surrounding pension debate) will be briefly alluded to.

Both Chile's (1980) and Argentina's (1993) original pension reforms were presented as "icons" of broader policy reform processes at their time. Chile's reform was probably the best known of the so-called "modernizations" performed by the military regime. Argentine reform was a significant piece of President Menem's wide pro-market economic policy in the '90s. In being such "icons", the reforms were surrounded by a notable communication battle between promoters and opponents, which ended up being called the "privatization" of pensions. Borzutzky (2002) argued that the pension reform publicity campaign, the most expensive in Chile's history according to the author, "stressed the issues of modernity and self-reliance involved in the new system, as opposed to the politicization, chaos, and crisis involved in the old one" (ibid., p. 217). Also in Argentina the reform was politically introduced as something "up-and-coming" in contrast to the notorious, deficient, and broken old pension system.

But the Argentine reform of 1993 did not completely eliminate the old system; the law that was finally approved, unlike the Chilean system and the President's original proposal, did not close the pay-as-you-go scheme and created a true multipilar model. This phenomenon has not been trivial in the "public" vs. "private" controversy previously mentioned. Despite the fact of its legitimate importance, this singular controversy seems to have dominated all public debates regarding pensions in Argentina. At the time the reform was introduced, authorities explicitly promoted the advantages of the newly created private system of individual accounts and encouraged people to join in, but there was no objective and well-organized informative strategy to educate workers about their choices (Isuani *et al.*, 1995).

As in other policy fields, the *Concertación* governments in Chile have opted for continuity over radical change, and they have consistently supported the new pension system. Since 1990, reforms to the pension system had been minor, mostly affecting the investment regulations. Only in recent years the question of coverage emerged as a critical problem and became the center of policy debates.

On the other hand, in Argentina the terms of the discussion concerning pension system have persistently survived and the "privatization" has been the axis where the political and public debates have frequently rotated. In fact, the main message transmitted by authorities with regards to the 2007 and 2008 reforms has been that workers would "recover" the possibility to switch from the "private" to the "public" system in 2007 (which before was not an alternative), and, in 2008, that the reunified State managed scheme would provide better benefits to retirees.

In conclusion, the processes underlying the recently passed reforms in both countries are clearly different and resulted in different systems. Pension reform has been recognized as a process that requires careful and thorough technical analysis, as well as communication strategies in order to build support and consensus (IDB 2007). In that sense, in March 2006, Chile's President created a Presidential Advisory Council on Pension Reform to review the system performance, study its most important deficits, and carry out a extensive process of public hearings which lasted 90 days. The Council – which was made up of respected specialists in the field – produced a full assessment and proposed several reforms. Subsequently, the government established a Committee of Ministers to assess the Council's recommendations, the outcome of which was a comprehensive proposal for pension reform that was submitted to Congress and approved in January 2008. On the other hand, most of the recent reforms in Argentina have had limited analysis, and were approved either by decree or by laws that Congress approved with no inputs from experts, civil society or representatives of interest groups, and with little debates among legislators.

5 Conclusions

Argentina and Chile are among a few countries in the region that have traditionally pioneered the implementation of reforms in social policies. The two countries are among a small group that introduced pension systems in their legislation in the early 1900s, and then advanced through different stages including more workers. In 1980, Chile pioneered again by introducing a structural reform that, among other important changes, created a privately run system of pension funds. Argentina, with some differences, followed Chile's model a decade later, when the traditional PAYG scheme was converted into a multipilar system.

The pioneering tradition continues at the end of the first decade of this Century, as both countries introduced important reforms to their pension system once more. This time, the reforms clearly shared some objectives, such as the expansion of old-age coverage and a redefinition of the role of the State in ensuring ample access to benefits. However, there were important divergences in other aspects, including the institutional organization, partially due to differences in political views and policy making processes.

The reforms in Argentina resulted in a sharper, immediate and dramatic increase in coverage and the role of the State. The number of pensions grew by 50 per cent within one year due to the introduction of a generous inclusion program, that allowed anyone past retirement age to apply for a benefit, regardless of their past contributions or even their current status as beneficiaries.[40] Also, the reforms resulted in the reversal of an important component of the 1993 system, as the system management was unified under a public agency (thus, closing down the private management industry), individual accounts eliminated and the prevailing model went back to a defined benefit scheme. However, it is important to note that these changes did not represent a return to the pre-1993 situation, as most parameters of the system (including contribution rates, retirement age, and replacement rates) were not reinstated at the old levels, and the PAYG agency will continue to receive earmarked general taxes (originally assigned to finance the transition costs). Thus, it is likely that this agency will manage a growing fund, representing more than 10 per cent of GDP as of 2008. So far, there have been no official estimates of the fiscal impact of the reforms, either in the short or medium term.

In Chile, instead, most reforms will have a gradual effect over time. The number of beneficiaries of the new "Solidarity Pillar" will be limited, but it will increase as the system is fully implemented. This is clearly the most important component of the new law, which should result in a nearly universal coverage of the pension system in the near future. Other reforms affect the operational aspects of the existing system, and the institutional structure of the supervisory and implementing governmental agencies. Also, a number of changes aimed at eliminating some inequities in the system, especially with regards to gender differences where introduced in the system.

The design and approval of these reforms followed a very different process in each country, as a consequence of the prevalent political and institutional context. The Chilean reform started when President Bachelet announced her intention, and set up a Council of experts. Two years later, after many debates, publications and analyses, the law was approved. In Argentina, most decisions were taken rather quickly at the highest level of the Government, and debates were limited and very short. These differences are probably a contributing cause for the different results and, as such, are worth of further study and analyses.

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[40] As the program advances, a restriction to limit duplication of pension benefits was introduced, but it did not include restrictions for those receiving a survivor's benefit.

The slower and stepwise approach taken by Chile's authorities will probably ensure more sustainable and better calibrated results for their reforms than in Argentina. On the other hand, the bolder, faster reforms of Argentina resulted in an immediate response to a current problem. Most elderly excluded from the system received a pension benefit within a year, improving their welfare immediately, while in Chile the process to reach all beneficiaries will be more gradual.

Clearly, neither system has reached a "final" design, as there are remaining policy challenges that authorities will need to consider in the near future, and new problems or issues will probably emerge in the future. The ability of future governments to respond adequately to these challenges will certainly define the well being of future generations of Chileans and Argentines.

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PENSION FUNDS' CONTRIBUTION TO THE ENHANCEMENT OF AGGREGATE PRIVATE SAVING: A PANEL DATA ANALYSIS FOR EMERGING ECONOMIES

Ernesto Rezk,[*] Mariano Irace[*] and Vanina Ricca[*]

1 Introduction

As of the eighties, and later in the nineties, several countries in Latin America began to assess the convenience of substituting existing PAYG earning related pension schemes (as it happened with Chile's pioneering reforms) or adding (as in Argentina) privately managed fully funded pension systems – based on individual capitalization accounts – leaving on contributors hands' (labour and self-employed workers) the decision on the preferred system.

In some cases, the switch took place all of a sudden following bankruptcy situations faced by PAYG regimes, whose causes could be traced back to sharp inflationary processes and economic and demographic unbalances dwindling to unbearable levels the workers/retirees ratio and increasing existing pension regimes' deficits; the massive incorporation of beneficiaries (especially self-employed) through *ad hoc* plans amounting to a bail out[1] and the channeling of pension resources to general fiscal revenues, in order to deal with the important deficits originated by a growing public spending and the difficulties in tax collection and public financing, must also be accounted for at the moment of explaining the collapse of unfunded pension schemes.

Nevertheless, it needs to be acknowledged that a widespread fall in saving rates occurring by the time in many Latin American countries, must also be acknowledged as an important motivation underlying substantial changes in pension systems, as the idea prevailed that the accumulation of pension fund assets would definitely encourage aggregate savings (Bailliu and Reisen, 1997) and contribute also to enlarge domestic capital stock markets (Reisen, 1997; Raddatz and Schmukler, 2008).[2]

The economic appeal that individual capitalization schemes have upon policy makers, especially for their expected positive impact upon saving rates, must however be revised in the light of the very often ambiguous results found in the literature devoted to the analysis of several countries' recent experience. Thus, while some analysts of the micro and macroeconomic performance of pension systems conclude that fully funded pension schemes definitely contributed to enhancing private saving in countries like Chile and Singapore others find running counter evidences for Malaysia (see for instance Corsetti and Schmidt-Hebbel, 1996; Morandé, 1996 and Faruqee and Husain, 1994).

In the context of the American economy, Feldstein (1974) also analyzed the impact upon individuals' decision on saving of introducing social security systems; by resorting to a life-cycle model, his econometric estimations showed that social security funds depressed personal savings.[3] Nevertheless, Feldstein also explored the implications of using an "extended life-cycle model", allowing people to continue working after the age of 65 and in which the net impact of social security regimes upon aggregate savings fell short of being unambiguous.

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[1] Those programmes, known as "moratorias", permitted contributors to enjoy the benefits after a limited number of years of contribution (smaller than the 35 legally required).

[2] The paper by Raddatz and Schmukler is a particularly interesting one as the authors aim at shedding light on the very interesting debate of how pension funds affect capital markets development.

[3] Mainly based on the rational of a PAYG system, the idea was that the need of counting with savings for future consumption was averted by retirees' guaranteed benefits financed through previously collected social security taxes.

It is to be noticed that the existing theoretical controversy with regard to the real impact of individual capitalization upon saving rates and capital formation is related to the Life-cycle Model's nature, whose conclusions sensitively react to changes in assumptions held, but also to the type of pension system referred to. Bailliu and Reisen's paper (1997) is in this regard worth mentioning as these authors also stressed the ambiguity of pension fund assets' effect upon saving depending for instance on whether there were taxed returns or liquidity constraints, for what they concluded that the sign of the relation between pension fund assets and saving was a matter of empirical resolution.

The empirical treatment of the subject also poses interesting challenges, as shown by econometric attempts forced to deal with the problem of a scarce number of degrees of freedom, this being explained by the relatively short existence of main fully funded pension regimes in the world and the consequent recourse to statistical series yielding information only for a limited number of periods. Grouping data for a set of countries and estimating coefficients by means of a fixed effect panel data model, in order to reflect included countries' specificities, becomes therefore an alternative to sort out the mentioned difficulty.

In the light of preceding paragraphs' content, the paper aims at carrying out an analysis of pension regimes based on individual capitalization (fully funded pensions) implemented since the eighties in six Latin American countries: Argentina,[4] Chile, Colombia, Mexico, Peru and Uruguay, in order to ascertain whether they were conducive to increasing aggregate saving and substantially or somehow helped to strengthen domestic capital stock markets. In pursuing the mentioned objective an updated version of the Life-cycle Model is used to provide the econometric model's theoretical background; finally, it is expected that the econometric estimation of the effect of pension fund assets, as well as those stemming from other economic and demographic variables, upon the selected countries' saving rates, will also serve the purpose of yielding conclusions with economic policy implications on the performance of fully funded pension regimes.

The remainder of the paper is structured as follows: Section 2 provides a review of stylized facts in all the six countries; Section 3 presents a theoretical analysis of the life-cycle framework including social security; Section 4 conducts a fixed effect panel data model's econometric estimation and analysis of results; and Section 5 concludes. An Appendix is included in which main features of domestic individual capitalization regimes are outlined.

2 Review of stylized facts

The review of the fully funded pension regimes in all the six countries chosen, as well as the analysis of determined features of their investment portfolio structure and the evolution of some other related variables and indicators is intended to shed some light on individual capitalization' performance in the Region following something more than a decade since it came into being.[5]

A first feature deserving a comment is the relative size and evolution of pension fund assets, in terms of gross domestic product, as depicted by Figure 1.

Although an increasing path is observed in all cases, differences emerge once countries are individually considered; thus, while the ratio reached more than 50 per cent in Chile only in

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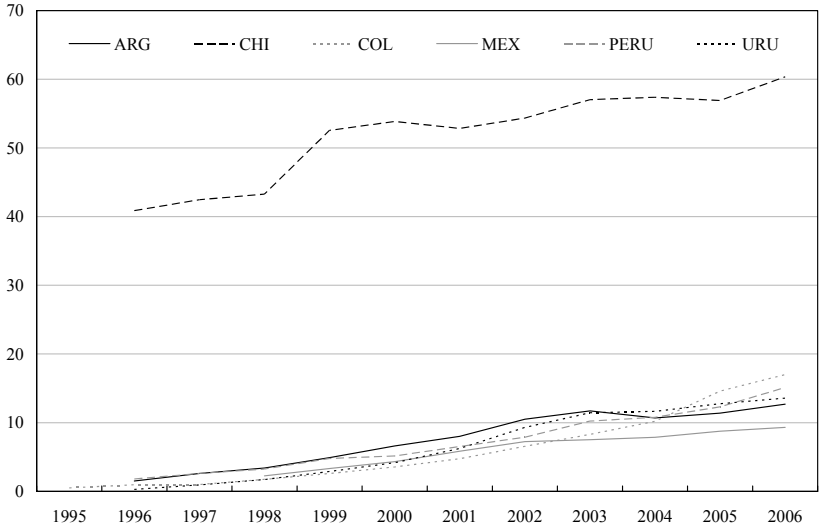
[4] As is publicly known the Argentine Congress enacted, in November 2008 and following a project received from the Executive Branch, a law that stopped the privately managed fully funded pension scheme based on individual capitalization. From that moment on, the ANSES (Social Security National Administration) already managing the PAYG regime, took over exclusive responsibility for the collection of all social security taxes and the payment of pension benefits.

[5] Except for Chile, where the system dates from 1980.

Figure 1

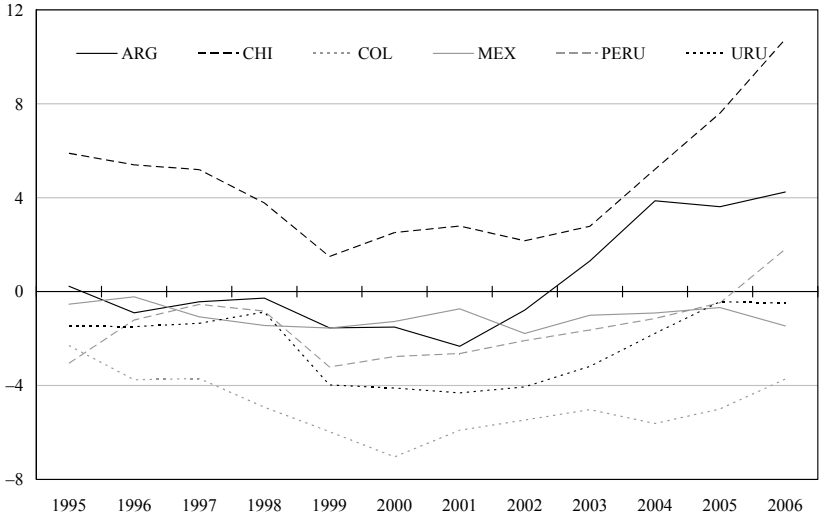
Pension Fund Assets
(percent of GDP)



Source: Data from FIAP (International Federation of Pension Fund Associations) and national series.

Figure 2

Budget Surplus/deficit
(percent of GDP)



Source: International Monetary Fund Financial Statistics.

Colombia, Uruguay and Argentina it climbed over 10 per cent[6] in the 1995-2006 period. Two main reasons can be accounted for in explaining differences in percentages: in the first place, individual capitalization started much earlier in Chile for what the regime exhibits more maturity;[7] in the second place, individual capitalization is mandatory in Chile and Mexico whereas PAYG regimes in Argentina, Colombia and Peru have not been eliminated and compete with the former as people are allowed to choose. Uruguay presents in turn an interesting situation as inclusion in either of the two regimes depends on individuals' scale of income or wages.[8]

An analysis of the evolution of government budget surpluses is next in order, since the model to be presented below in Section 4 suggests a negative relationship between pension fund assets and this variable. Except for Argentina and Peru, as of 2003 and 2006 respectively, Chile was the only of the six countries exhibiting an outstanding budget surplus throughout the

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6 With an average of 6.8 per cent for the remainder five countries.

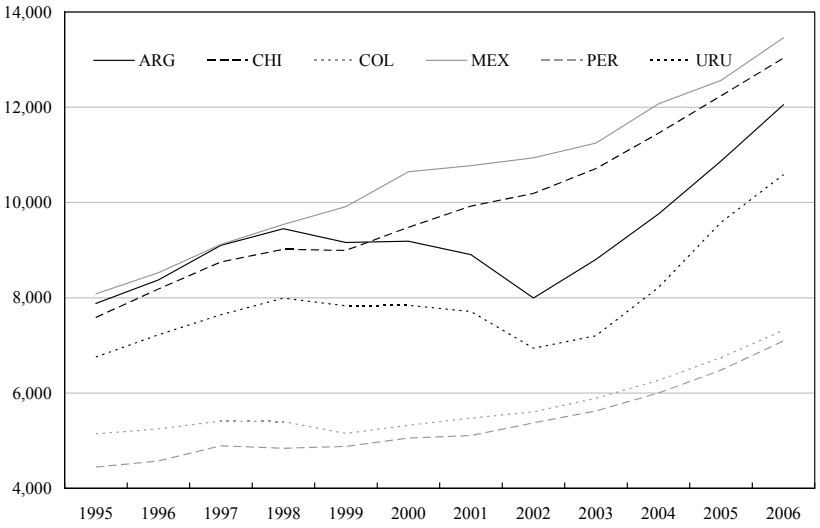
7 Nevertheless, the assets' yearly percentage growth is higher in the other five countries as suggested by Bailliu and Reisin (op.cit., p. 23) due to the fact that, by being more recent, they have greater contributors/retirees ratios.

8 People can however express their decision to be included in one of them.

period considered (Figure 2), due to a sound fiscal discipline and the setting of debt targets and stabilization funds following the effect of favourable cyclical conditions for Chilean copper exports. Contrariwise, persistent fiscal deficits were the prevailing situation in the rest of countries, save for the already mentioned exceptions.

Figure 3

Income per Capita
(purchasing power parity)



Source: International Monetary Fund Financial Statistics.

The mentioned disparities regarding public sector saving are somehow reflecting price behaviour in the region; thus, whereas Chile,[9] and to a lesser extent Colombia and Peru achieved a gradual reduction in their inflation levels to around an annual 3 per cent increase, Argentina (leaving behind the extreme price stability of the Convertibility period) and Uruguay, had more inflation than the rest and did not show evidence of theirs curbing the pattern of sustained price increases.

With regards to another of the variables included in the econometric model, persisting inflationary levels caused that Argentina began experiencing decreasing real interest rates (and even negative figures in 2005 and 2006); however, positive real rates of interest prevailed during the period in the rest although variability in time showed notorious differences among countries.

Two alternatives were in turn considered for assessing income per capita's performance in the six countries, variable whose importance resides in that the theoretical framework suggests a positive relationship with saving rates:[10] income per capita measured in current dollars and income per capita in purchasing power parity (seeking data to be comparable among countries); the second variant seems more appropriate for the analysis as it is to be expected that income measurement should somehow reflect individuals' average purchasing power.

As shown by Figure 3, the income per capita similarly evolved in all the six countries, although in Colombia and Peru the variable exhibited, in absolute terms, much lower levels than the rest with figures only averaging 60 per cent of the other four countries' income per capita (61 per cent in the case of Colombia and 57 per cent for Peru).

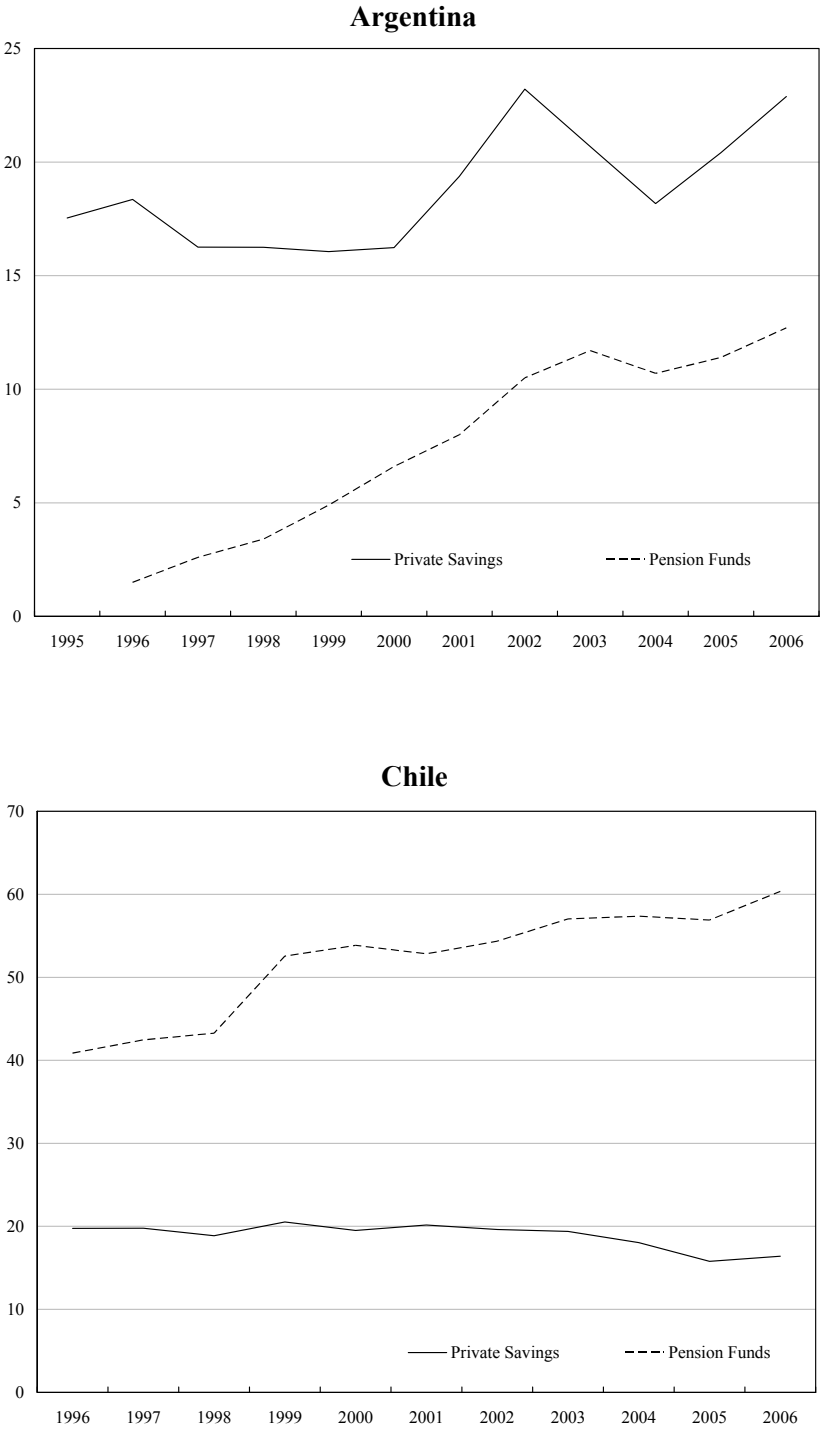
It must be borne in mind, in order to better analyze the relationship between pension fund assets and aggregate savings, that let alone Chile whose individual capitalization regime began much earlier in 1980, the implementation took place in the middle of nineties for the rest of

[9] Chile is, together with Brazil, a clear example of inflation targeting in Latin America.

[10] Without much need of emphasis higher income levels give more room to save once basic needs are taken care of.

Figure 4

Pension Fund Assets and Aggregate Private Savings, by Country
(percent of GDP)



Source: International Monetary Fund Financial Statistics (IMF) and national series.

countries.[11] As will be seen below, this caused an impact on the variables in two ways: the size of the fund relative to gross domestic product and the probable impact of pension funds upon private savings.

Figure 4 features the importance of when the regime was started upon the fund's relative size; thus in Chile, where the regime creation dates from 1980, pension fund assets reached 40 to 50 per cent of gross domestic product, whereas in the newer systems figures normally range from 0-3 per cent, at the beginning of the period to 10/12-15/20 per cent in 2006. It is also worth mentioning that, apart from being the first implemented regime, the mandatory and exclusivity features of the Chilean system must also be accounted for at the moment of explaining the relatively major size reached by its assets.

Figure 4 helps also to visualize the impact of pension funds upon aggregate saving, which will be later econometrically proved in Section 4. Conversely to Chile and Uruguay, where there seems to exist – *prima facie* – a negative relationship between both plots, in the

[11] Peru in 1993, Colombia in 1994, Argentina and Uruguay in 1995 and Mexico in 1997.

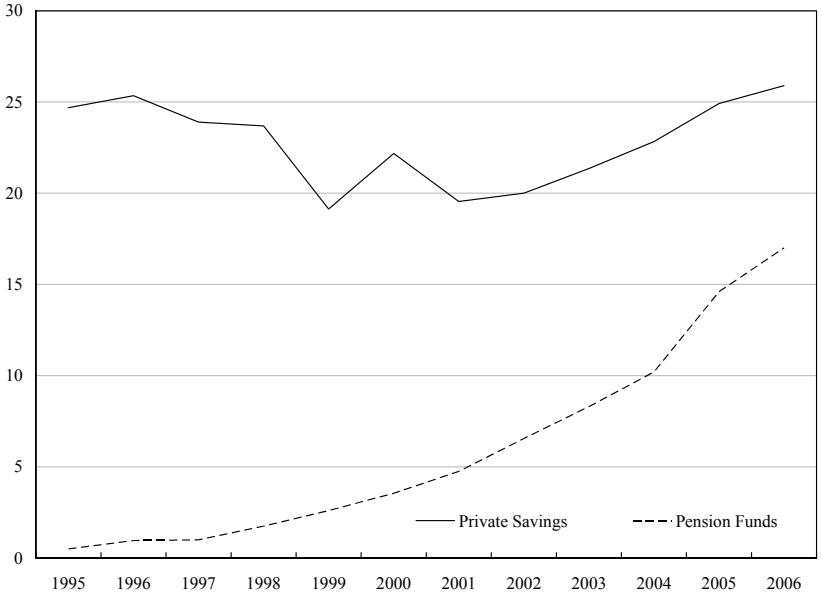
rest of countries the graph shows that pension fund assets clearly dragged aggregate savings, the effect being more visible generally as of the fifth year of the regime implementation. Argentina is in particular a worth quoting case as aggregate private saving kept stable between 1997 and 2000 although gross domestic product shrank in these years as a consequence of an industrial recession lasting until 2001; it can be inferred therefore that the sustained growth shown by pension funds somehow helped to compensate a fall in savings that would otherwise happened following the reduction of income.

As for the supposedly paradoxical Chilean case, the explanation can again be sought in that, due to the earlier regime implementation, the effect must have been stronger in the eighties when restrictions on foreign investment by the new pension funds existed.[12] In short, the stagnation and consequent small fall in aggregate savings in percent of gross domestic product must be looked at in the light of the

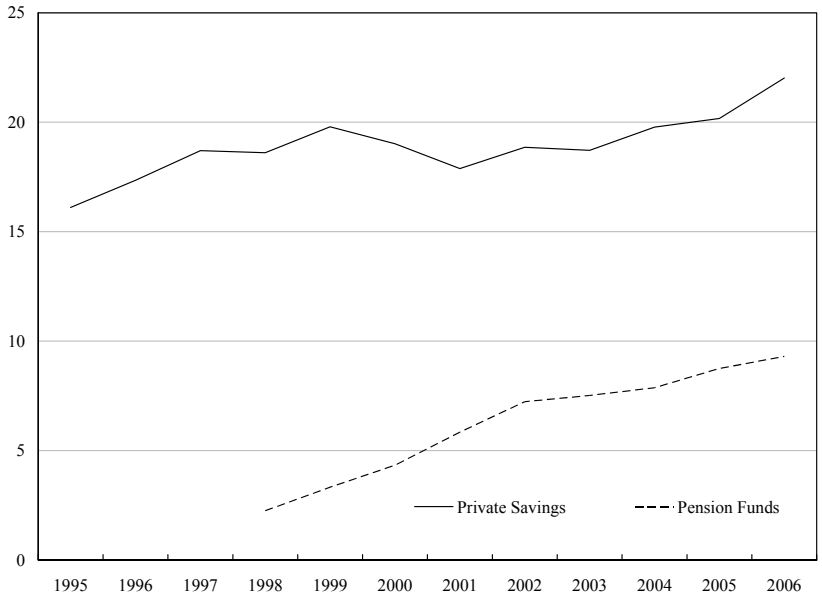
Figure 4 (continued)

Pension Fund Assets and Aggregate Private Savings, by Country
(percent of GDP)

Colombia



Mexico



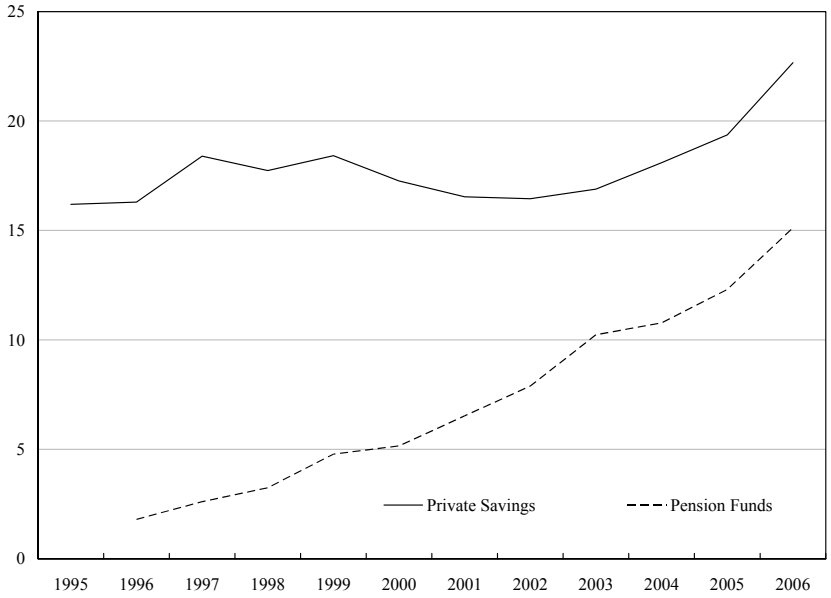
Source: International Monetary Fund Financial Statistics (IMF) and national series.

[12] While Fontaine (1996) recalled that until 1989 Chilean regulations banned any international diversification of pension funds, Reisen (1997) in turn asserted that this restriction was crucial in explaining why the Chilean domestic capital market grew in size and depth despite an internal climate of debt crisis and uncertainty.

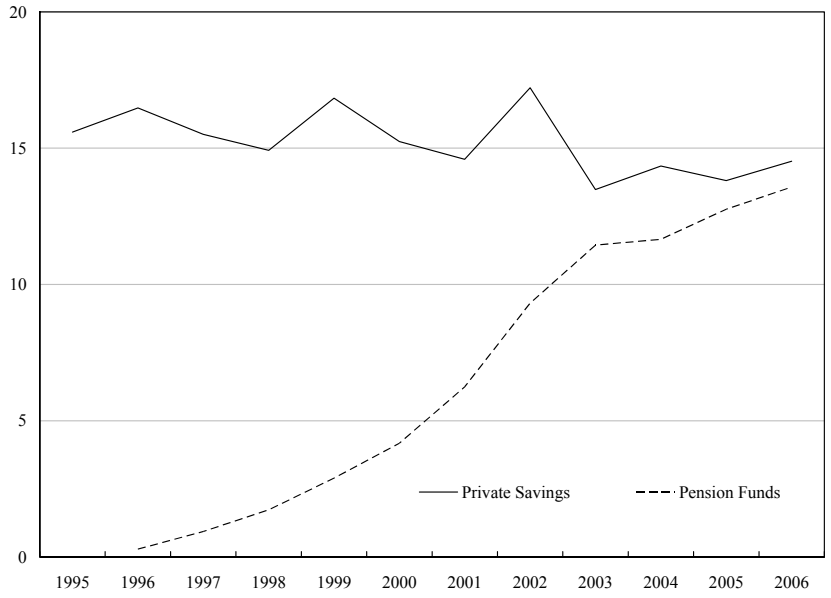
Figure 4 (continued)

Pension Fund Assets and Aggregate Private Savings, by Country
(percent of GDP)

Peru



Uruguay



Source: International Monetary Fund Financial Statistics (IMF) and national series.

banning lift in foreign investment, which is in turn confirmed by the figure showing the latter's incidence in portfolios.

In seeking next an explanation for the Uruguayan case, the saving plot's pattern must somehow be reflecting a feature of the implemented system which notwithstanding the fact that it is mandatory for certain wage earner groups, inclusion by default is based on the individuals' income scale.

The variations and lack of similarities in portfolio structures, as shown by Figure 5, are the best examples of differences, in many cases significant ones, that can be found in national legislation concerning how pension fund assets can be invested. In particular, and even if it is taken for granted that public bonds will always be important part of portfolios, countries often place a limit to their share in investment composition.[13] Despite this, countries have somehow managed to find shortcuts to the mentioned limitations, as it is particularly noticeable in the case of Argentina, whose legislation banned

[13] See National Legislation in the Appendix to this paper.

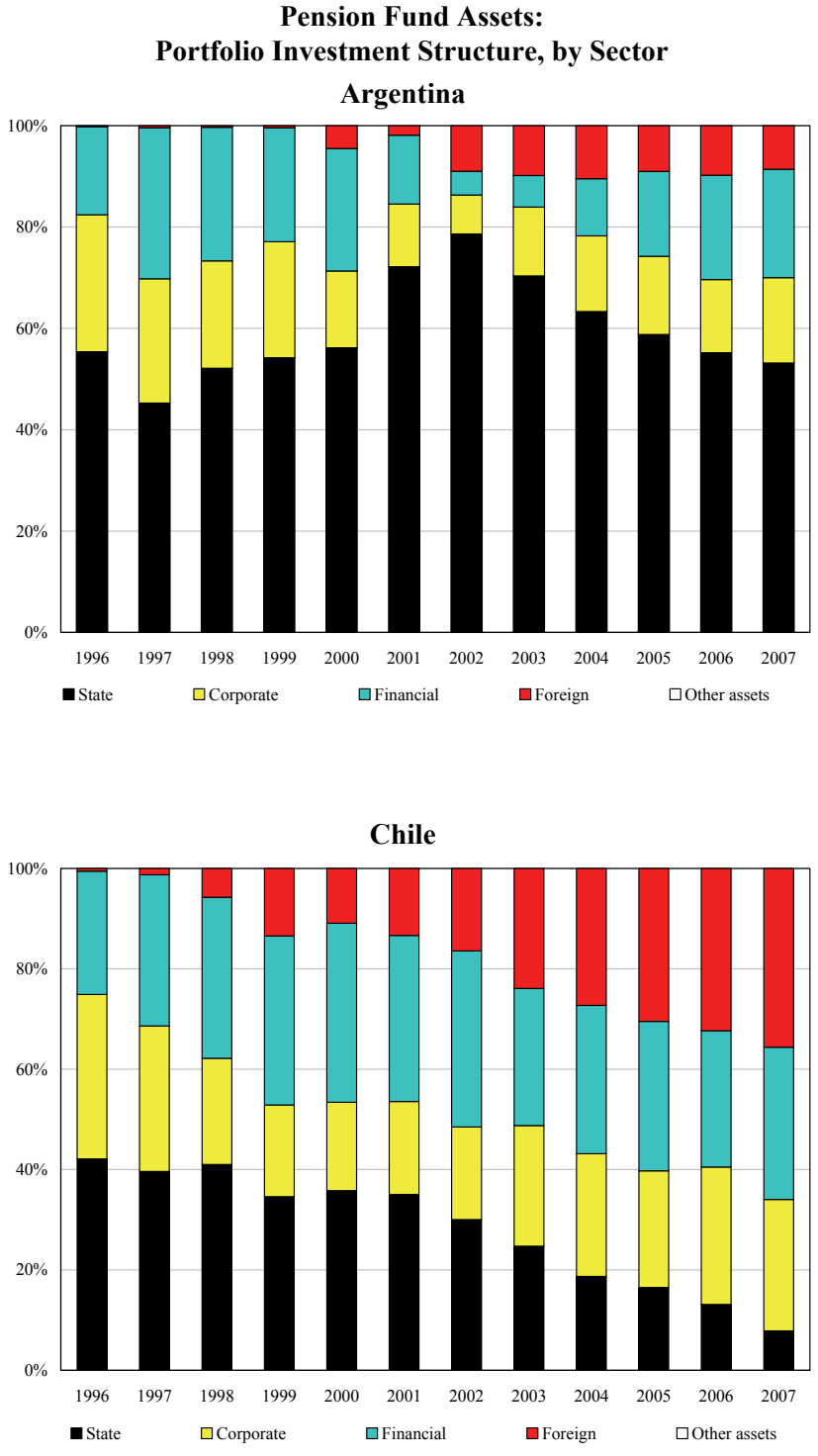
pension funds to invest in public bonds beyond 50 per cent of the whole portfolio. Fiscal matters and the restructuring of public debt must be borne in mind when the excessive government bonds' participation in pension funds is analyzed in Argentina; in particular, severe credit restrictions preventing the access to foreign and domestic financing led the authorities to resort to pension funds which became forced lenders.

As for the rest of countries, Chile and Peru exhibit public bonds' lesser shares but while in the former the evolution shows a downturn trend there is an increasing participation in the latter country. The cases of Mexico and Uruguay are also noticeable in that public bonds participation in portfolios is practically overwhelming[14] whereas Colombia reflects in turn the average situation of around 45-50 per cent.

Figure 5 permits to observe that the participation of other portfolio components also fell short of being stable, or similar among countries, throughout the period considered. In general, there has been a tendency, on the part of

Figure 5

Pension Fund Assets:
Portfolio Investment Structure, by Sector

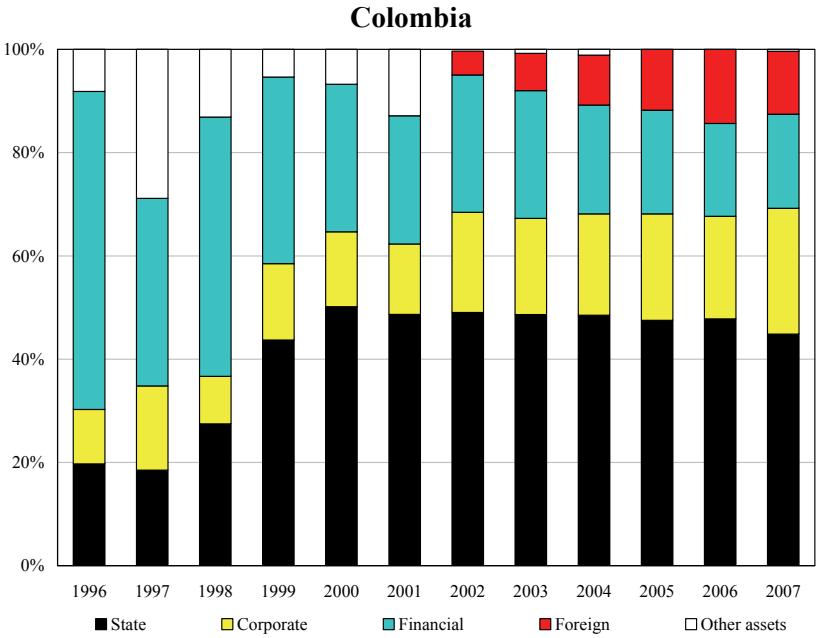


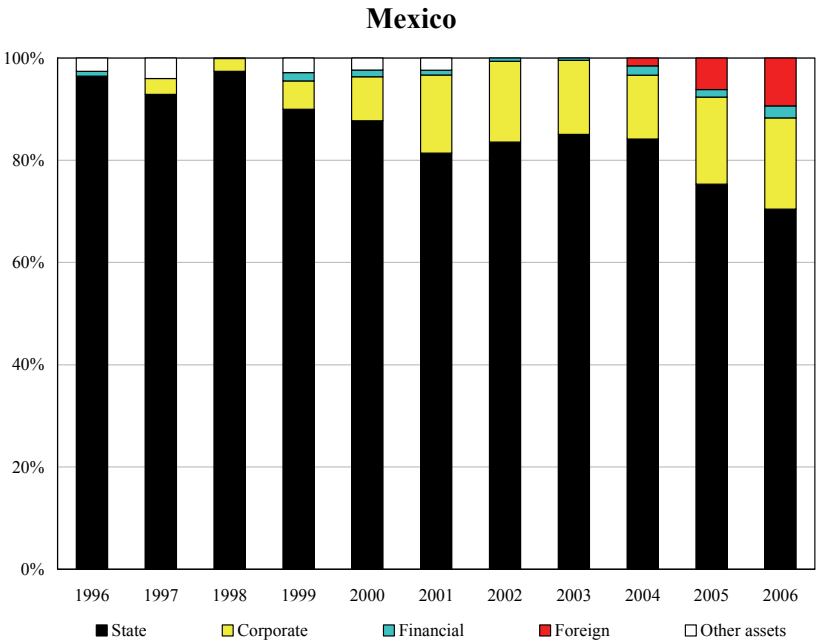
Source: FIAP (Federación Internacional de Administradoras de Fondos de Pensiones).

[14] Investment of Mexican pension funds in government bonds represented more than 90 per cent in 1997, although they later stabilized in around 70-80 per cent for the rest of the period; the opposite took place in Uruguay as the initial participation rounding 60-80 per cent climbed to 80-90 per cent by the end of the considered period.

Figure 5 (continued)

Pension Fund Assets:
Portfolio Investment Structure, by Sector





Source: FIAP (Federación Internacional de Administradoras de Fondos de Pensiones).

pension funds and except for Uruguay, to increase investment in foreign assets shares although at a slow rhythm and reaching a level that rounded 5 to 10 per cent of total. Chile is however the worth stressing case here as, following the end of the initial banning over pension funds' international diversification of portfolios, foreign assets started to climb reaching to date more than 35 per cent of all applications.

Financial investments by pension funds both exhibited an irregular performance among countries as well as a marked cyclical behavior in the period; except for the case of Chile where they have had a very stable share within the portfolio, with moderate variations within a 25-30 per cent interval, investment in financial assets showed marked cyclical variations in Argentina, Colombia, Peru and Uruguay whereas their participation was negligible in the case of Mexico. Similar conclusions can in general be drawn for the case of firm shares, although in this case Peru was the only country in which the latter's participation kept stable around 40 to 50 per cent of the total public fund's portfolios.

Lack of uniformity among countries is also a prevailing feature concerning the level of fees[15] perceived by pension fund groups (Graph 6), despite the fact that the evolution towards smaller figures is common to all cases; fees' decreasing paths are more notorious in Chile and Argentina than in the rest and only in Colombia stable levels prevailed in the period.

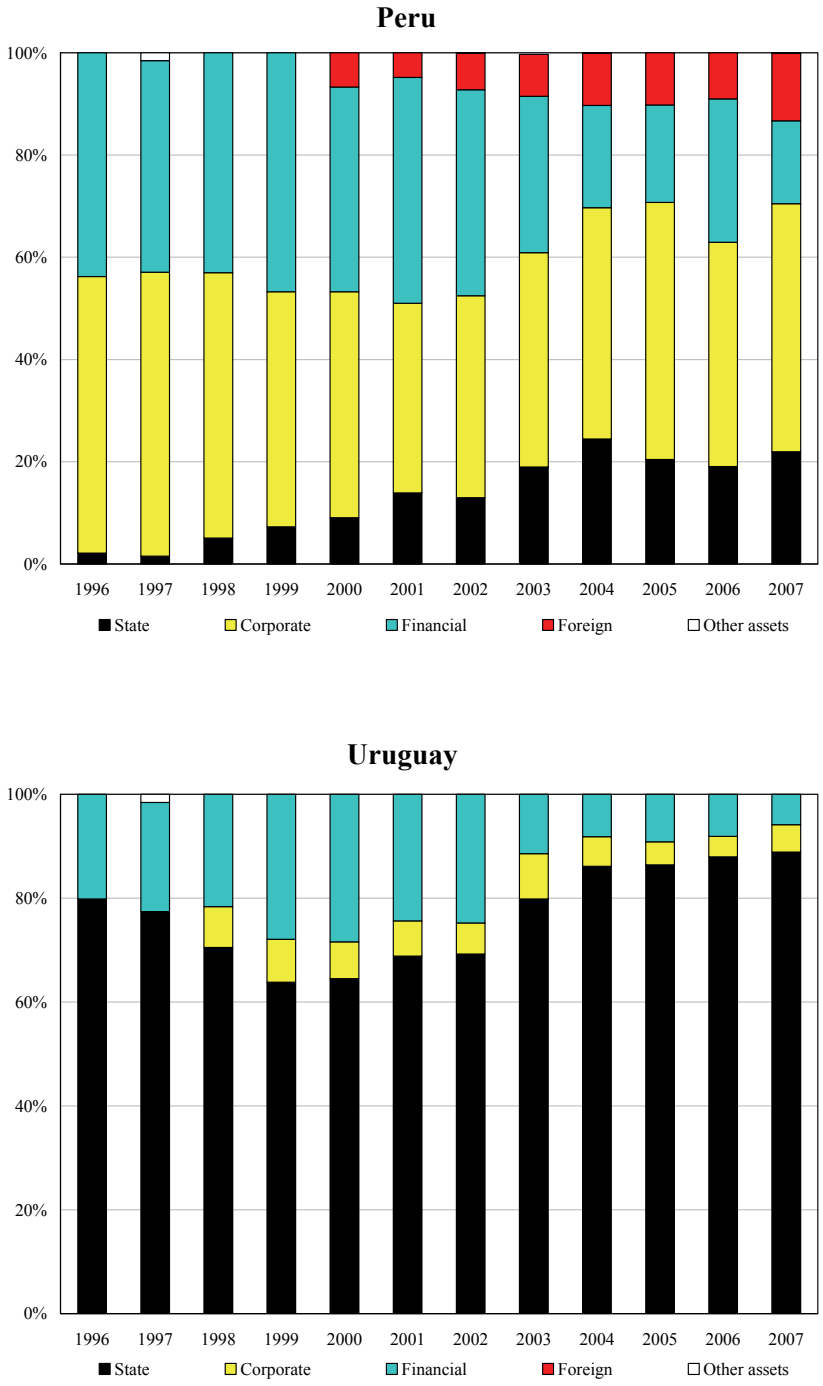
Fees' higher initial levels have normally been explained by the need to face major marketing and operational costs that firms managing pension funds incur when the system begins in a determined country. Once the regime is established, pension funds gradually start to compete to attracting new customers and the level of fees becomes thus one of items regarded by potential new entrants at the moment of choosing a pension fund.

3 Theoretical analysis of the life-cycle framework including social security

Theoretical backgrounds based on the

Figure 5 (continued)

Pension Fund Assets:
Portfolio Investment Structure, by Sector

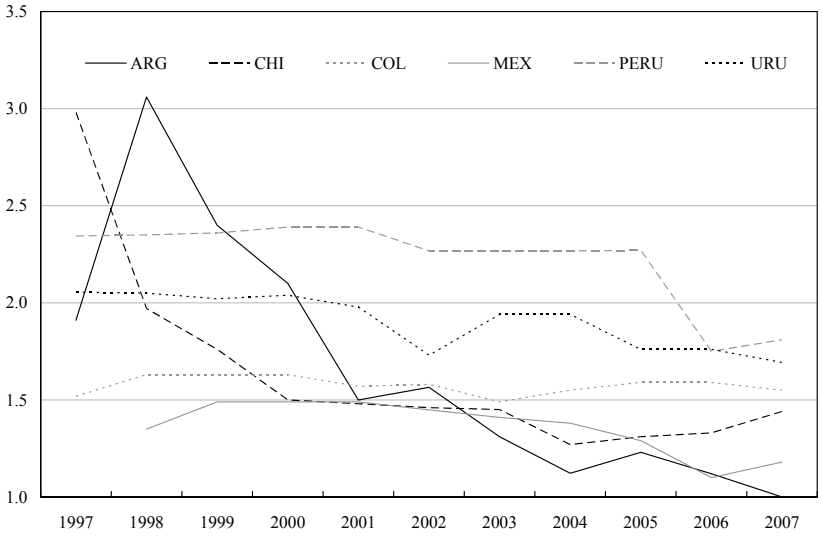


Source: FIAP (Federación Internacional de Administradoras de Fondos de Pensiones).

[15] Fees amount to a percent of the wage earned by workers and are supposed to embody the pension funds firms' operational cost expenses and benefits.

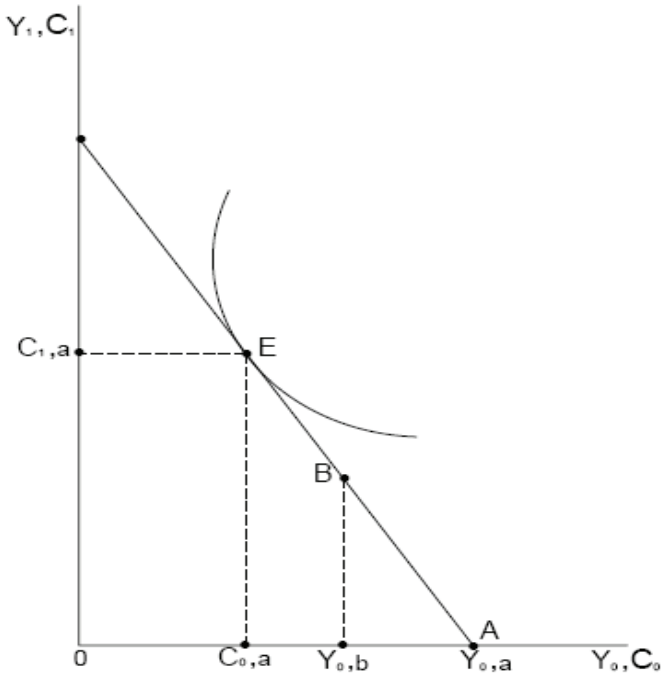
Figure 6

Variabile Fees
(percent of wage)



Source: FIAP (Federación Internacional de Administradoras de Fondos de Pensiones).

Figure 7



"life-cycle hypothesis" were generally resorted to in order to analyze the impact of social security systems upon savings. The idea, originally due to Modigliani and Brumberg and later summarized and extended in the paper by Ando and Modigliani (1963), basically states that an individual consumer's utility is a function of his own aggregate consumption in the current and future periods. As is to be expected, the approach emphasizes that individuals maximize consumption subject to their budget constraint; that is, subject to their lifetime resources, which in turn are the sum of current and discounted future earnings and current net worth.

In simple graphical terms,[16] and assuming a consumer whose life lasts two periods: a working period in which he earns wages and/or other incomes and a second one in which he retires from working and ceases having incomes, the situation is represented in Figure 7.

While Y_0 and C_0, on the horizontal axis, respectively stand for the individual's earnings and consumption in period 0, Y1 and C1 in turn

[16] This diagrammatical analysis highly relies on Feldstein (1974).

represent income and consumption in period 1. Assuming that the individual only receives earnings during his working life ($Y_{0,a}$), and that there is neither social security taxes nor pension benefits, ($C_{0,a}$) will indicate the desired level of current consumption resulting from the tangency between the utility function and the budget line; the individual's saving decision in the pre retirement period – amounting to ($Y_{0,a} - C_{0,a}$) and resulting from the rate of interest implied by the slope of the budget line and the current income and consumption – allows him to enjoy a level of consumption equal to ($C_{1,a}$) in period 1.

Figure 7 also permits to analyze how the introduction of social security regimes,[17] whose benefits are financed by collecting social security taxes, affects individual's savings. The collection of a tax immediately causes the current disposable income to reduce by the amount of the payroll tax, in this case ($Y_{0,a} - Y_{0,b}$) and savings to dwindle also to a new level equal to ($Y_{0,b} - C_{0,a}$); nevertheless, the equilibrium position indicated in E still holds as, by keeping unaltered the original budget line and its slope, benefits paid in the second period (out of capitalized taxes) will still guarantee the consumption level ($C_{1,a}$). The assertion of savings' reduction seems thus to be correct and based on the following two accounts: the reduction of disposable income and the ultrarational idea that payroll taxes are perfectly substituting the impact of private saving fall upon future consumption.

The implication that social security regimes always have a negative impact upon savings has not however gone unchallenged in the related literature, as soon as one departs from the framework of analysis provided by simpler versions of the life-cycle model. Feldstein (1974) himself quoted authors' yielding empirical evidence on that people covered by fully funded regimes save even more than those uncovered individuals, based on a "recognition effect"[18] emerging when people entering a private pension plan realize the benefits of saving for their old age (educational effect) and change their utility function, or a "goal gradient hypothesis"[19] whereby efforts are intensified the closer people are to set goals.

Nevertheless, the dual effect of social security systems upon saving levels has appropriately been analyzed by Feldstein (1974), as shown in Figure 8, whose crucial contribution was to extend the traditional life-cycle model in order to allow for endogenous retirement ages.

As can be seen, the budget line's parallel displacement AN denotes the fact that the individual decides not to retire at the age of 65 and earns also incomes in period 1;[20] the situation regarding consumption and saving will now be $C_{0,c}$ and ($Y_{0,a} - C_{0,c}$) respectively whereas E' indicates now the new equilibrium position. By assuming that a social security system is introduced, forcing the individual to retire at the age of 65, it is easily noticed that the situation reverts to point B in Figure 8 since the social security tax reduces period 0's disposable income and the compulsory retirement makes no possible to have earnings in period 1.

Since the situation indicated by B means that E is still the equilibrium position for consumption, the resulting saving level ($Y_{0,b} - C_{0,a}$) will in this case be larger than ($Y_{0,a} - C_{0,c}$) showing what Feldstein termed as the dual effect of social security; that is, when individuals retire at the age of 65, social security taxes have the unambiguous effect of reducing saving while for those working beyond 65 social security systems may induce early retirement and the effect of benefits upon savings will in this case be ambiguous.

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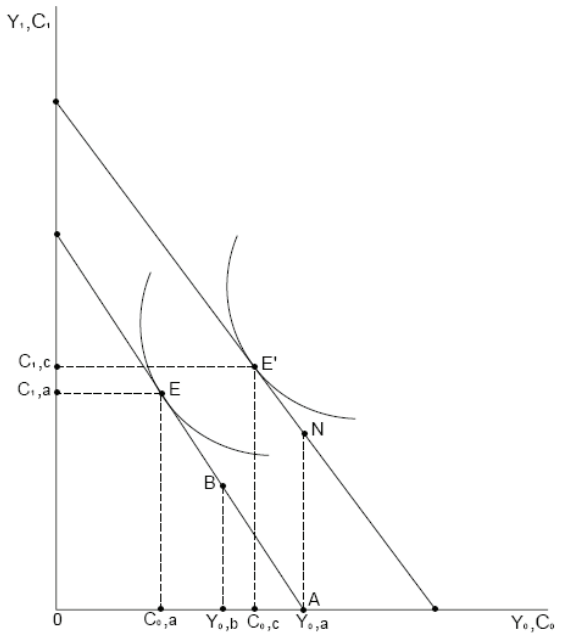
17 As will be shown, results more clearly depict the case of unfunded PAYG regimes.

18 First stated by Cagan (1965).

19 See Katona (1965, p. 4).

20 As Feldstein (1974) stressed it, N stands for the individual's initial position with incomes in the second period in addition to keeping the same earnings in period one (point A).

Figure 8



A very interesting theoretical analysis of the impact of voluntary and mandatory fully funded pension schemes was in turn provided by Bailliu and Reisen (op. cit.) who extended the traditional life-cycle model by allowing for the possibility of heterogeneous individuals, in terms of their saving capacity and of liquidity restraints.

By modifying Figure 7, for homogeneous individuals, a scenario with low and high income earners[21] is presented in Figure 9 in which hypotheses of limited and unlimited tax exempt pensions, and taxable and tax exempt returns, are successively considered in order to assess the impact of fully funded pension funds upon savings.

Figure 9

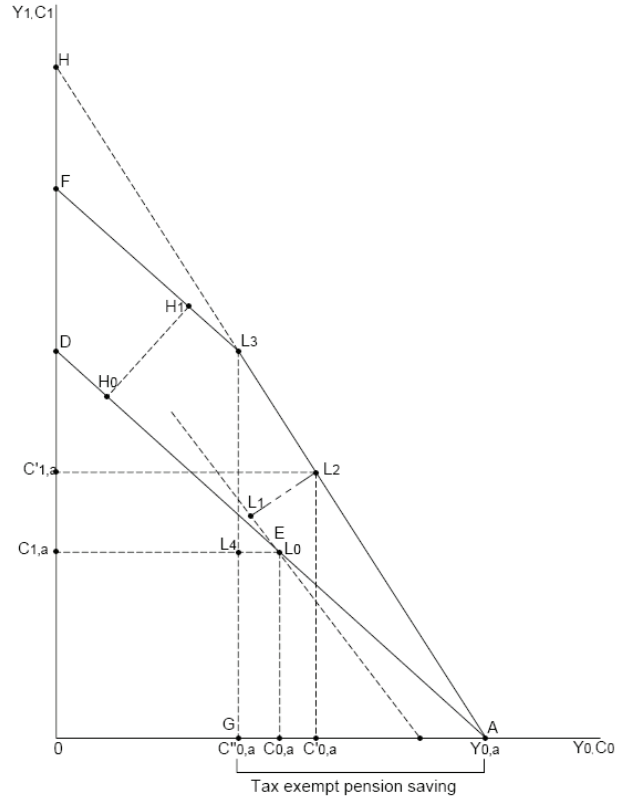


Figure 9 exhibits several modifications relative to the case shown earlier and developed by Feldstein: in the first place, while the budget line AD stands – as before – for disposable income, the new kinked line AF resulting from introducing a fully funded system with pension contributions only untaxed up to a determined amount depicts how untaxed

[21] Needless to emphasize, the implication of having heterogeneous agents is that low income persons save little or lesser than high income ones.

returns raise income more steeply for low savers (AL_3 line) whereas tax exempt incomes for high savers is indicated by the parallel displacement of the budget line over the section L_3F.

If a voluntary pension fund regime, with untaxed contributions limited up to AG, is established, low savers' final decision on consumption and saving will result from substitution and income effects: on the basis of the former one, a displacement over the broken line parallel to the new budget constraint will take place between L_0[22] and L_1, influenced by the higher rate of interest implicit in A L_3 whereas the income effect will be in turn responsible for the motion towards L_2. The outcome clearly shows that the impact of voluntary pension fund systems upon savings, when there exists a limit to low savers' untaxed contributions, falls short of being unambiguous: in the case drawn, the income effect prevailed over the substitution effect, consumption increased from $C_{0,a}$ to $C'_{0,a}$ and saving consequently shrank; should substitution effects had succeeded in stimulating savings, consumption would have ended somewhere to the left of $C_{0,a}$. As, by keeping unchanged the interest rate in the budget line relevant section, high savers' decision will only be influenced by the income effect (H_0 to H_1) and consumption and savings will increase and fall respectively for what, and given their relatively higher economic weight, the overall result will undoubtedly be a saving net fall.

Voluntary funded pension regimes hold however the chance of promoting savings when limits on untaxed contributions are abolished or not set, as indicated by the broken section L_3H of the budget line; in such a case, substitution effects may influence both the behaviour of low and high savers, and prevail over income effects, making a net increase in savings a likely result.[23]

Figure 9 permits also to show Bailliu and Reisen's assertion that savings unambiguously grow when a mandatory pension fund system, with taxable returns, is resorted to as the chosen social security regime. When contributions to the fund are mandatory low savers will displace from position L_0 to L_3, if pensions are tax exempted and to L_4 if they are not; in either case, the new consumption level will be $C''_{0,a}$ and the saving level will be greater than the ones implied by L_0 or L_2 over the respective budget lines. In terms of total net savings, compulsory pension funds with taxable returns are a good option as the mentioned low savers' increase in savings will not be impaired by the behaviour of high savers who, in not having the influence of income effects, will choose to stay in H_0.

In furthering the analysis of pension funds' impact upon aggregate savings, Bailliu and Reisin (op.cit.) introduced the case in which liquidity constraints strengthen mandatory pension funds' capability of increasing private savings, as shown by Figure 10.

Figure 10 depicts a mandatory pension fund, with taxable returns, in which liquidity constraints are highlighted by the dotted line passing through L_3 whose slope, higher than AL_3, stands for low savers' borrowing costs. If the regime forces the individual to place himself at L_4, as indicated above when pensions are taxed, he could only move to consumption level $C'_{0,a} > C''_{0,a}$ (corresponding to position L_2 over the budget line) only by resorting to borrowing against pensions assets, which is precisely averted by loans' interest rates being much higher than the rate of return implicit in the budget line.[24] In sum, and as pointed out by the authors, stimulated and high private savings require liquidity constraints to remain as tight as possible.

It is here worth quoting than Bailliu-Reisin's arguments had been raised earlier by Blinder (1982) who, in analyzing the relationship between pension funds and savings, concluded that

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[22] Let it be noticed that L_0 corresponds with the equilibrium situation depicted by point E in Figures 1 and 2.

[23] Nevertheless, Bailliu and Reisin (op. cit.) contend that, in this case, increases in private savings will be compensated by decreases in government savings and the net result is still an unknown.

[24] It is to be noticed that only to the extent that the borrowing cost line flattens, in the direction of the budget line, income and substitution effects will reinforce one other to stimulating higher consumption.

Figure 10

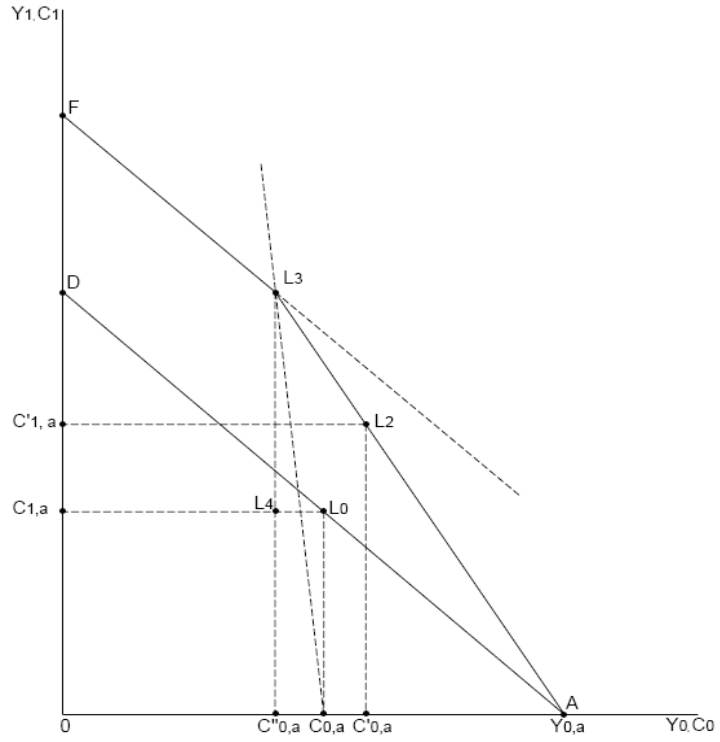
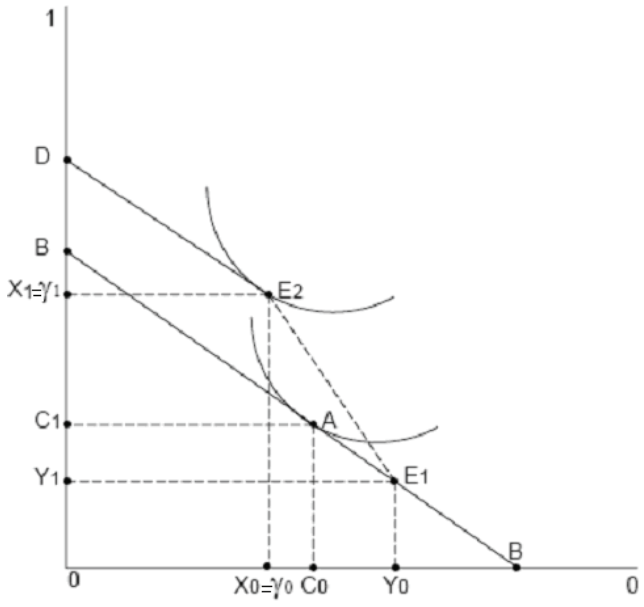


Figure 11



borrowing constraints would increase savings should the pensions impose binding capital markets constraints, as portrayed in Figure 11.

Thus, E_1 depicts the endowment point, corresponding to incomes Y_0 and Y_1 respectively whereas A indicates that – with no pensions – the optima consumption levels C_0 and C_1; a mandatory pension will lead to a corner solution like E_2 which will in turn force the highest saving level, as consumption falls to γ_0 in period 0 while it climbs up to γ_1 in the next period.

Blinder also made the interesting point that while expansions in private pensions, in the presence of capital market imperfections, will raise savings, social security systems of the PAYG system will likely not as – based on the Modigliani Miller Theorem's implications – saving in the latter case is solely aimed at financing consumption on retirement for what, and with no borrowing restraints, while private (funded) pension plans will not have any effect upon savings social security taxes in unfunded regimes will in fact reduce savings, as shown above with Feldstein's developments.

4 Fixed effect panel data model's econometric estimation and results

As mentioned in the Introduction, the relationship between aggregate private savings and pension fund assets will be assessed within the framework of a panel data model of the six countries (Argentina, Chile, Colombia, Mexico, Peru and Uruguay) and using series for the period 1995-2006. As quoted earlier, the recourse to the panel data model aims at sorting out the problem of degrees of freedom stemming from data's scarcity.[25]

The fixed effect variant was considered in place of pooled estimation as, by letting intersections to vary with each country,[26] it permits to capture countries' particular features and yet consider similar variables' coefficients or common slopes for all the cross section units. In line with this, each of the estimated regressions included country's specific individual effects captured by means of a specific dummy variable for each cross section unit or country.[27]

Since not only the impact of pension fund assets over aggregate private savings but also of other economic and demographic variables will be analyzed, the econometric specification is fully described by the ensuing equation:

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \mu_{it}$$

in which:

Y_{it} stands for the dependent variable aggregate private savings, in terms of gross domestic product, for country *i* and for period *t* (PASV), and

β_{1i} represents countries' specific intersection, whereas the explanatory variables are in turn represented by:

X_{2it} pension fund assets, in terms of gross domestic product, for country *i* and for period *t* (PFS) and whose coefficient's sign is expected to be positive, indicating its stimulating effect upon savings,

X_{3it} government budget surplus, in percent of gross domestic product, for country *i* and for period *t* (GOVS). As the hypothesis is being held that budget surpluses exert crowding out effects upon the private sector, the coefficient's sign for this variable is expected to be unambiguously negative,[28]

X_{4it} domestic credit (loans) to the private sector, in percent of gross domestic product, for country *i* and for period *t* (PRICR). The coefficient's sign is expected to be negative as the implication holds that the more accessible credits are, the more consumption will be eased and individuals will be less worried about their future and for building precautionary savings,

X_{5it} short term nominal or real active interest rate, for country *i* and for period *t* (NIR-RIR). The ambiguity of the coefficient's sign stems in this case of the possibility of substitution effects prevailing over income effects (positive sign) but also of the opposite actually holding (negative sign), as was already analyzed in Figure 3 above,[29]

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[25] Chile was the only of the six countries in which the individual capitalization system was already working in the nineties, when the rest introduced fully funded regimes.

[26] Nevertheless, intersections are invariant with respect to time.

[27] Following Greene (2007), in including constants, each dummy represents the country's differential effect relative to the base unit, in this case Argentina. In other words, the fixed effect model captures differences among units through differences in the constant.

[28] This assumption goes in line with Bailey's idea of ultrarationality between public and private saving, which is simply an application of the Modigliani-Miller theorem for the specific case of government finance. See David and Scadding, pp. 239-42.

[29] The sign will also be influenced by borrowing constraints; that is, should the interest rate be to heavy for potential borrowers, these will be discouraged from resorting to bank loans and stimulated to save (see Figure 4 above).

X_{6it} dependence index standing for the ratio between depending people (inactive individuals placed outside labour markets either for not having yet reached the age, for having reached the legal age of retirement or for being unemployed) and working people (whose used proxy here is the employed economically active population) (DI). Needless to emphasize, the coefficient's sign is expected to be negative as, following the ratio increase (indicating a prevalence of inactive over active people) the economy's earned incomes and savings depress,

X_{7it} per capita income level, as represented by the current per capita gross domestic product or the gross domestic product in purchasing power parity, for country *i* and for period *t* (GDP-PGDP). Given that savings are expected to increase following increases in gross domestic product, the variable's coefficient must necessary bear a positive sign, indicating a direct relationship between the dependent and this explanatory variable,

X_{8it} gross domestic product's rate of growth, for country *i* and for period *t* (GDPGR). The coefficient's sign is expected to be in this case unambiguously positive as increases in this variable's rate of growth will move earners to higher income levels and to lower marginal propensities to consume[30] and, finally,

μ_{it} stands for the error term meeting the classical assumptions.

Tables 1 through 4 below include results of the diverse econometric estimations carried out, depending on whether nominal or real interest rates and per capita gross domestic product in dollars or in purchasing power parity are used for obtaining the variables' coefficients.

The modified Wald test was applied in order to detect the likely existence of heteroskedasticity in the fixed effect regression model. As known, heteroskedasticity arises when the null hypothesis stating that errors have homogeneous variances[31] is rejected. The possibility of autocorrelation was assessed by running the Wooldridge test in order to confirm or discard the null hypothesis of no autocorrelation.

Whenever heteroskedasticity or autocorrelation could not be ruled out FGLS (Feasible Generalized Least Squares) were resorted to since this method permits to use an error variance matrix in which these effects are accounted for at the moment of performing the estimations.

A first comment, regarding results yielded by econometric estimations (Tables 1 through 4) is that variables' coefficients, save for the case of the dependence index, exhibit statistical significance at the 5 or 10 per cent levels and bear the expected signs according to the underlying theoretical framework.

Econometric estimations also supplied widespread and conclusive support to the crucial assumption of the positive impact of pension fund assets upon aggregate private savings; in this regard, results confirm that the variable's coefficient is significantly different from 0 in all cases but the third variant shown, in which the explanatory power seems to be taken by the real interest rate and the per capita gross domestic product in purchasing power parity. Let it be noticed that these results run counter the ones obtained by Bailliu and Reisin (1997) who, for a sample of eleven countries, could show a positive impact of pension fund assets upon private savings only when the former were demographically adjusted instead of being presented in percentage of gross domestic product.

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[30] Bailliu and Reisen's explanation for the sign places the emphasis on the life-cycle hypothesis' implication whereby in growing economies saving by the workers will increase relative to dissaving by the retired (1997, p. 32).

[31] Homoskedasticity would in turn mean a standing null hypothesis stating that H_0: $\sigma_i^2 = \sigma^2 \quad \forall i$.

Table 1

Equation 1[(a)]

Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model
χ^2 (6) = 30.51 *p*-value = 0.0000

Wooldridge Test for autocorrelation in panel data
F(1, 5) = 75.425 *p*-value = 0.0003

Dependent variable: PASV
Sample: 1995-2006
Included observations: 62

Coefficients: Generalized least squares
Panels: Heteroskedastic
Correlation: Common AR(1) coefficient for all panels (0.4789)

Variable	Coefficient	Std. Error	*t*-statistics	*p*-value
PFS	.1621637	.0628633	2.58*	0.010
GOVS	–.2781099	.1356909	–2.05*	0.040
PRICR	–.0568928	.0329231	–1.73**	0.084
NIR	.0816378	.0156141	5.23*	0.000
DI	–.0331060	.2806352	–0.12	0.906
GDP	.0006660	.0002607	2.56*	0.011
GDPGR	.0553130	.0308271	1.79**	0.073
CHI	–1.7157470	3.3990870	–0.50	0.614
COL	6.1097480	1.9959040	3.06	0.002
MEX	.3817979	1.9959040	3.06	0.002
PER	1.731593	1.7559930	0.99	0.324
URU	–5.645603	1.3236610	–4.27	0.000
CONSTANT	12.630470	2.1332570	5.92**	0.000

(a) The series include nominal interest rate (NIR) and gross domestic product in current dollars.
* Statistical significance at the 5 per cent level.
** Statistical significance at the 10 per cent level.

Table 2

Equation 2[(a)]

Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model
χ^2 (6) = 12.81 *p*-value = 0.0461

Wooldridge Test for autocorrelation in panel data
F(1, 5) = 56.009 *p*-value = 0.0007

Dependent variable: PASV
Sample: 1995-2006
Included observations: 62

Coefficients: Generalized least squares
Panels: Heteroskedastic
Correlation: Common AR(1) coefficient for all panels (0.4694)

Variable	Coefficient	Std. Error	*t*-statistics	*p*-value
PFS	.1230335	.0620584	1.98*	0.047
GOVS	–.2333545	.1390807	–1.68**	0.093
PRICR	–.0465444	.0326164	–1.43	0.154
RIR	.0725106	.0176939	4.10*	0.000
DI	.0471230	.3244887	0.15	0.885
GDP	.0004358	.0002981	1.46	0.144
GDPGR	.0550942	.0365475	1.51	0.132
CHI	–1.4019280	3.3287210	–0.42	0.674
COL	5.2789050	2.2901270	2.31	0.021
MEX	.4185314	1.1587690	0.36	0.718
PER	.4964914	2.0247090	0.25	0.806
URU	–5.280247	1.3901730	–3.80	0.000
CONSTANT	14.89972	2.4741820	6.02**	0.000

(a) The series include real interest rate (RIR) and gross domestic product in current dollars.
* Statistical significance at the 5 per cent level.
** Statistical significance at the 10 per cent level.

Table 3

Equation 3[(a)]

Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model χ^2 (6) = 20.86 *p*-value = 0.0019 Wooldridge Test for autocorrelation in panel data F(1, 5) = 44.892 *p*-value = 0.0011
Dependent variable: PASV Sample: 1995-2006 Included observations: 62 Coefficients: Generalized least squares Panels: Heteroskedastic Correlation: Common AR(1) coefficient for all panels (0.5237)

Variable	Coefficient	Std. Error	*t*-statistics	*p*-value
PFS	.0844234	.0770657	1.10	0.273
GOVS	–.4672454	.1496016	–3.12*	0.002
PRICR	–.0618667	.0335561	–1.84**	0.065
NIR	.0933493	.0163286	5.72*	0.000
DI	.0441775	.3054554	0.14	0.885
PGDP	.0009155	.0002773	3.30*	0.001
PGDPGR	.0720348	.0478833	1.50	0.132
CHI	.3771742	3.88799	0.10	0.923
COL	4.6743260	1.75403	2.66	0.008
MEX	–1.9652530	1.113703	–1.76	0.078
PER	1.2536360	1.491691	0.84	0.401
URU	–6.6743010	1.383662	–4.82	0.000
CONSTANT	9.3865820	2.521955	3.72**	0.000

(a) The series include nominal interest rate (NIR) and gross domestic product in purchasing power parity.
* Statistical significance at the 5 per cent level.
** Statistical significance at the 10 per cent level.

Table 4

Equation 4[(a)]

Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model
χ^2 (6) = 8.83 *p*-value = 0.1833

Wooldridge Test for autocorrelation in panel data
F(1, 5) = 53.594 *p*-value = 0.0007

Dependent variable: PASV
Sample: 1995-2006
Included observations: 62

FE (within) regression with AR(1) disturbances

Variable	Coefficient	Std. Error	*t*-statistics	*p*-value
PFS	.2980042	.1264246	2.36*	0.023
GOVS	–.3792299	.2071593	–1.83**	0.074
PRICR	–.0579133	.0529605	–1.09	0.280
RIR	.072066	.0275331	2.62*	0.012
DI	–.5128899	.3215314	–1.60***	0.118
PGDP	.0007609	.0004911	1.55	0.129
PGDPGR	–.0366699	.0608567	–0.60	0.550
CONSTANT	8.290232	1.509061	5.49*	0.000
	F(7,43) = 3.45	*p*-value = 0.0051		

(a) The series include real interest rate (RIR) and gross domestic product in purchasing power parity.
* Statistical significance at the 5 per cent level.
** Statistical significance at the 10 per cent level.
*** Statistical significance at the 15 per cent level.

The decisive quoted results can however be better understood by resorting to the theoretical analysis of the preceding section, when the point was stressed that regimes' design mattered and that only mandatory individual capitalization regimes would enhance the level of savings. As shown in the Appendix, except for the particular case of Uruguay, contribution to fully funded systems is compulsory in the other five countries.[32]

In relation to the rest of explanatory variables, notwithstanding the fact that the sign of coefficients fell generally in line with what the life-cycle model (when social security is included) predicted, estimations differ as to variables' statistical significance. Thus, the estimated interest rate's coefficient was statistically significant at the 5 per cent level no matter the variant resorted to (nominal or real active interest rate);[33] this result basically features the case – described in Section 2 – in which the substitution effect prevails over the income effect and causes savings to increase. By the same token, it can also be interpreted that the variable's sign and statistical significance is highlighting the favourable impact of tight borrowing constraints upon aggregate private savings, as borrowing for consumption is notably discouraged when tight liquidity prevails.

The government surplus' negative sign also shows that the variable behaved according to the hypothesis of ultrarationality between public and private saving mentioned in the preceding theoretical section; nevertheless, differences arouse in relation to significance as in two cases it met the 5 per cent level and in the other two only the 10 per cent level.

Despite bearing the expected negative sign, estimation of PRICR's coefficient (bank credits to the private sector) yielded much less conclusive econometric results as in two cases showed to be significantly different from 0, but at 10 per cent level whereas in the other two cases results were even weaker.

Poor results were in general achieved with relation to the growth rate of per capita income as only in one case (equation 1) the coefficient was significantly different from 0 at 10 per cent level. Finally, the dependence index exhibited in general a very poor econometric performance and signs running counter the expected ones, the exception being equation 4, in which the sign is correct and the coefficient significant at 15 per cent level. The lack of significance, at conventional levels, is not at odds with Bailliu and Reisin's findings for the dependence index when the main variables are considered in terms of gross domestic product.

5 Conclusions

The article aimed at assessing whether fully funded pension regimes, based on individual capitalization, produced the distinctive effect of enhancing aggregate private savings and, in turn, helped somehow to strengthen domestic capital stock markets. Likewise, efforts were devoted to analysing the impact upon private savings of a group of economic and demographic variables which the related literature usually link to the performance of both defined benefit and defined contribution pension systems.

In meeting the sought objectives, the traditional life-cycle hypothesis was resorted to, in the first place, in order to explain how individuals' saving decisions were modified following the introduction of social security taxes within the framework of a PAYG regime. Next, and in line with contributions stemming from Feldstein (1974), Blinder (1982) and Bailliu and Reisen (1997),

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[32] Even in the countries in which workers and self-employed individuals can choose between PAYG and fully funded systems, as it was in Argentina until 2008, contributions were compulsory for those deciding for individual capitalization.

[33] That coefficients of both the nominal and the real active interest rate resulted significantly different from 0 raises the question of whether the explanation must be sought in that inflation was not too high in most of included countries during the period analyzed or else, that consumers – in observing the variable's nominal level – were in fact suffering from money illusion and myopia.

the theoretical approach was extended in order to include the cases of endogenous retirement age and fully funded regimes.

The impact of individual capitalization systems upon aggregate private savings was next considered within a life-cycle approach in which various hypotheses where successively upheld, such us: homogeneous and heterogeneous individuals, voluntary and compulsory contributions and loose and tight borrowing constraints. The theoretical analysis permitted to prove that only under mandatory contributions and operating liquidity restrictions private savings would unambiguously be increased by pension fund assets.

In ascertaining the validity of the paper's main hypothesis, the problem of degrees of freedom, stemming from data scarcity caused by the relatively recent implementation of most individual capitalization regimes, had to be dealt with by using a panel data model including statistical series from Argentina, Chile, Colombia, Mexico, Peru and Uruguay for the period 1995-2006.

Also, the recourse to the fixed effect variant whereby intersections were let to vary among countries, permitted to capture countries' particular features and yet consider similar variables' coefficients or common slopes for all the cross section units.

In relation to the econometric estimation of coefficients, results gave ample support to the assertion that mandatory pension fund regimes would have a positive impact upon aggregate private savings as the coefficient of pension fund stocks not only held the expected sign but it was also significantly different from 0 in all but one single case.

With regards to the rest of estimations, coefficients' performance exhibited results of varying econometric soundness, depending on the variable analyzed, but generally falling in line with predictions of the life-cycle model; thus, the interest rate's coefficient was always positive and statistically significant independent of whether the nominal or the real interest rate were used, the main implications being that substitution effects prevailed over income effect and that the assumed hypothesis of a positive impact of liquidity restrictions upon private savings really held.

The idea of ultrarationality between private and public savings resulted also generally proven as the coefficient held the expected negative sign and resulted significantly different from 0 at 5 per cent, in two cases and at 10 per cent in other two cases. On the other hand, the Keynesian relationship between saving and income (with gross domestic product used as a proxy for the latter) gathered in general econometric support as, apart from the bearing the correct sign, results showed coefficients statistically different from 0.

Poor results were however found for the cases of loans to the private sector and the growth rate of per capita income as, in spite of expected signs generally being achieved, higher significance levels (10 or 15 per cent) were required for discarding equal to 0 coefficients.

Finally, the almost null econometric performance of the dependence index is a worth stressing feature as, contrariwise to what it would have been expected, no relationship could be found between this ratio and the level of aggregate private savings and therefore the idea that demographic variables could somehow influence savings could not at this stage be proven. The point is not however ruled out that the short length of statistical series, as well as the way the ratio was computed, somehow conspired against the variable's performance at the moment of assessing its real impact upon savings.

APPENDIX

Argentina

By Law 24.241, enacted in September 1993, the so-called Integrated Pension System was created embodying both the existing PAYG Regime and the fully-funded system based on individual capitalization, operating since 1994 and stopped in November 2008.

Integration to any of the mentioned regimes was mandatory, falling on labour and self-employed workers the responsibility to choose. When PAYG was the decided upon regime, workers' contribution amounted to 11 per cent of monthly wages whereas employers' tax would in turn be 16 per cent of salaries paid.

When workers chose the fully funded system their 11 per cent contribution covered a life insurance premium of around 1.50 per cent and a 1.50-2 per cent fee for pension funds' operational expenses and portfolio management; the remainder went to personal capitalization accounts which also allowed the possibility for individuals to make voluntary contributions beyond the legally set 11 per cent. The 16 per cent tax on employers would in this case continue being collected in order to finance pensions of the already retired people within the PAYG System. Pension fund associations, in charge of managing individual capitalization accounts, were regulated and supervised by the Superintendence of Pension Fund Associations.

Benefits included ordinary pensions for the elderly, paid from the age of 65 for male and 60 for female, and disability and death pensions in the case of people under 65 years whose contributions to the system extended for at least 18 months in the last 36 months.

It is worth stressing that, no matter that beneficiaries belonged to PAYG or the individual capitalization system, the State guaranteed to individuals reaching the retirement age,[34] as a part of their pension, a Basic Universal Benefit (PBU)[35] that was equal to 2.5 times the average social security contribution. There was also a Compensatory Benefit (PC), aimed at bridging the years contributed by beneficiaries to the PAYG system before 1994, when the fully funded regime started and amounting to 1.5 per cent of average existing wages and computed on the basis of the number of years individuals belonged to the unfunded regime. The pension, at the age of retirement, completed with the Additional Benefit for Permanence (PAP), equal to 0.85 per cent per year beyond 1994.

The mentioned Law 24.241 was also specific as to the participation that diverse national and foreign assets could reach within pension funds' portfolios, as is indicated below:

1) central government's public credit operations: up to 50 per cent,
2) provinces, local governments and public utilities' bonds: up to 35 per cent,
3) public debt's bonds, with public bid authorized by the National Securities and Exchange Commission: up to 40 and 20 per cent,[36]
4) convertible corporate bonds with public bid authorized by the National Securities and Exchange Commission: up to 40 per cent,
5) convertible corporate bonds issued by privatized public ptilities: up to 20 per cent,
6) fixed term deposits in banks and other financial entities: up to 30 per cent,

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[34] The PBU was however subject to the condition of potential beneficiaries proving at least contributions for a period of 30 years.

[35] Prestación Básica Universal.

[36] Depending on whether the time to maturity is greater or smaller than 2 years.

7) domestic firms' shares with authorized public bid by the National Securities and Stock Exchange Commission: up to 50 per cent,
8) privatized public utilities' shares with authorized public bid: up to 20 per cent,
9) shares in open-end or closed-end investment mutual funds: up to 20 per cent,
10) bonds issued by foreign states or international organisms: up to 10 per cent,
11) securities issued by foreign firms: up to 10 per cent,
12) contracts negotiated in future and options markets: up to 10 per cent,
13) securities holding a mortgage as a collateral and authorized in public bid: up to 40 per cent,
14) securities representing participation in investment mutual funds with authorized public bid: up to 10 per cent.

In November 2008 the Argentine Government, following a political decision, sent a project to the Congress seeking to stop the existing fully funded capitalization regime. By Law 26425, Argentina came back to a single unified PAYG system.

Chile

The Decree Law 3500 approved in 1980 the creation of an individual capitalization scheme, whose operations started in 1981. The fully funded regime, based on individual capitalization completely substituted the PAYG system and voluntary contributions are also allowed.

The individual capitalization regime was made mandatory for workers acceding to labour markets as of January 1983, whereas workers already contributing to the PAYG system had the option to switch to the new regime.[37]

Contributions amount to 12.37 per cent of individuals' wages or earnings, 10 per cent out of which goes to individual capitalization accounts while the rest (1.04 and 1.33 per cent) includes the life insurance premium (1.04 per cent) and pension funds' fees aimed at defraying administrative costs and returns. There are no contributions imposed upon employers who only act as withholding agents. Pension fund associations, in charge of collecting and administering social security taxes, are in turn under the supervision of the Superintendence of Pension Funds.

Benefits of the individual capitalization system include ordinary pensions, paid at the age of 65 for male and 60 for female, and disability and death pensions in the case of people under 65 years and survival pensions. Pensions may accrue to beneficiaries under one of the following alternatives: an immediate annuity straightforwardly arranged by contributors with a chosen insurance company; a temporal rent combined with a differed annuity which is made possible by keeping funds in the individual capitalization account in order to enable the pension fund administrator to pay the former during the differed period and a programmed retirement, expressed in UF,[38] taken from the capitalization account by an amount determined by annually dividing the account's effective balance by the capital necessary to pay a unit of pension.

The Chilean state also guarantees a minimum pension to individuals showing contributions for 20 years and to those whose accumulated amount in their capitalization accounts falls short of the minimum required to finance the benefit. Contributors coming by choice from the PAYG system are entitled to a monetary expressed Recognition Government Bond for periods effectively

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[37] Self-employed workers kept in turn the option of choosing between the old and the new system.

[38] UF stands for Unidades de Fomento.

registered in the old regime.[39] Welfare-type pensions are also available for individuals under the poverty line, with monthly incomes inferior to 35.000 pesos.[40]

Chilean pension funds divide into five categories, depending on the maxima and minima percentages of their assets they are entitled to invest in equities, as shown by the table below:[41]

Fund	Maximum Limit	Minimum Limit
A	80%	40%
B	60%	25%
C	40%	15%
D	20%	5%
E	0%	0%

Pension funds are asked to offer alternatives B, C, D and E, of lesser relative risk, whereas the setting of option A, more intensive in equities, is not compulsory although effectively offered by all pension fund associations. The table in the following two pages in turn shows investment limits for type of instrument.

Colombia

The new Pension Regime was legally enacted in December 1993 and its operations initiated in 1994. The scheme is composed of a Non Contributory Public System and a Contributory Compulsory Mixed System in which a public defined benefit Average Premium Solidarity Regime[42] compete with an Individual Capitalization Private Regime[43] allowing also for voluntary contributions. Workers and self-employed individuals must indicate the regime to which they adhere with a switch between systems allowed each five years.[44]

Contributions to the individual capitalization regime reach 15.5 per cent of monthly earned wages (11 per cent goes to the individual pension fund, whereas the pension fund administrator's fee and the insurance premium amount to 1.60 and 1.40 per cent respectively; the remainder 1.5 per cent is absorbed by the Fund of Guarantee for the Minimum Pension, 75 per cent of which is in charge of employers and 25 per cent of workers. Self-employed workers, who finance by themselves the compulsory 15 per cent contribution, have also an additional 1 per cent contribution for the Fund of Pension Solidarity when their incomes exceed four minima wages.

The contribution rate gradually increased from 9 per cent in 2004 to the present 11 per cent. As of 2008, the Government is entitled to add an extra 1 per cent whenever the rate of growth of

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39 This monetary benefit is subject to the condition that individuals prove an effective contribution of at least 12 months to the PAYG regime, between November 1975 and October 1980.

40 Around US$ 66.

41 See also Raddatz and Schmukler (2008).

42 The Average Premium Solidarity Regime is managed by the Social Insurance Institute (ISS).

43 Individuals deciding for Individual Capitalization are entitled to the so called "pensional bond" whereby previous contributions to the Social Insurance Institute are acknowledged and will make part, on retirement, of the fund financing the private system pension.

44 The possibility for individuals to switch between regimes ceases within the 10 years to retirement date.

Instruments	Maximum Limits for Each Type of Fund				
	Fund A	**Fund B**	**Fund C**	**Fund D**	**Fund E**
1. Bonds issued by the Central Bank and the Treasury; letters of credit, recognition bonds and other bonds and securities issued public agencies and or institutes and bonds issued or bearing the State's guarantee	40%	40%	50%	70%	80%
2. Fixed term deposits, bonds and securities issued by financial institutions	40%	40%	50%	70%	80%
3. Securities guaranteed by financial institutions	40%	40%	50%	70%	80%
4. Letters of credit issued by financial institutions	40%	40%	50%	60%	70%
5. Private and public enterprises' securities	30%	30%	40%	50%	60%
6. Share-exchangeable private and public enterprises' securities	30%	30%	10%	5%	-
7. Shares of open corporate firms	60%	50%	30%	15%	-
8. Shares of open real estate corporations	60%	50%	30%	15%	-
9. Mutual investment funds' quotas referred to by law Nº 18.815, plus compromised contributions in subscription promise contracts and payment of national mutual funds' quotas, when ruled by D.L. No. 1.328/76	40%	30%	20%	10%	-
10. Commercial instruments issued by private and public enterprises (promissory notes, credit and investment bonds) if time to maturity is up to a year	10%	10%	10%	20%	30%
11. Credit bonds, securities and commercial papers issued or guaranteed by international or foreign or international banks or foreign states and central banks; credit bonds issued by municipalities, regional states and local governments; shares, securities and commercial papers issued by foreign firms; share convertible bonds issued by foreign banks and firms; securitized credit bonds issued by foreign firms; structured notes issued by foreign entities; participation quotas issued by foreign mutual funds; foreign bonds representing share indices; short term deposits; operations aimed at hedging fluctuation risks among foreign currency or rate of interest risks in a determined foreign currency; investment in foreign countries through participation quotas issued by mutual funds referred to in 9 above, when they have more than 50% of their assets invested abroad	The investment in foreign bonds and securities of the same pension fund's types of funds, plus the amount of foreign investment through mutual funds' quotas and national investment, are limited to 35 per cent of total of the same pension fund's types funds				
11a. Share-convertible bonds issued by foreign banks and firms	Foreign Global Limit	Foreign Global Limit	10%	5%	-

Instruments	Maximum Limits for Each Type of Fund				
	Fund A	**Fund B**	**Fund C**	**Fund D**	**Fund E**
11b. Current accounts in foreign banks (moving average for the last 30 days)	0.20%	0.20%	0.20%	0.20%	0.20%
11c. Structured notes issued by foreign institutions	4%	3%	2%	2%	-
11d. Overnight and short time deposits	2%	2%	2%	2%	2%
11e. Contracts whose object is the loan or mutual of foreign issuers' financial instruments, computed on the basis of lent instruments	1/3 Foreign investment in each type of fund				
12. Public bid instruments, authorized by the Central Bank and whose issuers are supervised by the Superintendence of Securities and Insurance or of Banks and Financial Institutions	Investment limits for each instruments will range between 1 and 5 per cent of the respective fund's total amount, as determined by the Central Bank of Chile				
12a. Foreign capital mutual funds' quotas	1%	1%	1%	1%	-
12b. Commercial papers of Law 3500's letter I) (not considered in 10 above)	5%	5%	5%	5%	5%
13. Amount of investment in foreign currency without exchange coverage	43%	28%	22%	17%	10%
14. Contracts whose object is the loan or mutual of domestic issuers' financial instruments, computed on the basis of lent instruments	15%	10%	5%	5%	5%
15. Term deposits; bonds and securities issued by financial institutions and securities guaranteed by financial institutions	40%	40%	50%	70%	80%
16. Private and public enterprises' securities, including those permitting their exchange for shares	30%	30%	40%	50%	-
17. Shares of open corporate firms and open real state corporate firms	60%	50%	30%	15%	-
18. Domestic mutual funds' quotas ruled by Law 1.328/76, referred to in 9 above	5%	5%	5%	5%	-
19. Subscription promised contributions and payment of quotas belonging to mutual funds referred to in 9 above	2%	2%	2%	2%	-
20. For each type of financial risk coverage, customarily done in formal secondary markets (limit computed in function of coverage instruments and measured in net terms)	Investment in coverage instruments				
21. Risk cover operations in domestic and abroad markets	Superintendence's Circular No. 1216 determines investment limits to be met by Administrators when undertaking risk cover operations on behalf of Pension Funds				

the gross domestic product reaches an average increase of 4 per cent during the preceding two years. In the case of the Solidarity Regime contributions amount to 15 per cent of earnings, 12 per cent out of which is devoted to finance pensions for the elderly and the constitution of reserves and 3 per cent is used in covering administration costs and pensions for the disabled and death benefit payments.

Benefits covered by the Pension General System are pensions for the elderly and the disabled, death benefit and burial expenses. Pensions for the elderly are offered under the following variants: annuities, reversible annuities, programmed retirement and programmed retirement with differed annuities. There also exists a minimum pension guarantee whereby the State makes up the possible difference between the pension and the legal minimum wage.

The ensuing list illustrates about alternatives permitted by the Colombian legislation for investing funds from individual capitalization, as well as about the maximum limits, in percentage of the total portfolio, set for each type of instrument:

1) issued internal and external public debt's bonds bearing the guarantee of the State,
2) other public debt's bonds issued by governmental agencies (up to 20 per cent),
3) securities issued by or with the guarantee of the Financial Institutions Guarantee Fund (Fogarin) and Cooperatives Guarantee Fund (Fogacoop) (up to 10 per cent),
4) Bank of the Republic's securities,
5) mortgage securities (Law 546/1999) (up to 40 per cent),
6) debt bonds issued, accepted or guaranteed by institutions under the control of the Colombian Financial Superintendence (up to 70 per cent),
7) securities issued by institutions not controlled by the Colombian Financial Superintendence (up to 30 per cent),
8) equities (up to 30 per cent),
9) current account deposits (up to 2 per cent),
10) repurchase agreement operations and active simultaneous operations over admissible investments (up to 10 per cent),
11) repurchase agreement operations and active simultaneous operations carried out through agricultural or agroindustrial stock exchanges (up to 5 per cent),
12) investment in securities issued by foreign entities (up to 20 per cent),
13) protected capital structured products domestically issued or issued abroad whose contractual terms referring to 100 per cent payment of capital and yield are guaranteed by issuers,
14) temporal value transfers (only for securities allowed in pension funds' regime of admissible investments) (up to 30 per cent).

Mexico

The Social Insurance Law enacted in December 1995 did away with the existing PAYG system and created a defined contribution regime (individual capitalization) privately managed by the so called Retirement Fund Administrators (AFORES).[45]

As of 1 July 1997, individuals acceding to labour markets freely choose an AFORE whereas they also decide where their contributions will be invested by choosing, on the basis of investment

[45] Their operations actually began in 1997.

profiles, preferences and age, one of the two Retirement Funds Specialized Investment Societies (SIEFORES). Benefits include retirement pensions and pensions for the elderly.

Contributions to the fully funded regime reach 6.5 per cent of earnings, 5.30 points of which go to individual capitalization accounts while AFORES in turn perceive 1.20 points in concept of average fees.[46] In addition to this, a social quota (solidarity contribution) equal to 5.5 per cent of the minimum wage prevailing in the Federal District is provided by the Mexican State to each capitalization account. Individuals can also increase pension fund assets with short and long run voluntary contributions.

Benefits include retirement pensions and pensions for the elderly. Given the regime's defined contribution feature, benefits depend upon the accumulated value and interests in the respective individual capitalization account; beneficiaries have the choice of buying an annuity from an insurance company or deciding for programmed periodic retirements from the AFORES, computed on the basis of the life expectancy and the expected return.

Pension fund administrators are subject to the supervision of an autonomous organism called the System of Saving for Retirement National Commission (CONSAR).

There also exists an insurance for the disabled and the surviving spouse, administered by the Mexican Institute of Social Security (IMSS) and jointly financed by workers, firms and the State (0.62,1.75 and 0.13 per cent of earned wages respectively).

Workers with proven contributions until June 1997 are entitled to perceive PAYG's benefits, whereas individuals having contributed to PAYG and the fully funded regime have the possibility of choosing between both systems.

A minimum pension, equal to a minimum wage, is guaranteed by the government to individuals proving 1250 weekly contributions and reaching 60/65 years of age.

A multifund system is available from AFORES, as of January 2005, to which pension fund assets can be directed:

- Basic 1 SIEFORE (SB1), whose assets can be only invested in domestic and foreign fixed interest securities and in international permitted bonds and securities from governments and qualified firms.
- Basic 2 SIEFORE (SB2), differing from the preceding one in that investment in equities is also permitted up to a maximum participation of 15 per cent of total. SB3, SB4 and SB5, created in 2008, have authorized participations of 20, 25 and 40 per cent, respectively.[47]

The evolution of the legal framework, from a single fund basically investing in bonds of the domestic public debt to funds respectively investing only in fixed interest securities and in a combination of fixed interest securities and equities, shows that investment alternatives have increased for individual capitalization and that individuals' risk-return profiles are better served now by the five funds available to date.

The new investment regime permitted also to introduce three new possibilities for SIEFORES: investment in private capital and infrastructure (by using structured notes and trusts) and real estate investment (by using trusts).

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[46] Since AFORES charge different fees, a single uniform fee for all administrators is computed in terms of the contribution flow, following the CONSAR's methodology.

[47] These three funds can be voluntarily established by the AFORES.

Peru

The Peruvian retirement structure embodies a public not contributive regime and a mandatory mixed contributive system with public PAYG and private individual capitalization regimes operating in competence. By being affiliation compulsory, workers must decide to which one they will adhere. The fully funded system, enacted in 1992 by Law 25987, started its operation in June 1993.

The average worker's contribution to the private system[48] is 12.66 per cent of his/her taxable income, 10 points of which go to individual capitalization accounts, 0.91 is devoted to finance disability and survival insurances and 1.81 is the fee perceived by the fund administrators. Workers can also realize voluntary contributions. Contributions to the public regime amount to 13 per cent of earned wages.

Benefits from the private system are retirement pensions and pensions for the disabled and the surviving spouse, paid by pension fund administrators or insurance companies under one of the following alternatives: monthly programmed withdrawals from the individual account until funds' exhaustion, family annuities whereby individuals contract an annuity for him/her until death including a survival pension for his/her beneficiaries, temporal rents with differed annuities during a determined first period and a family annuity thereafter.

The Superintendence of Bank and Insurance is in charge of supervising pension fund administrators whereas the PAYG regime is managed by the Prevision Normalization Office.

There are variants whereby pension fund assets can be invested by administrators, the percentage in brackets indicating each instrument's maximum allowed participation within portfolios:

1) government bonds (30 per cent),
2) Central Bank bonds (30 per cent),
3) term deposits and securities from financial system's firms (30 per cent),
4) securities issued by financial system's firms (25 per cent),
5) subordinated securities issued by financial system's firms and insurance companies (15 per cent),
6) investment bonds issued by banks, financial firms and other entities for mortgage financing (40 per cent),
7) securities issued by private legal entities not belonging to the financial system (40 per cent),
8) short term instruments (15 per cent),
9) repurchase agreement operations (10 per cent),
10) shares and representative values of rights upon deposited shares registered in the stock exchange (35 per cent),
11) certificates of preferential subscription (3 per cent),
12) derivatives of values traded in the stock exchange (0,1 per cent),
13) financial risk coverage operations (5 per cent),
14) participation quotas in investment mutual funds (15 per cent)
15) investment instruments representing securitized assets (10 per cent),
16) financial instruments issued or guaranteed by foreign states and central banks; shares and values representing rights upon deposited shares registered in the stock exchange; debt bonds,

[48] Contributions to the private system are not deductible from the Income Tax.

participation quota in mutual funds and risk coverage operations issued by foreign entities (9 per cent),

17) share primary issuance and securities representing credit rights oriented to financing new projects (4 per cent),

18) promissory notes issued or guaranteed by financial system's firms (5 per cent),

19) promissory notes issued or guaranteed by other entities (5 per cent).

The above mentioned investment possibilities are however subject to general participation limits, as indicated below:

a) bonds issued or guaranteed by the Peruvian Government (30 per cent),

b) bonds issued or guaranteed by the Central Bank (30 per cent),

c) the overall sum of a) and b) (40 per cent),

d) bonds and securities issued by foreign governments and for financial and not financial entities whose economic activity is mostly carried out abroad (17 per cent).

There exist, since 2005, a multifund scheme for mandatory contributions composed of Type 1 Fund (Conservative or Capital Preservation Fund), oriented to a stable growth with low investment volatility; Type 2 Fund (Balanced or Mixed Fund), seeking a moderate growth level with investment medium volatility and Type 3 Fund (Growth Fund), pursuing the fund's highest growth levels with high investment volatility.

Asset investment limits in each fund was set as follows:

Fund type	Instruments and maximum limits for each type of fund			
	Equities	Derivatives	Short-term Securities	Fixed-interest Securities
Type 1	10%	10%	40%	100%
Type 2	45%	10%	30%	75%
Type 3	80%	20%	30%	70%

Finally, no minima limits are established for investment in equities or in fixed interest securities.

Uruguay[49]

The present Social Security System dates from 1995 (Law 16713), but its operation actually started in 1996. It is a mixed scheme composed of a defined benefit contributive public regime, a private defined contribution individual capitalization regime and derived benefits integrating therefore the Intergenerational Solidarity Retirement System (PAYG) with Individual Capitalization System. Affiliation to the corresponding regime is determined in function of the three following earning levels:

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[49] We are very grateful to Alvaro Forteza for his helpful comments on the Uruguayan case.

a) retirement regime for intergenerational solidarity (PAYG): it includes workers whose monthly incomes are equal to or less than $ 5,000 pesos (215 dollars),
b) individual capitalization system: it includes individuals whose monthly income ranges between $ 5,000 and $ 15,000 (between 215 and 644 dollars) and those deciding for the fully funded system although their monthly incomes fall below $ 5,000,
c) voluntary individual capitalization regime: for all individuals, for amounts exceeding the mentioned compulsory upper limits.

Contributions to the PAYG regime reach 15 per cent of wages and, depending on individuals' earnings and choices, this percentage is split between the public and the private system. Workers with monthly incomes below $ 5,000 (215 dollars) may also opt for devoting half of their contributions to the individual capitalization regime (voluntary option for the mixed regime).

Contributions to the mandatory fully funded regime reach 15 per cent, of which 12.16 points go to individuals' accounts, 1.854 points is the administrator's fee and 0.988 the insurance premium. Employers' contributions (12.5 plus 5 per cent for mutual insurance for all salary levels) are directed to the PAYG system.

Benefits include pensions for the elderly,[50] computed on the basis of individuals' accumulated assets, the interest rate paid by the insurance company and the beneficiary's life expectancy.[51] Disability contingencies and pensions to the surviving spouse are financed by means of a specific insurance that AFAPS must compulsory take; this insurance's premium is discounted from monthly individuals' contribution to their capitalization accounts.

Pension fund assets are managed by Prevision Save Funds Administrators (AFAP), whereas the Bank of Social Prevision administers the PAYG regime, non contributive benefits, the unemployment insurance, the health insurance and family allowances. The AFAP Control Division, at the Central Bank of Uruguay, is in charge of supervising the individual capitalization regime of second and third pillars.

There also exist a non contributive welfare benefit (62.58 dollars) granted to individuals beyond 70 years who, due to age or disabilities can not accede to a permanent paid job.

The legislation is also specific concerning the participation that diverse national and foreign assets can reach within pension funds' portfolios, as well as the Previsional Save Funds' permitted investments to administrators, as is indicated below:

1) bonds issued by the Uruguayan Government (up to 65 per cent),
2) securities issued by the Uruguayan Mortgage Bank and instruments of monetary regulation issued by the Central Bank of Uruguay (up to 30 per cent),
3) term deposits in domestic financial entities, in national or foreign currency (up to 30 per cent),
4) securities from Uruguayan utilities or private firms and mutual investment funds' quota parts, operating in formal markets and authorized by the Uruguayan Central Bank (up to 25 per cent),
5) instruments standing for domestically located real estate, industrial, forest and other productive sectors gathering acceptable conditions of safety, return and guarantee, according to the requirements of the Uruguayan Central Bank (up to 20 per cent),

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[50] Contrariwise to the capitalization scheme, in which a lower limit does not exist for benefits (pension for the elderly), there is a minimum value for the quota part in the public Intergenerational Solidarity Retirement System equal to $ 550 (23,60 dollars), which is annually increased in 12 per cent (each year after retirement) with a ceiling of 120 per cent.

[51] Acknowledgement bonds' issuance is not considered by the new regime.

6) guaranteed investments in public and private entities whose purpose is to grant loans to social security system's contributors and beneficiaries, Individual loans[52] should be not higher to six salaries or pensions (up to 15 per cent),
7) operations aiming at supplying financial risk coverage to the prevision save fund, with limitations and conditions set by the Uruguayan Central Bank (up to 10 per cent),
8) fixed interest securities issued by international credit entities, subject to conditions established by the Executive Power (up to 15 per cent).

[52] Loans granted should be cancelled within the year and their rate of interest will at least equal the evolution of the Wage Average Index plus five percent points.

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PENSION PRIVATIZATION AND COUNTRY RISK

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This paper explores how privatizing a pension system can affect sovereign credit risk. For this purpose, it analyzes the importance that rating agencies give to implicit *pension debt (IPD) in their assessments of sovereign creditworthiness. We find that rating agencies generally do not seem to give much weight to IPD, focusing instead on* explicit *public debt. However, by channeling pension contributions away from the government and creating a deficit of resources to cover the current pension liabilities during the reform's transition period, a pension privatization reform may transform IPD into explicit public debt, adversely affecting a sovereign's perceived creditworthiness, thus increasing its risk premium. In this light, accompanying pension reform with efforts to offset its transition costs through fiscal adjustment would help preserve a country's credit rating.*

1 Introduction

Pension "privatization" (social security reform characterized by the introduction of a defined-contribution pension scheme) aims at correcting actuarial imbalances at the root of long-run solvency problems in pre-existing pay-as-you-go (PAYG) defined-benefit public pension systems. However, other things equal, the reform's diversion of social security contributions to private personal accounts deprives the general government of revenues without an offsetting reduction in public spending because ongoing pension payments to existing pensioneers must continue, at least during a transition period. It is during this transition that governments often resort to market financing to make up for lost social security contribution revenue, leading to an increase in public debt.

During the wave of pension reform – particularly in Latin America during the 1990s – it was often argued that issuing debt to cover the imbalances that usually followed such reforms was not a cause for concern, since it just meant replacing implicit pension debt (IPD) with "explicit" public debt. A PAYG system is an intergenerational redistribution mechanism based on the rollover of IPD across generations of workers. [1] Contributors implicitly buy claims to future income from the government, which uses the proceeds to finance the benefits of retirees – that is, to redeem previously issued claims. However, once pension privatization takes place, the government cannot rollover pension claims any further, and must find new financing for the redemption of pension claims still falling due. Thus, financing the payments of benefits to pensioners (or making up for lost contribution revenue) by issuing financial debt would be, in some sense, gradually making IPD explicit.[2] However, if markets do not consider IPD and explicit public debt as equivalent, then turning one into the other could affect the market's perception of a government's credit risk.

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[1] See Conesa and Garriga (2005).

[2] Strictly speaking, making up for lost contribution revenue with financial borrowing is to replace a flow of new implicit financing with a flow of new explicit borrowing. Issuing "recognition bonds" to compensate workers for the loss of acquired rights, as has

(continues)

Several factors would seem to make financial debt a more problematic liability for the government than IPD. In most cases, IPD can be seen a contingent liability,[3] whereas explicit financial debt is a firm commitment. By definition, IPD is a very long-dated liability, payable in the country's own currency, and positively correlated with the tax base. In contrast, in most countries' financial debt has a relatively shorter average maturity, is often denominated in foreign currency, and its burden generally bears little relation to the tax base – if it does not bear a negative correlation to it. Creditors hold financial debt on a voluntary basis, which gives rise to relatively high rollover risks, whereas social security contributions are mandatory. More fundamentally, governments can, and often do, change the terms of PAYG pension schemes, thereby unilaterally restructuring IPD, whereas the terms of financial debt cannot be unilaterally modified.

Not only does pension privatization change the composition of the government's liabilities; it also changes the relationship between government and pension scheme's participants. Under a defined-benefit, PAYG-financed scheme, workers and retirees hold junior claims on the government, while bondholders and other creditors hold more senior claims. In fact, experience shows that governments will try to reduce pension benefits or increase pension contributions under PAYG plans before considering defaulting on financial debt. Workers and retirees are like equity holders, subject to residual risk. However, once pension privatization takes place, workers and pensioners become, through their pension funds, creditors on a par with other bondholders. The bonds held by pension fund managers (largely government bonds) are quite similar to the bonds held by other investors. Thus, a reform that kept the size of total obligations unchanged, but transformed IPD into explicit debt would increase the riskiness of the government's balance sheet and dilute the value of the financial claims already held by creditors.

Starting from an unsustainable PAYG scheme, a pension reform will usually aim at curbing the growth in total government liabilities over time. Thus, a pension privatization can involve a trade-off between reducing total public (implicit plus financial) debt in the long run, but increasing the riskiness of the composition of liabilities in the short and medium term as financial debt replaces IPD, at least during the transition period of the reform. This is not an argument against pension reform; it is an argument in favor of accompanying pension reform with fiscal efforts to offset the tendency of the reform to increase riskiness associated with the higher path of financial debt.

In this paper, we explore whether these conclusions can be supported by showing that financial markets – and financial analysts in particular – judge IPD and financial public debt differently as they assess sovereign creditworthiness. Our empirical evidence suggests that this may be, in fact, the case. This diverging perception of financial analysts over both types of debt may be simply due to their understanding of the intrinsic differences between the two, (as mentioned above), but it could also reflect myopia by the financial analysts themselves, who may not fully appreciate the obligations represented by IPD – in fact, such a myopic perception of IPD by the markets would constitute yet another difference between IPD and explicit debt.

Previous research in this area is scant, but the few available studies have mixed views on the equivalence between implicit and explicit liabilities.[4] When assessing the private sector, Feldstein and Seligman (1981) and Moody's (1998) argue that unfunded pension liabilities of corporations do end up reflected in corporate share prices and credit ratings. However, when assessing the determinants of sovereign credit risk, results are less clear. For example, Fiess (2003) seemingly

been done under some pension reforms, is closer to the idea of making the stock of IPD explicit, although it really involves putting a definitive value on IPD.

[3] Pension obligations under a PAYG-defined benefit system would be contingent on the life of the pensioneer who holds the claim, but also subject to discretionary changes in the parameters of the pension system itself.

[4] However, economists have increasingly emphasized the need to include the concept of IPD in the standard set of debt sustainability indicators (see Holzman, Palacios and Zviniene, 2004).

confirms the differential treatment of financial debt and IPD for the case of Mexico, by observing that the country's credit ratings remained broadly unchanged before and after the 1997 pension system reform, despite the fact that the reform's features generated, upon its approval, an immediate reduction of IPD. More generally, a widely held view among practitioners is that net present value estimates of IPD should not influence sovereign credit risk ratings for two reasons: first, these estimates are highly sensitive to small changes in parameters and assumptions, as noted by Truglia (2002) and Pinheiro (2004);[5] and second, they do not account for possible future policy actions to improve the finances of defined-benefit pension systems.[6]

We regress indicators of sovereign creditworthiness on IPD and explicit public debt, controlling for the main determinants of debt sustainability. The analysis shows that cross-country differences in financial public debt help explain differences in sovereign credit ratings, but differences in IPD do not. The apparent lack of attention to IPD on the assessment of sovereign creditworthiness could be an indication that markets, though concerned over contingent liabilities, simply do not trust available measures of IPD, which are subject to considerable error. To address this problem, we also estimate dynamic panel models of credit ratings that look at the effects of pension privatization *without* using direct measures of IPD – but focusing on the impact of the implementation of pension reforms. These models also suggest that markets focus mainly on explicit public debt levels without giving much weight to the IPD reductions generated by pension privatization. The corollary is that if a government wants to preserve its credit standing while it carries out a radical pension reform, then it must strengthen its non-pension fiscal balance to offset the loss of revenue from social security contributions, and avoid incurring additional explicit liabilities to finance the transition costs of the reform.

To illustrate the results of the econometric analysis, we present one simple counterfactual pension reform scenario. We look at the case of Mexico, which privatized its pension system in the late 1990's We construct simple fiscal scenario to show what might have happened to public debt and ratings, other things being equal, if it had done otherwise, and calculate the resulting impact on their credit standing, in line with our econometric estimates. This case helps illustrate the corollary mentioned above: public debt can become hard to manage when a country undertaking pension privatization does not offset its adverse cash flow effects with fiscal adjustment.

2 Country risk, credit ratings and implicit pension debt (IPD)

Financial debt is an important variable for rating agencies assessing government credit risk, and there is a strong relationship between a sovereign's debt and its credit rating (Figure 1).[7] For instance, as Argentina's federal government debt rose from 34½ per cent of GDP in 1997 to about 135 per cent of GDP in 2002, Standard and Poor's gradually downgraded its rating from BB to CC and ultimately SD (default). Similarly, Argentina's rating by the Institutional Investor's Country Credit Rating (IIR) System – which captures the aggregate views of economists and financial analysts on sovereign creditworthiness – fell from about 42½ in 1999 to 34¾ in 2001 and 23¾

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5 In particular, Pinheiro (2004) argues that in the late nineties estimates of IPD for Brazil from various sources varied by as much as 60 per cent of GDP.

6 See Moody's Investor Service's Sovereign Risk Unit managing director Truglia (2002).

7 General government debt is one key criterion for both Moody's and Standard and Poor's for assigning sovereign credit ratings, as stressed by Powell and Martinez (2008). Many other variables affect ratings – including the country's default history, the external and fiscal stance and the perceived institutional and governability status – which explains why advanced countries such as Japan, Belgium, Italy, Portugal and Spain can be in the "AA" range despite their high debts. These countries can rollover debt with relative ease, and there is no question on their ability to pay.

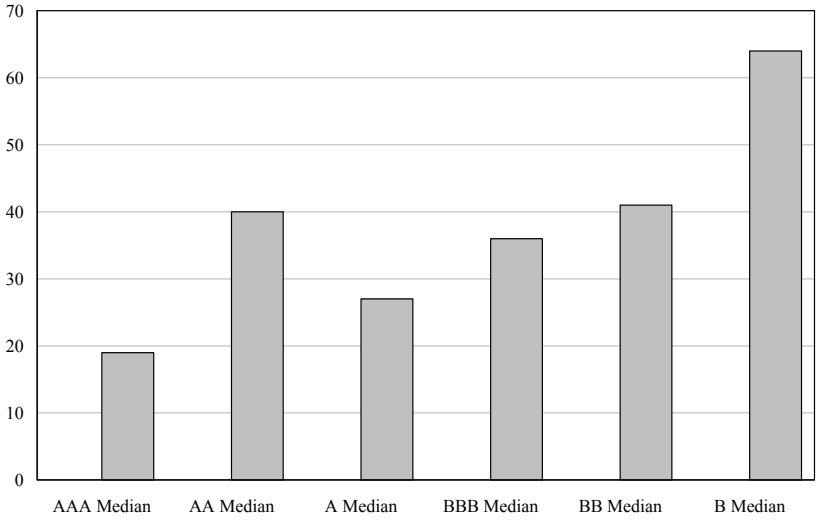
by 2002.[8]

Credit ratings are closely correlated with the risk premia countries face in the international capital markets (Figure 2). Thus, markets seem to penalize the same developments that rating agencies consider harmful to a country's creditworthiness, and are certainly informed by the ratings themselves. In this context, an increase in explicit debt (even if it is related to a generally beneficial pension reform), could be perceived as a sign of deteriorating creditworthiness – and be reflected in worsening borrowing terms for the sovereign.

The close link between financial debt and country risk is well documented, as noted in Powell and Martinez (2008). Moreover, some aspects of such link have been summed up in the concepts of "original sin" and "debt intolerance". Eichengreen, Hausman and Panizza (2003a and 2003b) define as the "original sin" a country's inability to borrow abroad in its own currency, even in the presence of good institutions and stability. In the context of pension reform, the "original sin" theory suggests that even

Figure 1

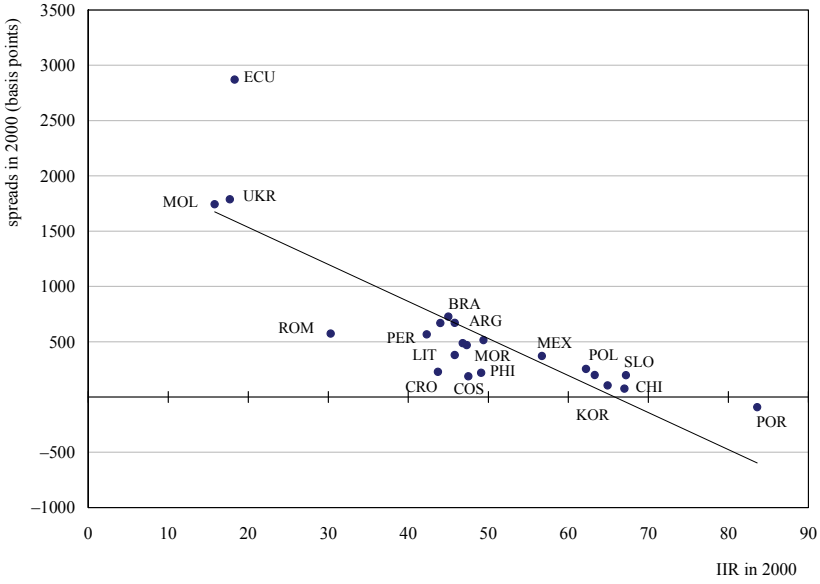
Standard and Poor's Credit Ratings and Government Debt
Net General Government Debt, 2004
(percent of GDP)



Source: Standard and Poor's.

Figure 2

Risk Premia and International Investor Ratings



Sources: JP Morgan and International Investor Ratings.

[8] The country credit ratings developed by the Institutional Investor (IIR) are based on information provided by senior economists and sovereign-risk analysts at leading global banks and money management and securities firms. Respondents grade each country in a scale of 0 to 100, where 100 represents the least chance of default.

if IPD is brought under control by the reform, the country may find it difficult to find financing on adequate terms for the transition costs arising from the reform itself. Reinhart, Rogoff and Savastano (2003) define "debt intolerance" as the inability of emerging countries to function with levels of external debt that are easily manageable for advanced countries. A corollary of this view in the context of pension reform is that financing the transition costs with debt can generate or raise instability. Reinhart *et al.* (2003) also show that, as debt increases, the ratings deteriorate more rapidly in emerging countries than in advanced economies, a phenomenon that may be interpreted as a perception of lower debt management capacity in emerging markets.

In any case, whether IPD and explicit public debt are seen as equivalent by the financial markets is an empirical issue. In the following section we take this question to the data.

3 Econometric analysis

To test the hypothesis that IPD matters as much as financial debt for credit risk assessments we first use a direct approach, based on cross-country regressions of IIR against IPD, controlling for financial public debt and other factors.[9] This approach is constrained by data availability, especially since it is difficult to find data on IPD for a large sample of countries.

We also use an indirect approach based on the idea that if financial markets care about IPD, they should react positively to a pension privatization reform that reduces it. The coefficient of a pension reform dummy should capture the impact that reducing IPD has on the rating. This approach does not require estimates of IPD, which allows us to use a much larger sample of countries, and to avoid the measurement and conceptual problems affecting IPD estimates. Moreover, we can use panel regressions in this case, since we have identified 21 countries where a pension privatization took place and the ratings and control variables can be sampled over several years. The main constraint for this regression is the availability of time series for country ratings.

3.1 Direct approach

As our dependent variable, we use a transformation of the IIR for 2000, defined as 100 minus the original IIR (thus, for our variable, a value of 100 represents the highest risk of default). That is, a positive sign in an estimated coefficient means that a variable has a positive effect on the perceived probability of default. The focus of the analysis is a measure of IPD in 33 countries in 1999/2000 taken from Holzman, Palacios and Zviniene (2004), which is the widest homogeneous IPD data set available. The well-known debt sustainability condition suggests that the primary balance in percent of GDP and real growth should be on the right-hand side of a regression explaining the perceived creditworthiness of a sovereign, along with financial debt. Two measures of financial debt are used: in dataset (A), we include the public debt series as a share of GDP, presented in Holzman *et al.* (2004), while dataset (B) uses the public debt series provided by Tsibouris *et al.* (2006), to ensure robustness in our results regarding coverage.[10] In addition, international reserves, inflation, country size (proxied by the ratio of the country's GDP relative to

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[9] As noted by Baek *et al.* (2005), in the country risk literature, indicators of sovereign creditworthiness are usually represented by ratings of agencies and publications. For example, Jacque *et al.* (1996) also use the IIR and the Economic Intelligence Unit (EIU), while Cantor and Packer (1996) use Moody's and S&P ratings.

[10] The key difference in the series is that of coverage, with the Tsibouris *et al.* (2006) database including generally wider public sector debt in its series.

that of the U.S.), the current account balance in percent of GDP, an index of political stability[11] and an indicator of the regional "Original Sin" (as calculated by Hausman and Panizza, 2003a)[12] are used as control variables. All variables are for the year 2000, with the exception of real growth, which is the average for 1995-2000, and the "Original Sin", which is averaged for 1999-2001 (Annexes B and C).

We test for the effect of debt and IPD on country ratings by defining two different model specifications. In the first case, debt and IPD enter into the regression linearly, and a single coefficient for their impact on IIR is estimated across the sampled countries. The second specification allows for country-specific effects on the coefficients for debt and IPD by rescaling these variables by each country's relative size to the US economy.

Our estimates suggest that rating agencies do not consider financial debt and IPD equivalent when assessing country risk (Table 1, columns 1, 3, 5 and 7). Public debt has the expected positive sign and is significant across specifications; in contrast, the coefficient on IPD is close to zero, and not significant in all specifications, including those allowing for non-linearities on the countries' size. The coefficients on average growth rate, reserves, primary balance and relative size of the country are broadly significant across specifications and, as expected, tend to reduce the probability of default. The coefficient of the index of political stability has the expected sign, but is significant only in some of the specifications, suggesting that economic factors are the most important in the assessment of sovereign country risk. The multicollinearity test using the VIF (Variance Inflation Factor) reveals weak multicollinearity between total debt and the current account balance (Annex D). Thus, the same regressions are estimated by considering the net exports rather than the current account balance. The estimates for this specification are reported in columns 2, 4, 6 and 8, and broadly similar in magnitude and level of significance to those that included the current account balance.

Based on our regression estimates, we can reject the null hypothesis that the coefficients of IPD and public debt are equal. This provides support for the idea that markets see important differences between a sovereign's pension liabilities and financial public debt – differences which are relevant for the assessment of country risk. In consequence, making IPD explicit by financing the transition costs of a pension reform in the financial markets could trigger a deterioration of sovereign credit ratings.

3.2 Indirect approach

We assess the impact of enacting a pension reform law on credit ratings by estimating a panel regression with fixed effects, in which country risk is the dependent variable and the key regressor is a dummy variable indicating a pension reform. The panel used in this section contains data for 63 countries, including available data for each country between 1979 and 2003. The credit risk perception is again measured using the IIR. The dataset has 20 countries where a pension privatization reform took place in the period 1979-2003; introduction of a fully funded pension scheme is represented with dummy variables following three different specifications.[13] In the first specification, the dummy takes a unit value the year the pension reform law is enacted. Taking the year of enactment as the date of the pension reform implies that the expectation of a known

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[11] The political stability variable measures the likelihood of violence threats to, or changes in, government, including terrorism. The source is Kaufmann, Kraay and Mastruzzi (2005) and it is measured in units ranging from –2.5 to 2.5, with higher values corresponding to more stability.

[12] See "OSIN3" variable, Hausmann and Pannizza (2004), Table 1.

[13] The countries are Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Peru, Poland, Uruguay, Iceland, Kazakhstan, Latvia, Russia, Slovakia, Estonia, Lithuania, Bulgaria and Croatia.

Table 1

Institutional Investor Ratings (IIR), IPD and Debt

	(A) Holzman *et al.* (2004)				(B) Tsibouris *et al.* (2006)			
	Non-Interacted Debt and IPD		Debt and IPD Interacted with Relative Country Size		Non-Interacted Debt and IPD		Debt and IPD Interacted with Relative Country Size	
	1	2	3	4	5	6	7	8
Constant	56.28 (0.00)***	56.67 (0.00)***	64.63 (0.00)***	66.98 (0.00)***	59.61 (0.00)***	59.29 (0.00)***	66.10 (0.00)***	68.43 (0.00)***
Public Debt	13.13 (0.08)*	14.56 (0.05)**	–1071.25 (0.07)*	–982.69 (0.11)	13.71 (0.02)**	14.01 (0.01)***	–1588.71 (0.06)**	–1535.34 (0.10)*
IPD	–0.10 (0.95)	0.08 (0.96)	28.43 (0.49)	28.27 (0.51)	–0.52 (0.75)	–0.48 (0.76)	119.57 (0.17)	119.84 (0.21)
Primary Balance	–1.20 (0.11)	–1.25 (0.11)	–0.65 (0.36)	–0.75 (0.35)	–0.75 (0.27)	–0.74 (0.28)	–0.95 (0.19)	–1.00 (0.20)
Reserves	–96.31 (0.00)***	–100.45 (0.00)***	–68.92 (0.01)***	–70.15 (0.02)**	–85.99 (0.01)***	–85.69 (0.01)***	–77.51 (0.00)***	–78.52 (0.01)***
Average Growth	–1.66 (0.17)	–1.83 (0.15)	–1.58 (0.10)*	–1.79 (0.11)	–1.96 (0.10)*	–1.94 (0.09)*	–1.76 (0.08)*	–1.95 (0.09)*
Inflation	–0.02 (0.88)	–0.03 (0.83)	0.12 (0.29)	0.13 (0.29)	0.08 (0.47)	0.08 (0.52)	0.10 (0.40)	0.10 (0.40)
Current Account	–0.39 (0.21)		–0.55 (0.05)		–0.01 (0.98)		–0.53 (0.09)*	
Net Exports		–0.37 (0.14)		–0.47 (0.15)		0.02 (0.96)		–0.46 (0.15)
Relative GDP	–216.24 (0.06)*	–194.88 (0.11)			–219.85 (0.05)**	–221.78 (0.06)*		
Political Stability	–7.48 (0.14)	–7.11 (0.15)	–10.34 (0.06)*	–9.90 (0.07)*	–6.62 (0.19)	–6.61 (0.19)	–10.86 (0.05)**	–10.48 (0.07)*
Original Sin	17.09 (0.29)	16.26 (0.36)	8.92 (0.57)	6.62 (0.71)	12.36 (0.43)	12.47 (0.44)	10.44 (0.48)	8.12 (0.63)
Observations	33	33	33	33	33	33	33	33
R-squared	0.72	0.72	0.69	0.68	0.74	0.74	0.70	0.69

Robust p values in parentheses. * Significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.

upcoming reduction in IPD should be immediately reflected in the country's rating if the rating agencies are concerned about IPD. In the second specification, the dummy variable equals one both in the year of the reform and on the years that follow, to capture the permanent effect that the reform might have on country ratings. The third specification has dummy variables for the short term after the reform (when the reform is 0-4 years old), medium term (5-8 years old) and long term (9+ years old).

The control variables are largely as in the direct approach. The variables that represent macroeconomic and fiscal conditions are total public debt, international reserves, the primary balance, and the current account balance, all expressed in percent of GDP; real growth, inflation and country size (once more measured as the ratio of a country's GDP to that of the U.S.). Unfortunately, the political stability and Original Sin variables are not available for a sufficiently long period to be included in the exercise.[14]

We employ two different panel estimation techniques. We start with a static panel to estimate a model similar to the cross-country regressions in the direct approach. We also estimate a dynamic panel data analysis including instrumental variables for two reasons. First, the high persistence of IIR ratings might indicate a "reputation effect" (thus, the lagged ratings could contain relevant economic information); second, more robust estimation techniques can rule out potential inconsistency and biases in our regressions.

3.2.1 Static panel

The estimates for our static panel regressions indicate that pension reform dummies (and hence, IPD) generally do not help explain a country's credit rating. Table 2 shows the results of the indirect approach following a model similar to the one used in the cross-country regressions. In general, the pension reform dummy variables are not significant[15] – a surprising result, given that about 80 per cent of the pension reforms in the sample also cut workers' pension benefits, which should have reduced the probability of defaulting on total debt in the future, at least to some extent.

Most control variables have the expected signs. Total debt has a positive and significant effect on the probability of default (as measured by the IIR), while higher international reserves reduce this probability; inflation has a significant but low positive coefficient. The positive and highly significant coefficient in the current account may seem unintuitive at first glance, but it is correct – with the average country in the sample holding a current account deficit, the coefficient implies a negative elasticity between the probability of default and improvements in the current account. Country size and the primary balance have the expected negative sign, but the coefficients are not significant. These results suggest that given the relevance of total debt and international reserves in the country risk assessments, the rest of the macroeconomic variables might have a relatively minor bearing for the rating agencies.

3.2.2 Dynamic panel

As noted earlier, data inspection[16] suggests that our static panel results might be subject to potential problems of biased and inconsistent estimators. To address these issues, we estimate a dynamic panel using a two-stage least squares (2SLS) method yielding asymptotically efficient

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[14] The Variance Inflation Factor (VIF) shows no multicollinearity among these variables (Annex E).

[15] The exception is the medium-term dummy variable in the third specification, both when included alone and when interacted by the country's relative size. This implies that the pension reform might improve the rating only after 4 years. However, the lack of significance of the long-term dummy variable could mean that benefit on country ratings again fade away 8 years after the reform.

[16] The Arellano-Bond test confirms the existence of serial correlation of order one in our dataset.

Table 2

IIR and Pension Reform: Static Panel Estimation with Fixed Effects

	Non-interacted Debt and Dummies			Debt and Pension Dummies Interacted with Relative Country Size		
	1	2	3	4	5	6
	Pension Temporal Dummy	Pension Permanent Dummy	Pension Dummy by Period	Pension Temporal Dummy	Pension Permanent Dummy	Pension Dummy by Period
Constant	46.73	46.770	46.59	47.614	47.51	47.48
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
Total Debt	7.97	7.76	7.78	24.00	22.35	22.43
	(0.00)***	(0.00)***	(0.00)***	(0.08)*	(0.11)	(0.11)
Pension Temporal Dummy	0.91			64.77		
	(0.44)			(0.11)		
Pension Permanent Dummy		–4.05			–106.79	
		(0.12)			(0.21)	
Pension Dummy Short Run			–3.22			–39.82
			(0.24)			(0.70)
Pension Dummy Medium Run			–7.62			–156.88
			(0.01)***			(0.04)**
Pension Dummy Long Run			–5.19			–40.002
			(0.13)			(0.90)
Primary Balance	–2.624	–3.87	–5.27	6.09	4.78	4.65
	(0.83)	(0.74)	(0.66)	(0.64)	(0.72)	(0.72)
Reserves	–24.72	–24.76	–24.20	–26.60	–26.58	–26.49
	(0.01)***	(0.01)***	(0.01)***	(0.00)***	(0.00)***	(0.00)***
Current Account Balance	21.53	19.69	19.05	24.74	23.50	23.27
	(0.01)***	(0.01)**	(0.01)**	(0.01)***	(0.01)***	(0.01)***
Growth	0.03	0.03	0.02	0.047	–0.044	–0.047
	(0.79)	(0.70)	(0.79)	(0.62)	(0.63)	(0.61)
Inflation	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)***	(0.00)***	(0.00)***	(0.07)*	(0.06)*	(0.05)*
Relative GDP	–57.030	–55.235	–53.825			
	(0.19)	(0.19)	(0.18)			
Observations	831	831	831	831	831	831
R -squared	0.41	0.41	0.42	0.32	0.33	0.33
Number of Countries	63	63	63	63	63	63

Robust *p* values in parentheses. * Significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.
Year dummies included in all models.
Fixed effects results are estimates with standard errors and test statistics consistent to heteroskedasticity and serial correlation.

estimates of our coefficients,[17] including the first lag of the suspected endogenous variables as instruments in the regression (Table 3).[18]

The estimation results are somewhat more mixed. In our first model, which considers both debt and the pension dummy variables independently of country size, the exercise again suggests that pension reform has not had a significant impact in the determination of credit ratings. In particular, the pension privatization dummy variables have statistically insignificant coefficients under each one of their potential specifications. Higher growth rates and primary balances reduce the probability of default as perceived by the rating agencies. Also, total debt and inflation raise perceived country risk. Most of the remaining control variables have the expected signs and are significant. As before, the apparently unexpected sign in the coefficient on the current account can be explained by the presence of current accounts deficits across the sample, yielding the correct sign for the elasticity of the modified IIR to improvements in the current account – with a narrowing current account deficit reducing the probability of default.

The coefficient on reserves also appears to have an incorrect sign in the estimation. A likely explanation is that the instruments used in this estimation could be introducing some inconsistency to the reserves variable. In this light, an alternative model that incorporates a different instrument (the third lag of the rating) was also estimated, showing that the lagged dependent variable captures the explanatory power of the reserves and the total debt. This is not surprising considering that these variables have shown to be the most relevant determinants of the ratings. In this context, the results of this estimation are consistent with the static model.

Finally, allowing for the interaction between the countries' relative size with the debt and pension dummy variables delivers a coefficient for public financial debt with a significant but unexpected negative sign, possibly suggesting that the "quality" of the country – as measured by its relative economic power – might have relatively more bearing on the sovereign's IIR ranking than its actual debt stock.[19] Pension dummies generally continue to prove insignificant and, at best, their effect on country ratings seem to show with a considerable lag and fade away quickly.

In sum, the econometric evidence suggests that, under a reasonable range of specifications and estimation methods, rating agencies treat IPD and financial public debt differently. As argued earlier, there are good reasons that could explain this differentiation, and this is a factor that must be taken into account when planning a pension reform.

4 A counterfactual study: Mexico's pension reform

In this section we illustrate the implications of pension reform by constructing simple counterfactual scenarios for the Mexican case As the country undertook a radical pension reforms in the nineties, we ask how fiscal balances and debt would have evolved if such a reform had not taken place. For this purpose, we construct a counterfactual scenario by adding to fiscal revenues the contributions actually paid into individual capitalization accounts by the insured populations since the reform. We also reduce the government interest bill in proportion to the debt that the government would have avoided issuing if they had received those contributions as revenue. We keep the observed underlying (non-pension) fiscal balance. The construction of such a

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[17] See Technical Appendix.

[18] The bottom of Table 3 displays the tests for serial correlation, and the number of observations and countries. The tests for serial correlation show that there is no serial correlation of order 1 and 2.

[19] Furthermore, the relative size indicator could likely be picking up the impact of other structural issues (such as political stability and the "original sin" ranking) which were not available for the panel regressions under the indirect method.

Table 3

IIR and Pension Reform: Dynamic Panel (2SLS) Estimation Results

	Non-interacted Debt and Dummies			Debt and Pension Dummies Interacted with Relative Country Size		
	1 Temporal Dummy	2 Permanent Dummy	3 Dummy by Period	4 Temporal Dummy	5 Permanent Dummy	6 Dummy by Period
Constant	–0.18	0.48	–4.23	0.04	0.20	0.16
	(0.76)	(0.47)	(0.00)***	(0.94)	(0.68)	(0.76)
Total Debt	1.54	1.49	1.26	–18.48	–18.51	–17.72
	(0.13)	(0.14)	(0.10)*	(0.10)*	(0.09)*	(0.10)*
Pension Temporal Dummy	–0.07			11.65		
	(0.89)			(0.62)		
Pension Permanent Dummy		–0.81			–62.83	
		(0.36)			(0.33)	
Pension Dummy Short Run			–0.81			–21.88
			(0.36)			(0.59)
Pension Dummy Medium Run			–1.14			-60.41
			(0.20)			(0.06)*
Pension Dummy Long Run			0.92			80.00
			(0.62)			(0.05)**
Primary Balance	–2.26	–2.14	–2.26	–1.98	–1.91	–2.01
	(0.54)	(0.56)	(0.54)	(0.60)	(0.61)	(0.59)
Reserves	4.290	4.18	4.01	4.61	4.45	4.34
	(0.064*	(0.07)*	(0.09)*	(0.07)*	(0.08)*	(0.10)
Current Account Balance	11.15	10.81	10.49	10.95	10.37	9.73
	(0.00)***	(0.00)***	(0.00)***	(0.01)***	(0.01)***	(0.01)***
Growth	–0.06	–0.06	–0.06	–0.07	–0.07	–0.06
	(0.04)**	(0.04)**	(0.04)**	(0.03)**	(0.02)**	(0.05)**
Inflation	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
Relative GDP	–22.03	–21.39	–20.52			
	(0.36)	(0.37)	(0.37)			
L. IIR	0.37	0.36	0.35	0.39	0.40	0.39
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
L. Total Debt	1.80	1.77	1.72	11.98	11.20	10.52
	(0.01)**	(0.01)**	(0.02)**	(0.23)	(0.23)	(0.27)
L. Total Debt						
L. Pension Temporal Dummy	0.01			3.24		
	(0.98)			(0.88)		
L. Pension Permanent Dummy		-0.60			–38.72	
		(0.20)			(0.00)***	
L. Pension Dummy Short Run			0.51			–53.48
			(0.24)			(0.02)**
L. Pension Dummy Medium Run			–1.67			–92.27
			(0.03)**			(0.00)***
L. Pension Dummy Long Run			2.68			320.68
			(0.29)			(0.00)***
L. Primary Balance	–8.36	–8.41	–8.290	–9.36	–9.29	–8.91
	(0.07)*	(0.07)*	(0.07)*	(0.06)*	(0.07)*	(0.08)*
L. Reserves	–2.70	–2.90	–2.47	–3.60	–3.36	–2.87
	(0.51)	(0.47)	(0.53)	(0.40)	(0.41)	(0.47)
L. Current Account Balance	9.59	9.54	9.35	8.99	8.87	8.68
	(0.01)***	(0.01)***	(0.01)***	(0.01)***	(0.02)**	(0.02)**
L. Growth	–0.09	–0.090	–0.09	–0.10	–0.10	–0.10
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
L. Inflation	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)***	(0.00)***	(0.00)***	(0.01)***	(0.01)***	(0.01)***
L. Relative GDP	–7.49	–7.84	–8.13			
	(0.43)	(0.43)	(0.41)			
m1	1.26	1.23	1.40	1.34	1.16	1.28
m2	–1.33	–1.30	–1.14	–1.15	–1.27	0.99
Observations	651	651	651	651	651	651
R-squared	0.57	0.57	0.58	0.55	0.56	0.58
Number of Countries	60	60	60	60	60	60

Robust *p* values in parentheses. * Significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.
L. indicates that the variable is lagged a period. Year dummies included in all models.
2SLS effects results are estimates with standard errors and test statistics consistent to heteroskedasticity and serial correlation.
m1 and m2 are tests for first-order and second-order serial correlation, asymptotically N(0,1). These test the first-differenced residuals.

counterfactual helps illustrate the order of magnitude of the adjustment needed in the fiscal sector if a pension reform is to be absorbed without allowing the trajectory of financial debt to change.

4.1 Pension privatization in Mexico

The Mexican pension reform replaced the old defined-benefit, PAYG system for private sector workers with a privately managed, defined-contributions scheme in July 1997. According to Zviniene and Packard (2002), this reform reduced IPD by 7 per cent of GDP by 2001. With the reform, workers affiliated to the old program had to switch to the new one. These workers (but not those joining social security schemes for the first time after the reform) retained the option of retiring under the provisions of the old scheme by transferring to the government the assets accumulated in their capitalization accounts at the moment of retiring. Thus, while the government remained liable to service its previous implicit contracts when workers chose to remain under the old scheme, it stopped collecting the pension contributions paid by all private sector workers.

As noted earlier, Fiess (2003) examined country risk indexes for Mexico before and after the pension reform, concluding that it had no impact on country risk. While we agree with this observation, we argue that the pension reform did not have a negative impact on the country's credit rating *because the government made a significant effort to control its total explicit debt* – which, as we have seen, is the main indicator used by rating agencies in determining their risk assessments.[20]

To illustrate this point, we calculate a counterfactual scenario for Mexico's public debt as explained earlier.[21] We add to fiscal revenues workers' contributions to their private capitalization accounts (AFORES) and subtract from government expenditures the interest cost that the government would have saved if it had reduced financing with those contributions (Figure 3). The contributions that actually went to private capitalization accounts represent the gap between the actual primary balance and the counterfactual primary balance; both measures show a surplus between 1996 and 2004. The exercise reveals an effort to undo the easing of policies that followed the 1995 crisis. The path of the counterfactual debt following the pension reform in 1997 shows a clear downward trend, hinting that an adjustment of the non-pension or underlying balance prevented the large cash imbalance in the residual public pension system from causing financial debt to rise and thereby helped preserve the country's credit rating.

4.2 Risk assessment

Based on the regression estimates of previous section, we measure the impact of pension reform on the Mexican credit rating.[22] Table 4 summarizes the cumulative estimated effect of the pension reform on IPD and explicit debt in the country. By 2001, IPD had declined as expected, while explicit debt had risen moderately. In fact, the reduction in IPD exceeded, in absolute terms, the increase in financial debt, as one should have hoped for reforms aimed at improving long-term solvency. The final column presents the estimated impact of this change in Mexico's composition of public liabilities on the country's sovereign credit ratings, based on our estimates from Table 1

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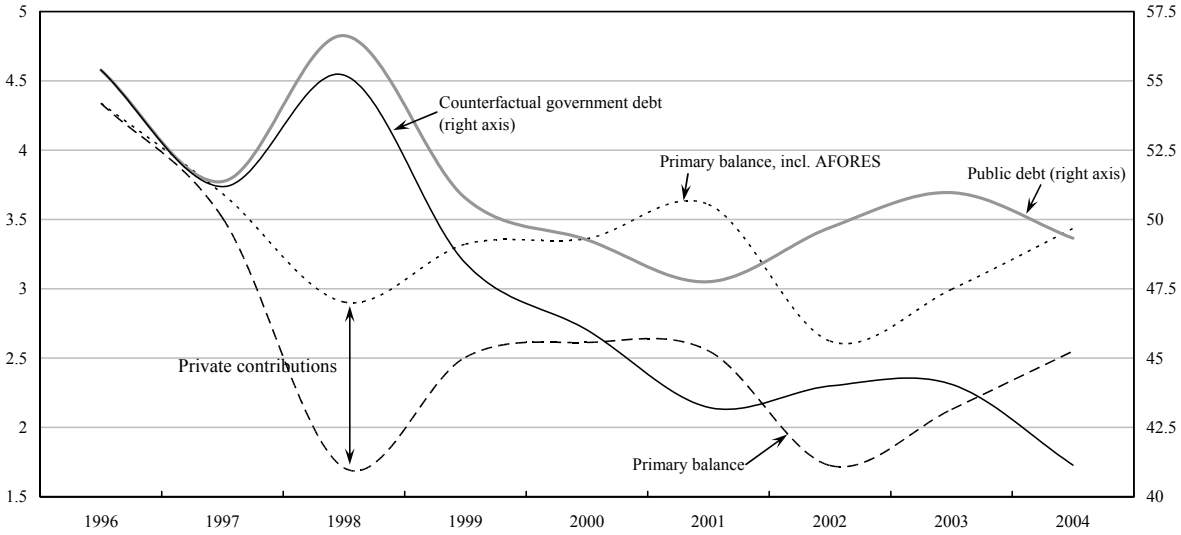
[20] Another possibility (see Gil, Packard and Yermo, 2005, chapter 3) is that the negligible effect on Mexico's country risk may reflect the country's low IPDs by Latin American standards prior to the reform. However, even if relatively low by regional standards, IPD was high in absolute terms and the reform reduced it by a significant amount in a few years.

[21] The concept of public debt used in the calculations shown in this section is the broadest one available for Mexico, the historical stock of the financial requirements of the public sector.

[22] The IIR used in this exercise is the one officially released, rather than the transformed variable used in the regressions presented in the previous sections.

Figure 3

Mexico: Counterfactual Explicit Debt and Primary Balance
(percent of GDP)



The counterfactual debt takes into account the debt creating flow generated from the lost of AFORES contributions and its cost.
Source: Fund staff estimates.

Table 4

Estimated Impact of Pension Reform on IIR

Country	Pension Reform Implementation	Change in Explicit Debt Due to the Reform, 2001	Reduction in IPD Due to the Reform, 2001[a]	Estimated Change in IIR Due to the Reform by 2001[b]
		(percent of GDP)		
Mexico	lug-97	4.6	7.1	0.66

[a] Source: Zviniene and Packard (2002) and authors.
[b] Impact from the increase in explicit debt and the law enactment. Calculated from estimates presented in Table 1, specification A(2), and the counterfactual debt scenarios.

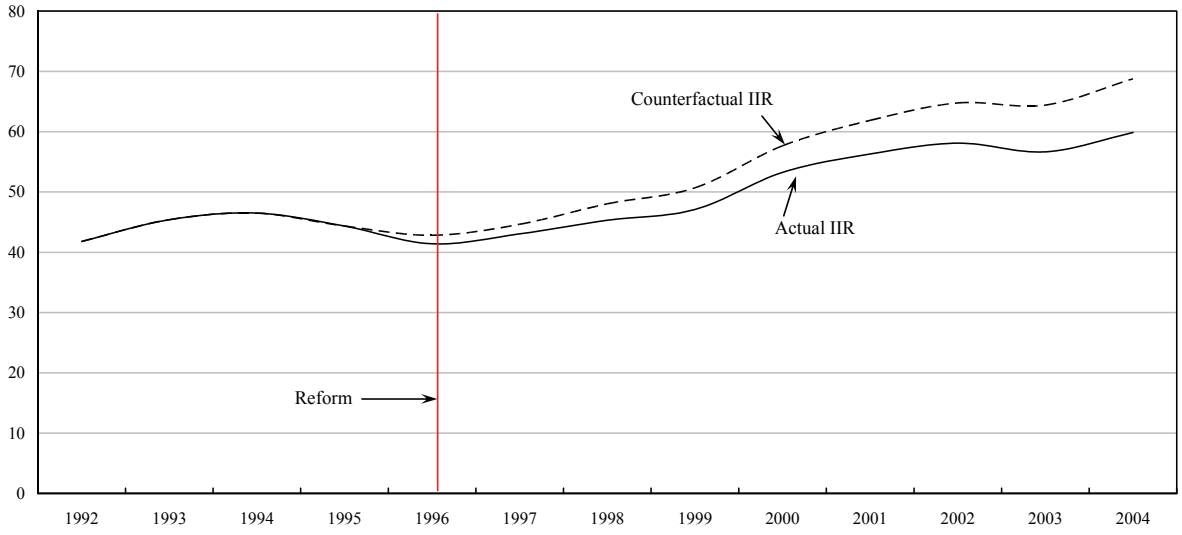
and the counterfactual debt scenario. In fact, the estimated sovereign credit risk was expected to rise marginally, given the limited increase in explicit public debt, and despite the large reduction in IPD. This result is consistent with the observations presented by Fiess (2003).

We also simulate the counterfactual credit ratings for Mexico over a time period (Figure 4), based on the estimation results of the dynamic panel estimates with a period dummy presented in Table 3. The counterfactual rating comes from the difference between actual and counterfactual debt.[23] According to our estimates, the IIR for Mexico in 2001 would have been 5.70 points better in the absence of a pension privatization – a relatively small amount, also in line with the results of Fiess (2003).

[23] The effect of the counerfactual primary balance is not taken into account into the counterfactual ratings, since the estimated coefficient on the primary balance is not statistically significant.

Figure 4

Mexico: Counterfactual IIR
(percent of GDP)



Source: Staff estimates.

5 Conclusion

In this paper, we explored the effect of a pension reform on country risk perceptions by examining the relevance of government debt and IPD debt for the credit ratings. We find that, rating agencies do not take into account IPD when assessing sovereign risk, but focus on the country's explicit financial debt. Now, determining whether this is the result of a rational assessment of the differences between IPD and financial debt – which we judge economically significant – or of myopia is probably besides the point. This bias (if we can call it so) in the assessment of sovereign risk appears to be robust to a reasonable range of model specifications, and does not just reflect problems in the measurement of IPD. Thus, the implications for the perception of creditworthiness of financing the transition costs of pension reform with debt, and a government's ability to finance them with adjustment, are factors to take into account when considering reform. It would be an error to waive the issue away by declaring that the reform simply makes implicit debt explicit.

A clear policy implication of the paper is that a radical pension reform that aims at improving a sovereign's long-term solvency by reducing implicit pension liabilities could end up increasing the riskiness of the government's balance sheet in the short and medium term, thereby hurting the country's credit rating, unless fiscal adjustment keeps the explicit debt trajectory from deteriorating. There are two corollaries to this conclusion. The first is that pension reforms require fiscal space to be implemented, to help compensate their transition costs in the short and medium terms. In support of pension privatization, the reforming government would be well advised to take policy actions to offset some or all of the transitional costs of the reform and their effects on the path of financial debt. The second is that when governments do not have room to implement the needed fiscal adjustment to offset the near- and medium-term cash costs of a pension privatization, it might be preferable to follow a gradual but decisive parametric approach to improve the sustainability to the PAYG pension system before a transition to a fully-funded system might be undertaken.

ANNEXES

ANNEX A
Distribution of Countries by Rating, S&P, 2004

AAA	Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Isle of Man, Liechtenstein, Luxembourg, Netherlands, Norway, Singapore, Sweden, Switzerland, United Kingdom, United States
AA	Andorra, Belgium, Bermuda, Italy, Japan, New Zealand, Portugal, Spain, Taiwan
A	The Bahamas, Bahrain, Botswana, Chile, Cyprus, Czech Republic, Estonia, Greece, Hong Kong, Hungary, Iceland, Israel, Korea, Kuwait, Latvia, Lithuania, Malaysia, Malta, Qatar, Saudi Arabia, Slovenia
BBB	Barbados, Bulgaria, China, Croatia, Kazakhstan, Mexico, Montserrat, Oman, Poland, Slovak Republic, South Africa, Thailand, Trinidad and Tobago, Tunisia
BB	Brazil, Colombia, Cock Islands, Costa Rica, Egypt, El Salvador, Guatemala, India, Jordan, Macedonia, Panama, Peru, Philippines, Romania, Russia, Turkey, Vietnam
B	Belize, Benin, Bolivia, Burkina Faso, Ghana, Grenada, Indonesia, Jamaica, Lebanon, Madagascar, Mali, Mongolia, Mozambique, Pakistan, Papua New Guinea, Paraguay, Senegal, Serbia, Suriname, Ukraine, Uruguay, Venezuela
CCC	Cameroon, Ecuador
CC	Dominican Republic

Source: Standard and Poor's.

ANNEX B

Series	Description and Sources	Sample Period
Institutional Investor's Country Credit Ratings	Institutional Investor	1979-2003
Standard and Poor's Country Sovereign Ratings	Standard and Poor's	2000
Implicit Pension Debt/GDP	Holzmann, Palacios and Zviniene(2004), World Bank Discussion Papers	2000
Political Stability	World Bank's Governance Research Indicator Country Snapshot (GRICS)	2000
Public Debt/GDP	Holzmann, Palacios and Zviniene(2004), World Bank Discussion Papers	1979-2003
Total Debt/GDP	Experience with Large Fiscal Adjustments database: Tsibouris *et al.* (2006), completed with IMF data	1979-2003
Primary Balance/GDP	Experience with Large Fiscal Adjustments database: Tsibouris *et al.* (2006) and OECD	1979-2003
Reserves	World Development Indicators, World Bank	1979-2002
Growth Rate	World Development Indicators, World Bank	1979-2003
Inflation	World Development Indicators, World Bank	1979-2003
GDP	World Development Indicators, World Bank	1979-2003
Current Account Balance	World Development Indicators, World Bank	1979-2003
Net Exports	World Development Indicators, World Bank	1979-2003
Pension Reform Dummy	Own Research	Different years
Spreads	JP Morgan	1998-2001

Annex C

Argentina	Hungary	Peru
Bolivia	Iran	Philippines
Brazil	Korea	Poland
Chile	Kyrgyz Republic	Portugal
Colombia	Lithuania	Romania
Costa Rica	Malta	Senegal
Croatia	Mauritius	Slovakia
Dominican Republic	Mexico	Slovenia
Ecuador	Moldova	Turkey
El Salvador	Morocco	Ukraine
Estonia	Nicaragua	Uruguay

Annex D

Variable	**Variance Inflation Factor (VIF)**[a]	**Tolerance**[b]
CA Balance	2.67	0.37
Total Debt	2.52	0.40
Political Stability	2.09	0.48
Inflation	1.78	0.56
IPD	1.69	0.59
Average Growth	1.57	0.64
Reserves	1.54	0.65
Primary Balance	1.50	0.67
Relative GDP	1.33	0.75
Variable	**Variance Inflation Factor (VIF)**[a]	**Tolerance**[b]
Net Exports	2.44	0.41
Political Stability	2.07	0.48
Total Debt	2.05	0.49
Inflation	1.79	0.56
Average Growth	1.71	0.58
IPD	1.61	0.62
Reserves	1.58	0.63
Primary Balance	1.53	0.65
Relative GDP	1.38	0.72

[a] VIF = $1/(1–R^2)$; [b] Tolerance = $1–R^2$.

Annex E

	Variance Inflation Factor (VIF)[a]	Tolerance[b]
Pension Reform	1.01	0.99
Primary Balance	1.13	0.88
Total Debt	1.11	0.90
Reserves	1.23	0.81
Net Exports	1.27	0.79
Growth	1.06	0.95
Inflation	1.01	0.99
Relative GDP	1.07	0.93

[a] VIF = $1/(1–R^2)$; [b] Tolerance = $1–R^2$.

Annex F

	OLS	FE
Institutional Investor Rating		
L.iirating	1.00	0.92
	(0.00)***	(0.00)***
Primary Balance		
L.pb	0.80	0.67
	(0.00)***	(0.00)***
Inflation		
L.inflation	0.30	0.22
	(0.12)	(0.03)**
Growth		
L.growth	0.61	0.36
	(0.00)***	(0.00)***
Current Account Balance		
L.cabalance	0.79	0.65
	(0.00)***	(0.00)***
Reserves		
L.reserves	1.01	0.88
	(0.00)***	(0.00)***
Total Debt		
L.totaldebt	0.99	0.82
	(0.00)***	(0.00)***

Robust *p* values in parentheses.
* Significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.
L. indicates that the variable is lagged a period.
Year dummies included in all models.

TECHNICAL APPENDIX

There are two reasons for considering a dynamic panel data analysis for our estimation in Section 2. First, the high persistence of the ratings provided by the IIR might indicate a "reputation effect" faced by the rating agencies. Thus the lagged ratings should contain relevant economic information. The AR(1) process estimations for each dependent variable, included in Annex F, show that series such as the investor rating, current account balance, reserves and the total debt are highly persistent. Second, the size of the coefficients on total debt and international reserves estimated in the static panel seem very high, hinting at a possible overestimation.

The model considered here is:

$$y_{i,t} = \beta x_{i,t} + \eta_i + v_{i,t} \tag{1}$$

$$v_{i,t} = \rho v_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

for $i = 1,\ldots, N$ and $t = 2,\ldots, T$,

where:

$$E(\varepsilon_{i,s}\, \varepsilon_{i,t}) = 0 \text{ for } s \neq t$$

$$E(y_{i,t}\, \varepsilon_{i,t}) = 0 \text{ for } t = 2,\ldots,T$$

The dependent variable, $y_{i,t}$, represents the IIR for country i at period t, while $x_{i,t}$ represents a matrix containing the rest of the variables. There is an unobservable individual effect for each country, η_i. The error term is given by $v_{i,t}$. The Arellano-Bond test for serial correlation confirms the existence of serial correlation of order one for our dataset. In order to quantify the level of serial correlation the residuals from the ordinary least squares (OLS) estimation are regressed on the lagged residuals. This is:

$$v_{i,t} = \rho v_{i,t-1} + \varepsilon_{i,t}$$

Obtaining a significant and strong serial correlation of order one, represented by $\rho > 0$. The static model is transformed in order to obtain a dynamic representation with serially uncorrelated shocks. Lagging equation 1 by one period and multiplying it by ρ gives:

$$\rho y_{i,t-1} = \rho\beta x_{i,t-1} + \rho\eta_i + \rho v_{i,t-1} \tag{3}$$

Using (3), equation (1) can be rewritten as:

$$y_{i,t} - \rho y_{i,t-1} = \beta x_{i,t} - \rho\beta x_{i,t-1} + \eta_i - \rho\eta_i + v_{i,t} - \rho v_{i,t-1}$$

$$y_{i,t} = \rho y_{i,t-1} + \beta x_{i,t} - \rho\beta x_{i,t-1} + (1-\rho)\eta_{i} + \varepsilon_{i,t} \tag{4}$$

This is a dynamic panel model with serially uncorrelated shocks.

Some considerations about estimation alternatives are relevant to find the consistent estimator for ρ and β. Since the explanatory variable $y_{i,t-1}$ is positively correlated with the error term $(1-\rho)\eta_{i} + \varepsilon_{i,t}$ due to the presence of the individual effects, the OLS estimator in the levels equation (4) is inconsistent. This estimator is biased upwards as a result of the positive correlation between $y_{i,t-1}$ and η_i. In principle, the Fixed Effects (FE) estimator could be seen as addressing this inconsistency by transforming equation (4) to eliminate η_i. This transformation consists in expressing the original observations as deviations from the individual means. OLS is used to estimate the transformed equation. The individual effects are removed from the transformed equations since the mean of the time invariant η_i is itself η_i. For simplicity, we focus on the simple AR(1) model, abstracting from the variables $y_{i,t-2}$, $x_{i,t}$ and $x_{i,t-1}$, however, the same reasoning applies when they are present. The transformed model is given by:

$$\tilde{y}_{i,t} = \rho_1 \tilde{y}_{i,t-1} + \tilde{e}_{i,t} \tag{5}$$

where:

$$\tilde{y}_{i,t-1} = y_{i,t-1} - 1/(T-1)(y_{i,1} + \ldots + y_{i,t} + \ldots + y_{i,T-1}) \tag{6}$$

$$\tilde{e}_{i,t} = e_{i,t} - 1/(T-1)(e_{i,2} + \ldots + e_{i,t-1} + \ldots + e_{i,T}) \tag{7}$$

Thus, this transformation implies a correlation between the transformed lagged dependent variable and the transformed error term. The component $-y_{i,t}/(T-1)$ in equation (6) is correlated with $e_{i,t}$ in equation (7), and the component $-e_{i,t-1}/(T-1)$ in (7) is correlated with $y_{i,t-1}$ in (6). Nickel (1981) and Bond (2002) show that these negative correlations dominate positive correlations between other components such as $-e_{i,t-1}/(T-1)$ and $-y_{i,t-1}/(T-1)$, so that the correlations between the transformed lagged dependent variable and the transformed error term are negative. This indicates that the FE estimator is biased downwards. Thus, we might expect that a consistent estimator will lie between OLS and FE estimates, or at least not be significantly out of the interval described by these two estimators.

A class of consistent estimators would require to first transforming the model to eliminate the individual effects and then apply instrumental variables. As noted before the FE estimator is not useful in this context, since it introduces the shocks from all time periods into the transformed error term. In this context, the first-differencing transformation has proved to be more promising. First differencing equation (4) gives:

$$y_{i,t} - y_{i,t-1} = \rho(y_{i,t-1} - y_{i,t-2}) + \beta(x_{i,t} - x_{i,t-1}) - \rho\beta(x_{i,t-1} - x_{i,t-2}) + \varepsilon_{i,t} - \varepsilon_{i,t-1}$$

$$\Delta y_{i,t} = \pi_1 \Delta y_{i,t-1} + \pi_2 \Delta x_{i,t} - \pi_3 \Delta x_{i,t-1} + \Delta\varepsilon_{i,t} \tag{8}$$

For $t=2,\ldots,T$, for which we have the moment conditions:

$$E(y_{i,t-s}\,\Delta\varepsilon_{i,t}) = 0 \text{ for } s \geq 2$$

$$E(x_{i,t-s}\,\Delta\varepsilon_{i,t}) = 0 \text{ for } s \geq 1$$

In equation (8) the correlation between $\Delta y_{i,t-1}$ and $\Delta\varepsilon_{i,t}$ is negative since $\Delta y_{i,t-1} = y_{i,t-1} - y_{i,t-2}$ and $\Delta\varepsilon_{i,t} = \varepsilon_{i,t} - \varepsilon_{i,t-1}$. However, if $y_{i,t-1}$ is uncorrelated with the subsequent disturbances, $\varepsilon_{i,t}$, then $y_{i,t-2}$ and $\Delta y_{i,t-2}$ are valid instrumental variables for $\Delta y_{i,t-1}$ in the first-differencing equations. The two-stage least squares (2SLS) estimator[24] provides asymptotically efficient estimators in this context. In particular, for the small size that characterizes our sample. In the case of large samples the Generalized Method of Moments (GMM), developed by Hansen (1982) provides efficient estimators.

[24] Also known as Anderson and Hsiao (1981) estimator.

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PENSION FUNDS AND FINANCIAL MARKETS: EVIDENCE FROM THE NEW EU MEMBER STATES

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The recently established pension funds in the new EU Member States face investment risks that stem from a challenging macroeconomic environment, including, inter alia, volatile inflation and shallow domestic capital markets. The question arises whether a move to funded pension system in such a volatile economic environment always increases the long-term sustainability of public finances. Against this background, this paper surveys the main challenges for pension systems and public finances in the new EU Member States and provides evidence on pension fund performance in recent years. We conclude that in some of these countries the limited diversification of assets, the impact of high inflation as well as the financial market turmoil may have indeed reduced the positive impact of systemic pension reforms on fiscal sustainability.

1 Introduction

During the 1990s many of the Member States that entered the EU in 2004 or 2007 faced severe problems with the functioning of their statutory pay-as-you-go (PAYG) public pension systems. Particularly the relatively low retirement ages, high replacement rates and rather high social security contribution rates – which provided limited incentives to participate in the system – put the PAYG schemes under pressure as their economies shrank and the informal sector rose. As a consequence, several of these countries started to implement parametric reforms of their PAYG public pension systems in order to contain the rise in pension expenditure, including, inter alia, reductions in replacement rates.[1] At the same time, several of the new EU Member States (NMS) started to introduce a mandatory fully funded component into their pension systems and/or set the framework for a voluntary pension pillar (see Holzmann and Palacios, 2001, and Nickel and Almenberg, 2006). Notwithstanding these parametric and systemic pension reforms, this paper argues that challenges for these countries' age-related public expenditures may remain sizeable, both in the short-to-medium as well as in the long term. First, in the presence of a substantial ageing of the population, in several NMS public pension expenditure-to-GDP ratios are projected to rise partly significantly over the long term, despite already enacted reforms (see European Commission and Economic Policy Committee, 2009). Second, in addition, governments in the NMS may be called upon to step in also for risks associated with the private pension pillar. For example, in the NMS the newly established private pension funds face significant risks related to shallow domestic capital markets, volatile inflation and flexible exchange rates. The economic crisis has shown that funded pension systems are vulnerable to financial market developments. Pensioners who retired recently and who had to buy annuities out of their savings from the private pension pillar tended to suffer losses. Nevertheless, at the current juncture, these losses seem to be contained in the NMS as many of these systems are not yet mature and the amount of accumulated savings in these pension funds is thus limited. This notwithstanding, with increasing maturity of these systems and rising importance of private pension income, risks of losses from the private pension pillar may give rise to calls to governments to step in and ensure sufficient retirement

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[1] See for a survey provided in Cangiano, Cottarelli and Cubeddu (1998).

incomes.[2] For example, as the experience with the economic crisis shows, Worldbank (2009) argues – though not specifically for the NMS – "Indeed, there are some, primarily, low income workers with lower saving levels who might, even under a phased annuity purchase or withdrawal program, be required to liquidate their diminished accounts in the short term. This group could be assisted through programs that offer a minimum return guarantee, analogous to what has been provided in the banking system in response to the crisis". They conclude that "A well-designed zero pillar or the incorporation of a minimum pension guarantee into one of the other pillars can mitigate the effects of future economic volatility on the vulnerable elderly and lifetime poor. These systems need to be carefully designed to ensure their affordability and that they do not have negative incentive effects". Also IMF (2009a) sees private pension related risks for the general government arsing from the crisis to stem from "[..] pressures to make up for the losses suffered by pensioners covered by private pension plans". Thus, to sum up, if the aggregate outcome the individual pensioner receives from both the public PAYG as well as from statutory and voluntary funded private pension systems would be inadequate to ensure a decent standard of living, pressure on governments to top up "insufficient" pensions may tend to rise, posing additional risks to the general government budget, which governments had originally hoped to reduce through the implementation of funded pensions systems.[3]

Against this background, this paper addresses the risks to public finances associated with a move to funded pension systems in a volatile economic environment as in catching up economies such as the NMS. The analysis covers ten countries, namely Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Romania, Poland, Slovenia and Slovakia. As a caveat, the analysis is impeded by poor data availability in the area of private pensions. Not only are there often only a few annual observations, given the relatively short period of time since the implementation of these funded systems. In addition, the lack of comparable data across the NMS impedes an in-depth econometric analysis in this field. Against this backdrop, this paper takes stock of the available pension asset data and links it with inflation as well as with the most recent financial market developments. This way it identifies exposures to risks and where government budgets should therefore account for these risks over the medium to long term. The paper finds the risks for public finances not so much to come from potentially strong variation in pensions incomes due to stock market developments as the share of pension funds invested in stocks tends to be comparatively low. In the contrary, it finds that in some of the NMS the limited diversification of assets and especially the relatively high fraction of total assets held in government debt securities limits to some extent the possible positive impact from systemic pension reforms over the long term. In case pension outcomes would render pension incomes insufficient during the catching up process over the medium to long term, this could potentially lead to a stepping in of the government and thus imply a smaller relieve to general government budgets than anticipated. As a consequence, while maintaining multi-pillar pension systems continues to be of paramount importance, a wider diversification of assets and better financial knowledge is decisive.

The paper is structured as follows. Section 2 presents a brief overview of pension systems in the NMS. Section 3 then surveys the pension system related challenges for public finances in the NMS. Section 4 first addresses the severe data limitations in the area of research on private pensions in the NMS. In order to analyse the performance of private pension funds in these countries against the background of inflationary and capital market developments, the paper then surveys the asset structure of private pension funds and aims at identifying the vulnerability of

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[2] At the same time, several NMS weakened the second pillar by, *inter alia*, allowing employees to reduce contributions to the second pillar and increase contributions to the PAYG systems (see for a survey Antolin and Stewart, 2009).

[3] Against this background, also the Economic Policy Committee and European Commission (2009) in their regular projections on age-related spending for the EU27 intend to increase their reporting on private pensions.

Table 1

Pension Systems in the New EU Member States

Country	Old-age Pension Scheme PAYG	Funded Pension Scheme		Occupational Pension Scheme (Voluntary Participation)	Minimum Pension/ Social Assistance
		Mandatory Private Pension	Voluntary Private Pension		
Bulgaria	x	x	x	x	x
Czech Republic	x	-	x	-	x
Estonia	x	x	x	-	x
Latvia	x	x	x	-	x
Lithuania	x	voluntary	x	-	x
Hungary	x	x	x	-	x
Poland	x	x and voluntary	x	x	x
Romania	x	x	-	-	x
Slovenia	x	-	x	x	x
Slovakia	x	x and voluntary	x	-	x

Source: European Commission and Economic Policy Committee (2009).

these schemes against the background of the in some instances high inflation over the past years and the 2008-09 stock market developments. Section 5 draws policy conclusions.

2 Overview of pension systems in the NMS

All NMS have a funded pension pillar in combination with the standard old-age PAYG public pension scheme (see Table 1). While all of these countries apart from Romania have a private pension scheme with voluntary participation, not all of these countries have yet implemented a private pension scheme with mandatory participation. In the Czech Republic and Slovenia a mandatory private pension scheme does not exist at all, while in Lithuania, Poland and Slovakia, participation in these schemes is voluntary for some groups. In principle, the younger cohorts are encouraged to participate in the funded schemes, while the older cohorts closer to retirement have more flexibility to decide whether to participate or not. Occupational pension schemes exist only in Bulgaria, Poland and Slovenia. As the last column of Table 1 indicates, in all of the countries analysed here, a minimum pension and/or social assistance scheme exists. Consequently, it could, in principle, have a budgetary impact if pensions received from the first, second and third pillar of the pension system would turn out to be below the levels of either a minimum pension or social assistance, which would in such cases be paid to pensioners.

As Table 2 shows, statutory funded private pension schemes differ significantly across countries. First, the stage of development of these systems differs depending on the year of their

Table 2

Statutory-funded Private Pension Schemes

Country	Year of Introduction	Total Contribution *(percent of gross wages)*	Share Paid by Employer	Share Paid by Employee
Bulgaria	2002	5	60	40
Estonia	2002	6	67	33
Latvia	2001	4 (in 2007) rising to 10 in 2010	27	73
Hungary	1998	8 (for participants of so-called hybrid system: 2% can be given by employer)	0-(20)	100-(80)
Poland	1999	7.3	0	100
Romania	2004	2 (in 2008) rising to 6 by 2016	0	100
Slovakia	2005	9	100	0

Source: Social Protection Committee (2008).

implementation. For example, Hungary[4] already introduced its statutory private pension scheme in 1998, while Slovakia implemented it only in 2005. In other words, the Slovak scheme is in this sense less mature than the Hungarian. Second, statutory funded private pension schemes differ both in terms of contribution levels and how these are shared between employers and employees. For example, in Poland and Romania the statutory pension scheme is fully financed by employees, while it is fully financed by employers in Slovakia.[5]

3 Pension system related challenges for public finances in the NMS

The share of public expenditure on pensions in total general government expenditure varies widely across the NMS (see Figure 1). With around 26 per cent of total general government expenditure, this share was largest in Romania in 2008, followed by Bulgaria (22.4 per cent). In contrast, with about 13 per cent, this share was lowest in Hungary.[6] As Figure 1 also shows, Poland and Latvia have reduced the share of public pension expenditure in total general government

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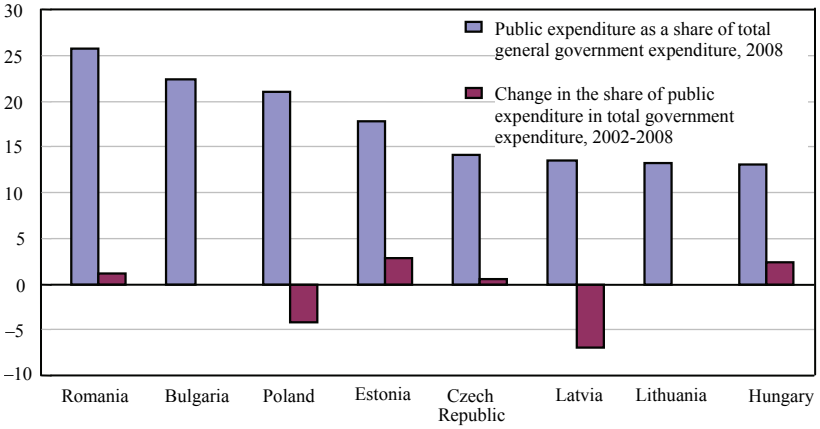
[4] However, Orbán and Palotai (2005) showed that the Hungarian pension system was even after the pension reform in 1998 unsustainable. In addition, they claim that the returns recorded in the private pension funds fall short of expectations and, on the condition that these low returns persist, the second pillar is projected to provide annuities that do not make up for the reduction in benefits received from the public pillar.

[5] Dušek and Kopecsni (2008) provide a survey of pension reform measures in Hungary, the Czech Republic and Slovakia and estimated of the policy risk of social security. They conclude that PAYG is not a secure source of retirement income since pension reforms do change the future contributions and benefits in different directions for different workers, and the magnitude of the reductions in social security wealth sometimes exceeds several years' worth of the workers' earnings.

[6] The size of the share of public pension expenditure in total general government expenditure gives a very first indication of the sensitivity of the latter with respect to shifting to a second pension pillar. In principle, the relief to the general government budget resulting from a shift to a private pension scheme or public occupational scheme outside the government budget should tend to be largest in those countries, in which the public PAYG scheme represents a particularly large share of total general government expenditure. Obviously, the budgetary impact depends on the magnitude of shift towards private pensions. Moreover, also parametric pension reforms such as changes in the retirement age can play a crucial role.

Figure 1

Public Pension Expenditure, 2002-08
(share of total expenditure)



Source: ESCB, ECB calculations.

expenditure between 2002 and 2008, while in the Czech Republic, Estonia, Hungary and Romania this share increased slightly. These changes may reflect systemic and parametric pension reforms as well as shifts in the overall structure of public expenditure, *i.e.*, efforts aimed at cutting back other expenditure.

Looking ahead, multiple challenges for public finances can be identified, depending on the channels through which the structure of the pension system affects public expenditure. These channels comprise, first, pressure from the public PAYG pensions systems and second, pressure arising from risks associated with the private pension pillar. In what follows, these channels are discussed in more depth.

Turning to the first channel, pressure on PAYG pension schemes and thus public finances in the NMS arise from demographic and macroeconomic developments. Regarding demographics, as Figure 2 shows, the old-age dependency ratio, *i.e.* the ratio of the population aged 65 and above over the population aged 15-64 has increased steadily over 1996-2007 in the NMS. This is due to several factors, for example, improved health care services increasing the life expectancy of the elderly. At the same time, the economic catching-up process opened new career opportunities for the young generations who changed their behavioural patterns (e.g. increased migration abroad, postponed childbearing) which generally reduced the population aged 15-64. Only in Slovakia, the old-age dependency ratio was slightly lower in 2007 than in 1996. However, with the exception of Bulgaria until 2006, the old-age dependency ratios in these countries remained partly significantly below the EU27 average.

Nevertheless, demographic pressures are projected to rise strongly in the future. As indicated in Figure 3, old-age dependency ratios, which in 2007 were in all NMS below both the EU27 and the euro area average, are projected to be above these levels in 2060. The strongest increases in the old-age dependency ratio are projected for Romania, the Czech Republic[7] and Lithuania.

Furthermore, developments in employment affect the net position of the public pension systems via revenue collection.[8] As the accession to the EU brought a growth stimulus to the NMS economies, the large increases in employment that many of the NMS saw boosted revenues in the

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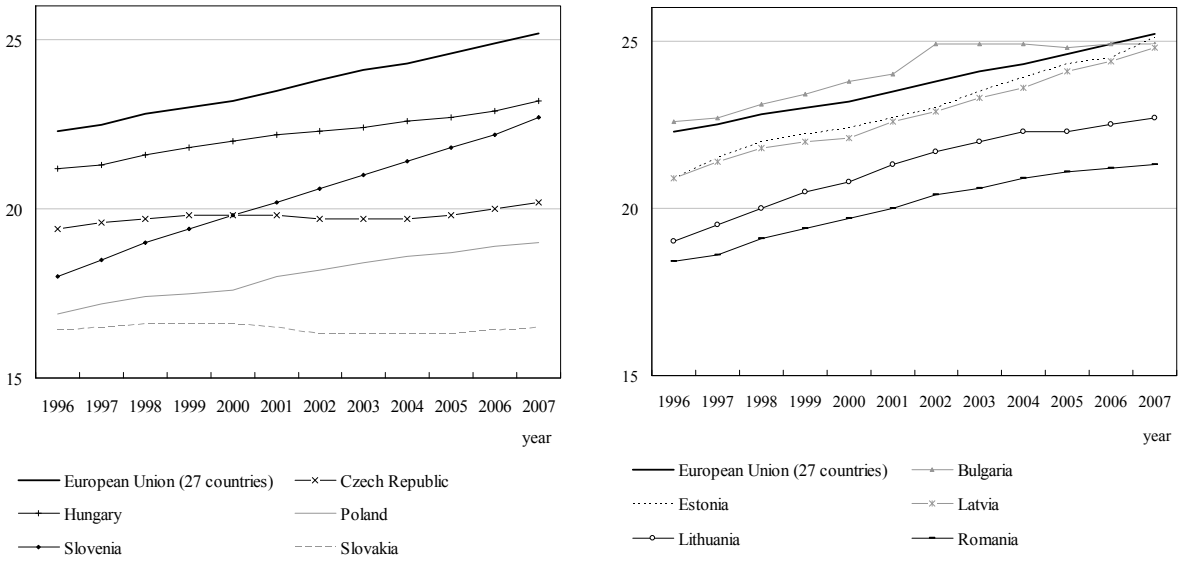
[7] For example, Botman and Tuladhar (2008) claim that given the ageing pressures in the Czech Republic, restoring debt sustainability will require additional reforms and a further increase in the retirement age is desirable, but will not suffice.

[8] Looking back to the 1990s, in many NMS early retirement was often used as a measure to lower high official unemployment figures. Eligibility rules for retirement were relaxed and older workers close to retirement who lost their jobs often exited the labour force and retired. This rendered the PAYG systems increasingly unsustainable.

Figure 2

Old-age Dependency Ratios, 1996-2007
(population 65 and over to population 15 to 64 years)

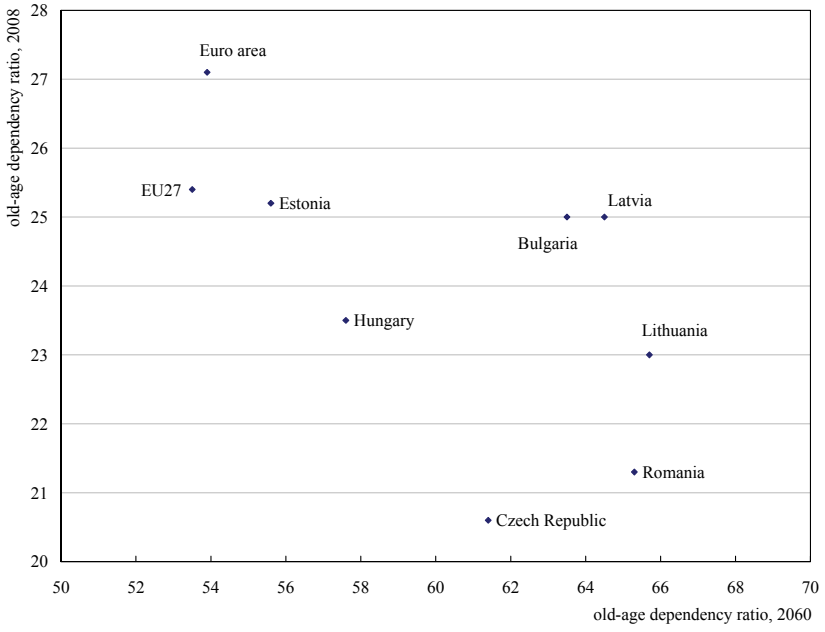


Source: Eurostat, ECB staff calculations.

statutory PAYG schemes (as well as in the individual accounts of the private pension schemes). As Figure 4 indicates, with 13.6 percentage points, Bulgaria saw the largest increase in the employment rate between 2000 and 2008, followed by Latvia (11.1 percentage points) and Estonia (9.4 percentage points). Looking forward, the beneficial contribution from strong employment growth is at least partially reversed. Instead, the projected and in part substantial increase in unemployment brought about by the economic

Figure 3

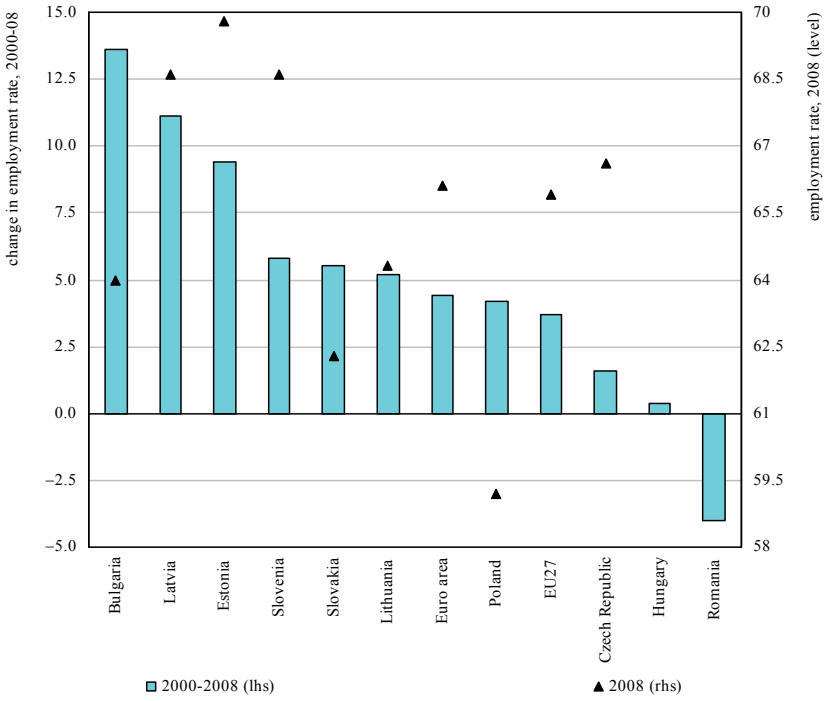
Demographic Pressures:
Old-age Dependency Ratios in 2007 and 2060



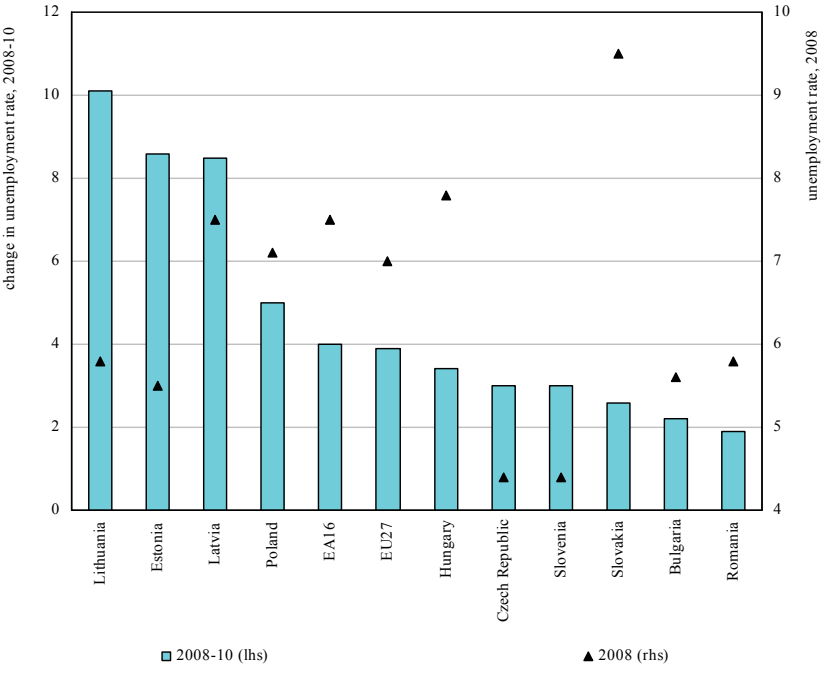
Source: Economic Policy Committee and European Commission (2008), ECB calculations.

Figure 4

Labour Market Developments in the NMS
Employment Rates, 2000-08



Unemployment Rates, 2008-10



Source: AMECO, staff calculations.

and financial crisis in all of these countries will deteriorate general government revenue in the short-term, putting some stress on public PAYG schemes. In addition, via lower contributions also to private schemes, the rise in unemployment also tends to reduce individual pensions accounts. As Figure 4 shows, the increase in unemployment over 2008-10 is projected to be the strongest in Lithuania (10.1 percentage points), followed by Estonia (8.6 percentage points) and Latvia (8.5 percentage points).

The second channel through which the structure of the pension system affects public finances relates to the risk that governments would need to top up "inadequately" low public and private pensions. The European Commission and Economic Policy Committee (2009) project the developments of benefit ratios and gross average replacement rates from public and private pensions for several of the NMS, the results of which are displayed in Table 3. These long-term projections should be treated with extreme caution given the large uncertainty and poor data

Table 3

Benefit Ratios and Replacement Rates in the NMS, 2007-60
(percent)

Country	Benefit Ratio				Gross Average Replacement Rate			
	Public Pensions		Public and Private Pensions		Public Pensions		Public and Private Pensions	
	2007	2007-60	2007	2007-60	2007	2007-60	2007	2007-60
Bulgaria	44	–20	44	–8	-	-	-	-
Czech Republic	45	–17	-	-	33	–17	33	–17
Estonia	26	–40	26	–18	28	–41	28	9
Latvia	24	–47	24	4	33	–33	33	2
Lithuania	33	–16	33	–2	32	–10	32	15
Hungary	39	–8	39	–3	49	–23	49	–13
Poland	56	–54	56	–44	-	-	-	-
Romania	29	26	29	41	36	-	36	34
Slovenia	41	–6	41	–2	-	-	-	-
Slovakia	45	–27	45	–11	-	-	-	-

Note: The benefit ratio is the average benefit of public/private pensions as a share of economy-wide average wage (gross wages and salaries in relation to employees). The gross average replacement rate is calculated as the average first pension as a share of economy-wide average wage.
Source: European Commission and Economic Policy Committee (2009).

availability. This notwithstanding, the table shows that benefit ratios and replacement rates differ widely among the NMS. Benefit ratios from public pension schemes are highest in Poland and lowest in Latvia and Estonia. In all NMS apart from Romania, where the public pension pillar may still be considered as being in a "built-up" phase, the benefit ratios in public pension schemes are projected to decline – partly significantly. The projected decline in the public pension benefit ratio over 2007-60 is projected to be largest in Poland, Latvia and Estonia and smallest in Slovenia and Hungary. Accounting for income from private pensions, the table shows that the benefit ratio is projected to fall strongly in Poland and to lesser extents in Estonia, Slovakia, Bulgaria, Hungary, Lithuania and Slovenia. As regards gross average replacement rates, for the few NMS for which projections are available, the table points to expected substantial declines in the area of public pensions. Accounting for private pensions, the picture is less clear, as in several countries the gross average replacement rate is projected to rise slightly. Generally, declines in these indicators over time need to be assessed against their starting levels. In this respect, for example, the declines in the public and private benefit ratio in Estonia from a low level in 2007 to the lowest level across this section of countries in 2060 may point to very low pension levels, potentially raising pressure on government budgets in the future.

4 Pension fund performance und risks

This chapter surveys pension fund performance in the new EU Member States and captures

several risks to these systems that have increasingly emerged since their implementation. Many of these risks are not unique to the new EU Member States and apply to other countries as well. These risks include in particular the inflation risk, namely the fact that inflation grows faster than nominal returns on assets, as well as the financial market risk, which is associated with exposure of the pension assets to stock market developments. The global financial and economic crisis in 2008-09 has shown that in particular the financial market risk and the associated melt-down in pension assets worldwide has become a major concern for policy makers.[9, 10]

Before we provide some evidence on pension fund performance in the NMS, the next section first briefly discusses the available data.

4.1 Data

The availability of homogenous data on pension funds in the NMS is limited. First, as shown above, the 2nd and 3rd pension pillars were introduced only recently in many NMS – the time series have therefore only a few observations. Second, data is only available on an annual basis. Third, while publicly accessible data on pension funds from national sources, such as pension funds associations or supervisors, are often richer and available at higher than annual frequencies, they are not fully comparable across countries.

The main two sources of homogenous data that we use in this paper are from the OECD (the Pension Funds database) and from Eurostat. Both include annual data on pension funds developments. However, the available time series for the countries considered here are short, with the number of observations depending on the indicator chosen. For example, several indicators cover the period 2000 to 2007, while some cover only the years 2003-06. The data cover all pension funds and similar vehicles (*i.e.,* pension funds, book reserve arrangements and pension insurance contracts), thus both mandatory and voluntary schemes that are either occupational or personal.[11] The OECD Pension funds database provides a comprehensive set of indicators on pension. However, the OECD database does not cover all NMS, but only its members: the Czech Republic, Hungary, Poland and Slovakia. Data provision for some of the other NMS, while sometimes provided, is rather limited.

The Eurostat database provides a dataset on pension funds performance that in principle covers all NMS, but misses many observations, especially for the period before 2004. This is likely due to the fact that the systemic pension reforms were implemented often only recently and that the pension fund segments of financial markets played a relatively limited role in the financial intermediation in the NMS.

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9 See also IMF (2009b).

10 There are various measures of pension funds performance, for example, Amir-Benartzi (1998) examine the correlation between the expected rate of return on pension assets as reported in the financial statements and the composition of the pension portfolio measured as the percent invested in equities. They find that these variables are related, but the relation is rather weak. Impavido and Rocha (2006) investigate the performance of the Hungarian second pillar and claimed that its performance since inception has been mixed. They concentrate on growth, portfolio and investment return, costs and fees. In terms of investment return, they find that government securities accounted for 73 per cent of the portfolio in 2004. They also find that the real rate of return net of fees was negative in some years and the annualized average net real rate return in the 1998-2005 period amounted to only 3.9 per cent p.a., lower than the average real wage growth of 5.3 per cent. Tapia (2008, p. 25) provides estimates of the financial performance of privately managed mandatory and voluntary pension funds in the Czech Republic, Estonia, Hungary, Poland and concludes that the average annual real investment rates of return has been positive for all, ranging from 1.0 per cent in the Czech Republic to 8.8 per cent in Poland, since the implementation of the 2nd or 3rd pillar. In addition, the average annual real investment rates of returns show important fluctuations for the entire period since the pension reform has been in place. The uneven performance could be, according to Tapia (2008), explained partially by the very high proportion of assets held in government bonds (around 60 per cent) and the irregular trends in government securities yields over the past years.

11 For the classification of pension funds see, e.g., OECD (2009), *Private Pensions Outlook 2008*, p. 32.

Table 4

Assets of Pension Funds in 2007
(percent of GDP)

Country	AT	BE	DE	DK	ES	FI	FR	LU	IE
Assets	4.8	4.0	4.1	32.4	7.5	71.0	1.1	1.0	46.6

Country	IT	NL	PT	SE	UK	CZ	HU	PL	SK
Assets	3.3	138.1	13.7	8.9	78.9	4.7	10.9	12.2	4.2

Note: In Denmark, France and Sweden, the significant fraction of pension savings is held in the form of pension insurance contracts which are not reflected in this table.
Source: OECD.

Despite these caveats, the available data nevertheless provide important information regarding pension fund developments in the NMS. However, the small number of observations prevents a more sophisticated empirical analysis. The next section provides some findings based on the available data.

4.2 The size and structure of private pension fund assets

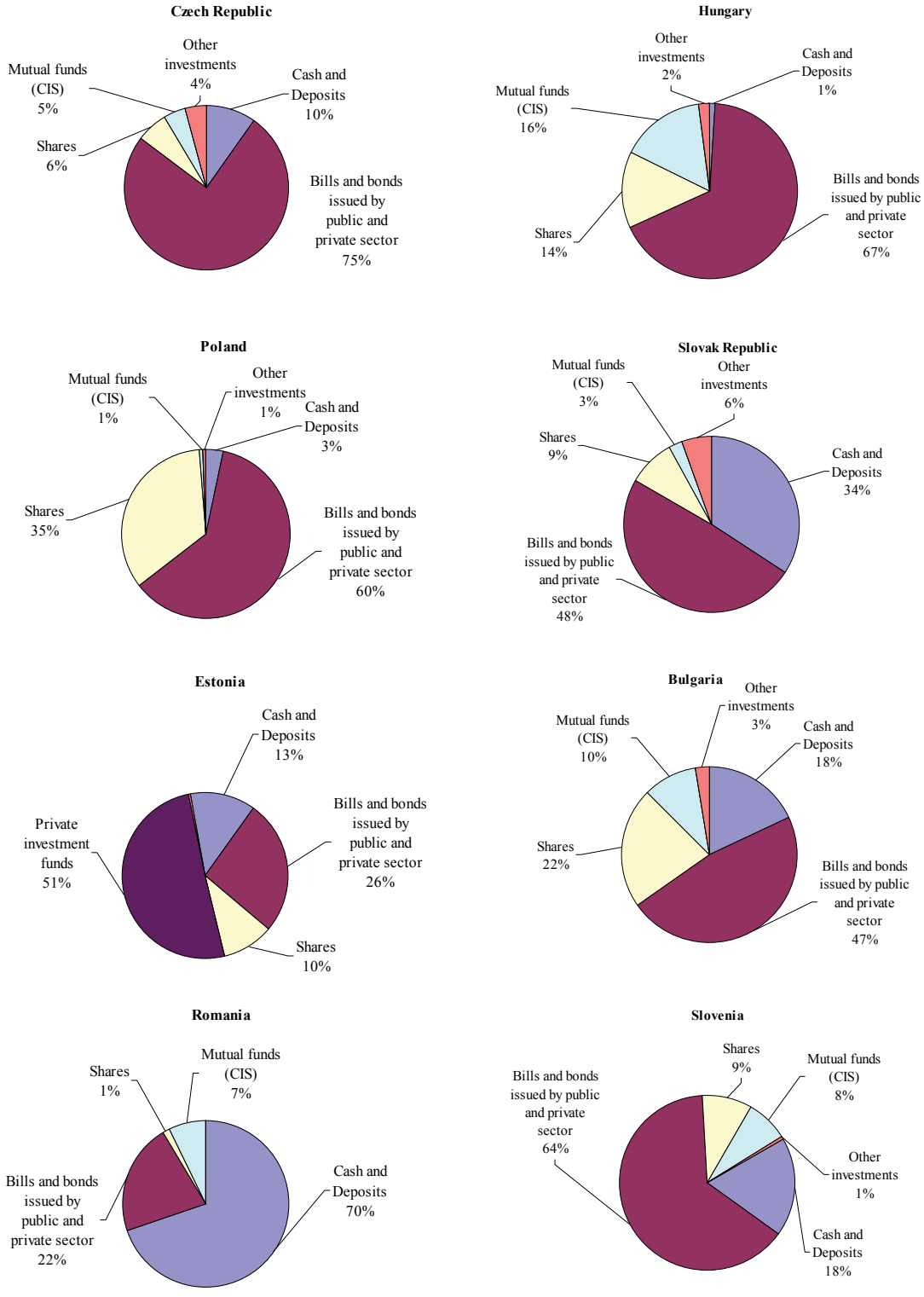
The savings cumulated in the pension funds increased sharply in the NMS, but still remained at low levels when compared to many of the old EU Member States. For example, the pension funds assets as a share of GDP represented only about 4.7 per cent in the Czech Republic in 2007 (2.3 per cent in 2001), 10.8 per cent in Hungary (3.8 per cent in 2001), 12.2 per cent in Poland (2.4 per cent in 2001) and 4.2 per cent in Slovakia (0 per cent in 2001), while they were about 79 per cent in the United Kingdom or 138 per cent in the Netherlands (see Table 4). Consequently, only a limited amount of pension income currently comes from private pensions in these countries. OECD (2009a) finds that compared to the OECD average of 19.5 per cent of retirement income coming from private pensions, this share is 2.9 per cent in Hungary, 1.2 per cent in Poland, 1.1 per cent in Slovakia and 0.7 per cent in the Czech Republic.

The impact of inflation and financial market developments on pension fund performance is determined by the structure of pension fund portfolios. Private pension fund assets consist of (1) bills and bonds issued by the public and the private sector, (2) mutual funds, (3) shares, (4) cash and deposits as well as (5) other investment (e.g. mutual funds). The distribution of private pension fund assets across these categories varies widely across countries, reflecting, inter alia, differing risk aversion, existing country-specific investment regulations and available investment opportunities in domestic capital markets.

As they should secure income for their members in their post-retirement period, pension funds in the NMS have often (but not always) opted for investing rather conservatively. As indicated by Figure 5, in 2007, the share of pension fund assets invested in cash and deposits, associated with low returns and low risks, varies from 70 per cent in Romania to 1 per cent in Hungary. In contrast, the share of pension funds assets invested in shares, which are associated with sizeable risks against the background of stock market volatility (that, from the historical perspective of developed economies, paid off in higher yields in the long run), range from 35 per cent in Poland to 1 per cent in Romania. Finally, as Figure 5 also shows, apart from Estonia

Figure 5

Structure of Pension Funds Assets as of 2007



Source: OECD.

and Romania, bills and bonds issued by the public and the private sector formed the largest share of private pension assets in 2007. The majority of these debt securities were issued by the public sector (at the central government or municipal level). The corporate sector is mainly financed through loans from the banking sector in the NMS; and only a limited number of larger financial and non-financial private corporations issue corporate bonds. This limits to a certain degree the domestic investment opportunities for pension funds.

The large share of bills and bonds issued by the public sector indicates that these pension fund assets are an important source of financing for the government. Against the background of the 2008-09 crisis and the arising financing problems for the government, in Hungary, for example, the private pension schemes have been obliged to invest a larger share of their funds in government bills and bonds. On the one hand, investment in debt securities issued by the public sector increases in principle the security of pension funds' investments due to a generally lower sovereign default risk when compared to the default risk of the financial and non-financial corporate sector. On the other hand, if government bonds represent a large fraction of total pension funds assets, it is questionable whether pension funds improve the overall efficiency of resource allocation. In the extreme case, if pension funds invested 100 per cent of their total assets in government debt securities they would act in principle as the first PAYG pillar; however, likely at higher administrative costs. One can assume that such a system would be more costly than a typical PAYG with implicit liabilities, due to administrative and other costs related to pension funds' maintenance, marketing, remunerations of pension funds' managers and owners.

According to Eurostat data, the geographical structure of pension fund investments differed substantially in 2006 and 2007 (the latest data available). For example, 100 per cent of pension funds' total assets were invested domestically in Poland in 2006 and Slovakia in 2007, while it was about 80 per cent in Bulgaria and the Czech Republic in 2007. On the contrary, this ratio was only 16 per cent in Lithuania in 2007.

The currency breakdown shows that a high share of investment is denominated in euro. This is particularly the case for the ERM-II countries and countries with a currency board exchange rate regime. In this respect, the share of pension fund assets denominated in euros was about 70 per cent of total investments in Lithuania, 46 per cent in Latvia and 38 per cent in Bulgaria in 2007. On the contrary, euro-denominated investment was only about 6 per cent in the Czech Republic in the same period.[12]

The limited diversification of assets in some of the New EU Member States, as shown in Figure 5, and especially the relatively high fraction of total assets held in government debt securities limit to some extent the possible positive impact from systemic pension reforms. If pension savings are allocated mainly into public sector debt securities, and if one assumes that the public sector is allocating financial resources generally less efficiently than the private sector, the funded pension pillars do not contribute to a higher economic efficiency via a better allocation of available resources. All in all, if the funded pillar is mandatory and used mainly to finance government deficits via purchasing government bonds, one can consider the pension funds' contributions as a special form of taxes, rather than voluntary savings.

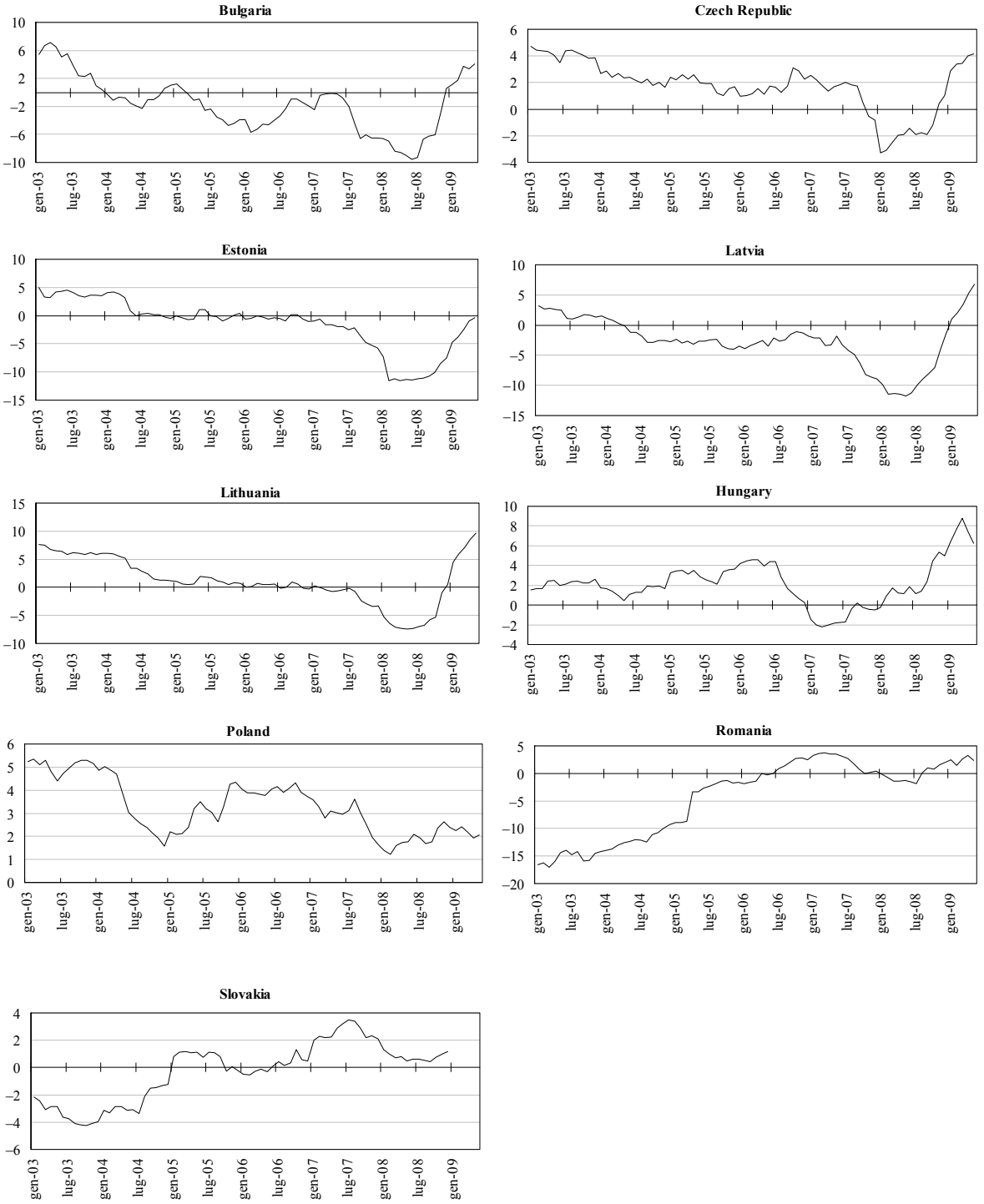
4.3 The exposure to inflation risk: some indications

For an assessment of the inflation risk, Figure 6 depicts the estimates of real yields on long-term year government bonds between January 2003 and May 2009. They indicate that in several of the NMS, the catching-up process observed over the last decade was associated with

[12] In Estonia and Poland, it was 60 and 0 per cent, respectively, in 2006.

Figure 6

Real Yields on Long-term Government Bonds
(percent)



Note: The real interest rates were calculated as a difference between the (observed) nominal yields on ten year government bond yields and the HICP annual rate of change. Latest observation: May 2009 (Slovakia: December 2009), monthly data.
Source: ECB.

partly high rates of inflation that lowered the investment real yields. In these Figures, the real yields were approximated by the difference between the nominal yields on ten year government bonds (or a similar instrument if no government bond was available) and the annual rate of change in the harmonised index of consumer prices (HICP). In some of the countries, the historical real yields from investments into government bonds were close to zero or even negative for protracted periods of time. For example, in Bulgaria and Latvia, past investments in government bonds were generally generating losses in real terms so that the contribution of these investments to the accumulation of pension assets tended to be negligible. However, the ongoing economic contraction brought inflation down. At the same time, the nominal interest yields on government bonds increased due to several factor including e.g. worsened fiscal outlook, pushing real yield further up.

Also other forms of investment are exposed to inflation risk. In particular, holdings of cash or investment in financial instruments with a fixed interest rate (such as bank deposits) were eroding in real terms in the inflationary environment.

Against this background, the question can be posed whether a move to funded pension systems in catching-up economies is helpful in the long-term. The Balassa-Samuelson hypothesis would lead to the conclusion that price levels in less productive economies will increase as the productivity increases to equalize with productivity levels in more developed economies. As a consequence, the catching-up process is often accompanied by a higher inflation (or a currency appreciation). The instability of prices creates difficult conditions for all savers, pension funds included. For example, the double digit inflation rates in the Baltic countries have damaged significantly the real value of savings accumulated until 2008. If the funded pension pillars were supposed to reduce the burden of the PAYG pillar in the future, low and stable inflation together with a savings-friendly environment is required in order to accumulate sufficient savings under the funded pillars with a positive real return.

In principle, establishing funded pension pillars before providing a stable (low-inflationary) macroeconomic environment brings about the risk that funded pillars may loose credibility and thus not attract sufficient voluntary savings in the future. In addition, if the real value of savings would be destroyed by high inflation, the establishment of pension funds does not improve the long-term sustainability of public finances.

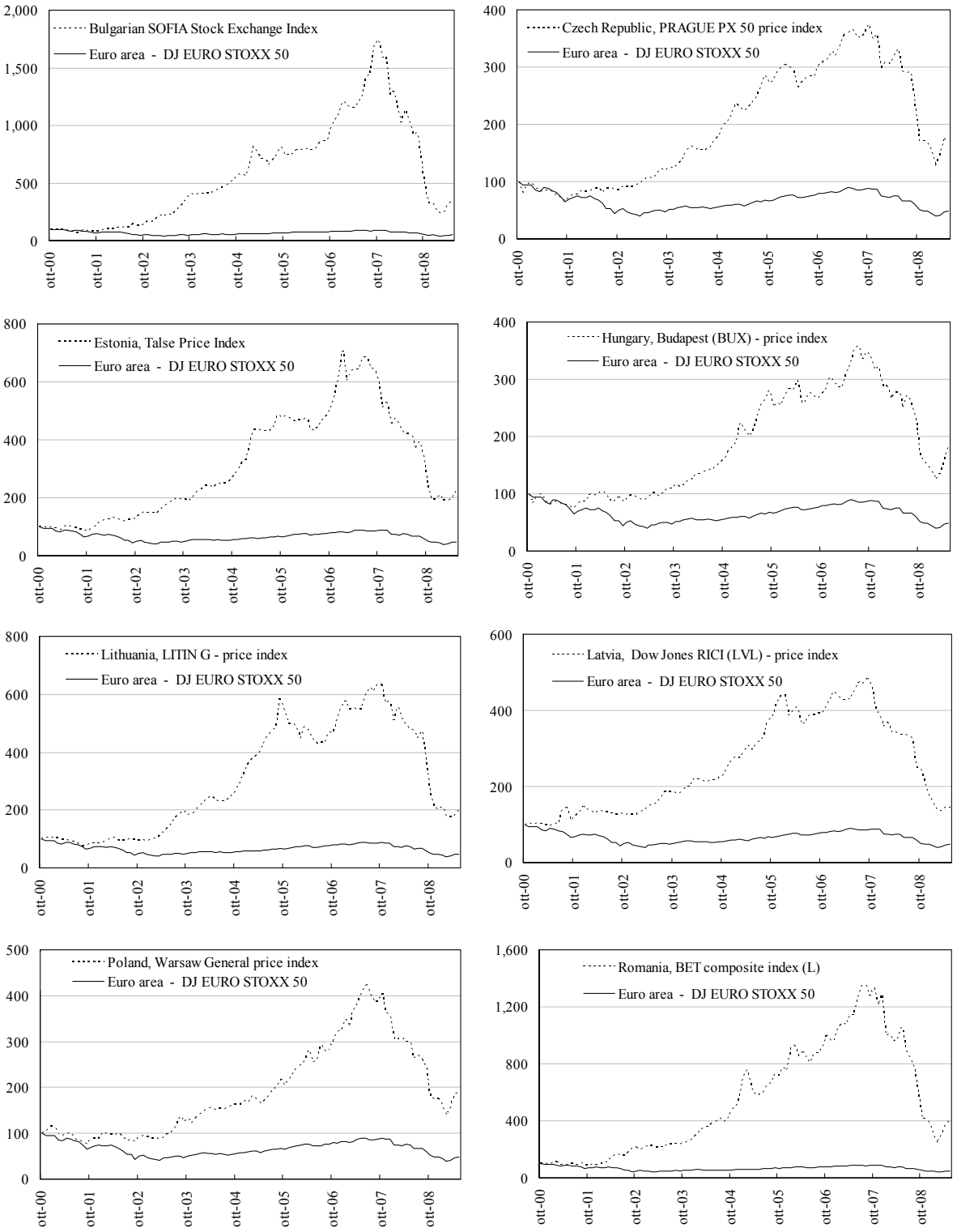
4.4 The exposure to the global financial crisis: some early indications

The OECD (2009b, p. 16) estimates that the total investment loss worldwide of private pension plans due to the 2008 turmoil in financial markets was around USD 5 trillion (out of which USD 3.3 trillion in the United States). According to OECD (2009b, p. 15), pension funds in the OECD countries experienced a negative return of about 20 per cent in nominal terms between January and October 2008 (22 per cent in real terms), amounting to a loss of about USD 3.3 trillion. Against this background, the question may be posed how the economic crisis has affected the NMS, bearing in mind that, as indicated above, the pension funds segment is still rather small in the NMS.

Figure 7 shows how the stock markets in the NMS developed between October 2000 and May 2009. In particular, the stock market indices in Bulgaria and Romania had grown substantially faster since August 2007 than what would have been in line with economic fundamentals. By February 2009, the NMS stock market indices dropped to about 20-45 per cent of their values in August 2007, but since then started to recover somewhat, in particularly in Hungary, Poland and the Czech Republic. All in all, the global financial market turmoil has negatively influenced the stock markets in all NMS and many of the stock market indices returned down to levels observed before 2003.

Figure 7

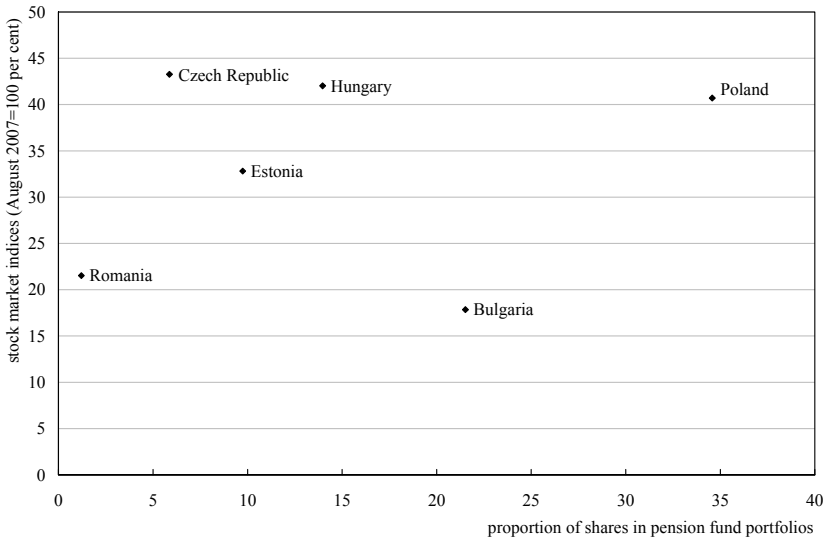
Stock Market Indices
(October 2000 = 100 per cent)



Note: Monthly data. Latest observation: May 2009.
Source: Datastream.

Figure 8

Exposure to Domestic Stock Market Developments



Source: Datastream, OECD.

As many of the pension funds profited from the substantial increase in stock prices in the past, the decline in stock prices implies losses for the stock holders in the short term. Figure 8 shows that particularly pension funds in Poland and Bulgaria would tend to be affected due to the relatively larger shares of stock in their portfolios. In the Czech Republic, Estonia and partly also Hungary, the adverse impacts of the economic crisis and the related stock market deterioration on pension fund assets were to some extent limited by a relatively modest representation of stocks in pension fund portfolios (less than 10 per cent, respectively 15 per cent of total assets).

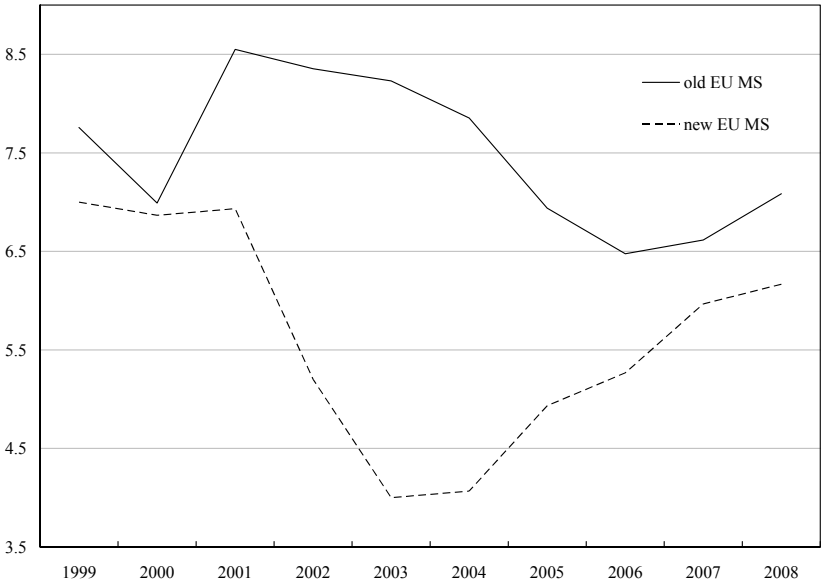
Consequently, indeed, also pension funds in the NMS faced significant losses stemming from the ongoing crisis. However, due to their relative short history, the absolute amounts of assets cumulated in the pension funds are rather limited in the NMS. Also, the NMS pension funds' exposure to stock markets is, except Poland and Bulgaria, rather limited. At the same time, pension funds that invested previously mostly in bonds may have benefited from the flight-to-quality that tends to lead to a higher demand for bonds associated with low risk. The higher demand tended to increase the prices of these bonds compared to other assets and thus may have mitigated to some degree the negative impact of the crisis on pension fund portfolios. This notwithstanding, many foreign investors pulled out of the NMS financial markets so that the liquidity of these markets declined significantly.

4.5 Convergence of New Member States to the old EU Member State levels

This section outlines developments in household savings, profitability of pension funds and funds' contribution rates in order to highlight differences or common trends in the NMS and the old EU Member States. To overcome the problem of missing observations at the country level in the NMS, we pooled available data on relevant macroeconomic, financial and pension fund variables. Figures in this section show an aggregated view on how the household savings rate evolved over time in these two groups of countries. In this respect, Figure 9 indicates that the household savings rate has on average been higher in the old Member States. In the NMS, the household savings rate was between 4 and 7 per cent of disposable household income – it declined from levels broadly comparable with the old Member States in 2001 to just about 4 per cent in 2003 and 2004 and since then it started to rise to about 6 per cent in 2008. On the contrary, in the old Member States, the household savings rate was on average between 6.5 and 8.5 per cent in the period from 1999 to 2008.

Figure 9

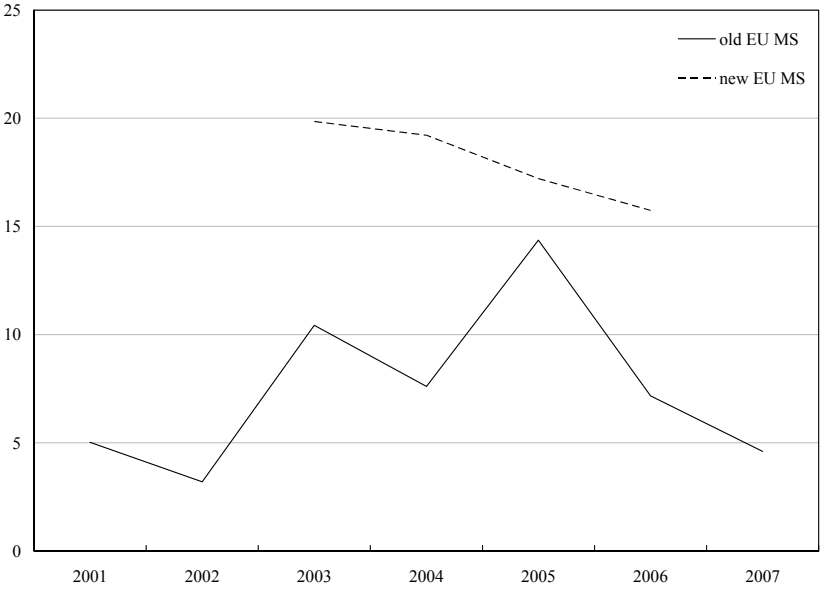
Household Saving Rate
(percent of disposable income)



Source: OECD, own calculations.

Figure 10

Profitability of Pension Funds Investments
*(net investment income divided by total investments * 100)*



Source: OECD, own calculations.

Figure 10 shows a declining trend in the nominal yields of pension funds between 2003 and 2006 in the NMS. The nominal yields of pension funds were higher in the NMS than in the old EU Member States; they declined from about 20 per cent in 2003 to about 16 per cent in 2006 in the NMS, while they fluctuated in the old Member States. The explanation of higher returns in the NMS may be higher inflation and more profitable investment opportunities in the NMS, e.g. related to their lower GDP per capita.

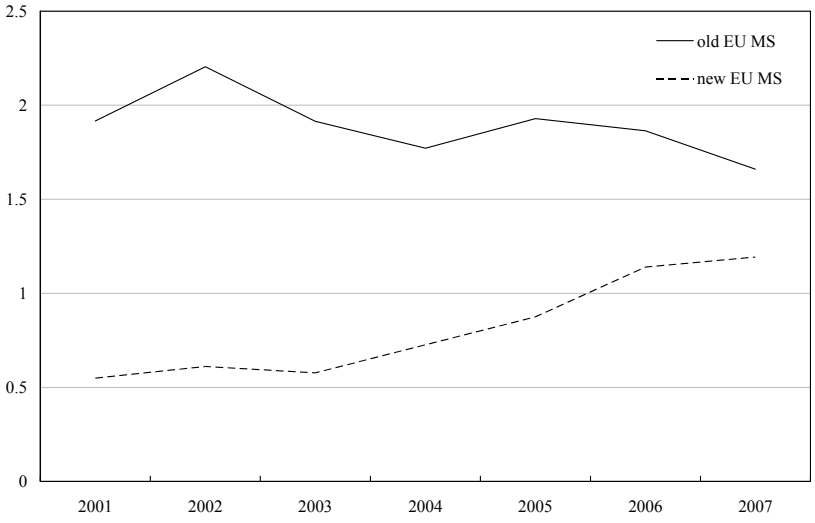
Employees' and employers' contributions to pension funds have been rising sharply in the NMS since 2003; however, their level remained below that in the old Member States in 2007, reaching only 1.2 per cent of GDP while it was about 1.7 per cent of GDP in the old Member States. This, together with the lower households saving rate shown in Figure 9, could potentially be an indication that the population in the NMS is not accumulating sufficient savings for the post-retirement period.

All in all, the NMS seem to be catching up with the savings patterns observed in the old Member States. Both the household savings rate

and contributions to pension funds are at lower levels in the NMS, but are converging to the levels observable in the old Member States.

Figure 11

Contributions to Pension Funds
(percent of GDP)



Source: OECD.

5 Conclusion

By way of a stock-taking exercise, this paper is an attempt to assess the multi-pillar pension systems and the associated budgetary risks in the new EU Member States. We find that the assets of pension funds are not well diversified in all countries that we consider here. In fact, to a large extent the pension funds in some of the NMS are invested in government bills and bonds. On the one hand, this increases in principle the security of pension funds' investments due to a generally lower sovereign default risk when compared to the default risk of the financial and non-financial corporate sector. On the other hand, if government bonds represent a large fraction of total pension funds assets, pension funds are in fact mimicking the first pension pillar. In addition, we find that pension fund assets have been subject to inflation risk, with real yields on government bonds having turned negative for several years for some of the NMS. This implies that the real value of the assets has been vanishing and the return has been lower, increasing the risk to the government that the future pensioners might not be able to sustain a living on the (meagre) return of their assets. This problem may be compounded by the effects of the ongoing global financial and economic crisis. We find that, indeed, pension funds in the NMS (as well as elsewhere) also faced significant losses stemming from the crisis. However, mainly due to their relative short history, the absolute amounts of assets cumulated in the pension funds have been rather limited in the NMS. Also, the NMS pension funds' exposure to stock markets was, except for Poland and Bulgaria, rather low. On the other hand, the relatively newly established funded pension schemes in the NMS face generally a higher risk of loosing credibility than schemes established earlier in the old Member States that already have a solid track record. A severe underperformance relative to previous expectations may hamper a further development of this financial segment in the NMS.

The adverse impacts of inflation and financial market volatility on the performance of pension funds that has been witnessed in recent years in several NMS underlines the fact that the problems concerning the sustainability of pension systems are not solved, yet. Of course, any assessment of this kind must distinguish between persons, who would now lose in such an environment (e.g. pensioners that need to buy annuities out of melt-down private pensions funds) or young persons, who, in times of deteriorating stock markets, buy equities cheaply at depressed prices and may profit from the increase of their prices in the future (see, for this argument, OECD,

2009b). However, not withstanding this argument, the witnessed volatility of financial markets and the impact of inflation give rise to the question who would pay the pension if pension funds fail to deliver what they were set out to deliver.

In addition, the available option of different investment strategies of pension funds that imply different risks call for an increased financial education of the population. Sufficient financial knowledge is necessary to enable responsible and qualified decisions about risks to future pension income. Only sufficiently educated pension savers are able to identify possible risks related to a particular investment strategy.

This basic stocktaking exercise has shown that the assessment of long-term sustainability of public finances in the presence of an increasing importance of private pension systems is important. A proper empirical assessment, however, requires first an improvement in the data situation in this area. From a policy point of view, portfolio and risk diversification remain an issue as does capturing the role of minimum pensions and social assistance.

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COMMENTS ON SESSION 2
PENSION REFORM AND CAPITAL MARKETS

António Afonso[*]

1 Introduction

I was asked to comment on three of the papers presented in the session that addressed the issue of pension reform and capital markets. More specifically, I will comment on the papers by Draper and Westerhout; Gillingham, Leive and Tuladhar; and Rezk, Irace and Ricca. These three studies cover related issues – pensions and savings – although in a different setting. For instance, the first paper is a theoretical paper presenting simulation results, based on a model capturing life-cycle behaviour of households. The second paper is a descriptive analysis of the consequences of the financial crisis on funded pension saving. On the other hand, the third paper offers an empirical analysis of the effects on saving from the substitution of PAYGO systems by fully funded pension schemes.

2 On "Privatizing Pensions: More than an Interesting Thought?" by Nick Draper and Ed Westerhout

The paper by Draper and Westerhout assesses the privatization of pension systems in an OLG life-cycle behaviour model. The sources of income include labour, capital and intergenerational transfers. One assumption is that equity as a percentage of wealth is roughly constant over time (implying constant return risk aversion).

According to the results, an economy with a defined benefits scheme can see an increase in utility of around 63 per cent and the privatization of pension funds would imply a 48 per cent decrease of utility at the steady state. In addition, in the presence of an annuity market there is a negative effect of 4.5 per cent at the steady state, and precautionary saving for longevity risk is no longer necessary. Finally, considering either endogenous or exogenous labour supply, there only very small differences in terms of utility.

From my reading of the version presented in the workshop, the privatization message and its implications were not too clear from the paper. On the other hand, are there significant changes if perfect capital markets are absent? For instance, short-selling is not always possible (may not even be allowed).

Regarding the calibration of some of the parameters in model I would see it as an added value if the authors are clearer on their sources and possible sources. For instance, the authors use an intertemporal substitution elasticity of 0.5, a rate of time preference of 0.0125 and an expected excess return on equity of 0.01. For example, in order to assess the magnitude of the excess return on equity, we can observe such measure for the U.S. and Japan (see Figure 1 and Table 1). During the period 1970:1-2008:3, the average equity excess return was 0.8 and 3.2 per cent respectively for the U.S. and for Japan, which is somewhat different from the working hypothesis of the model

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simulation. Therefore, some sensitivity analysis with the calibration parameters would be useful to see to what extent some results still hold.

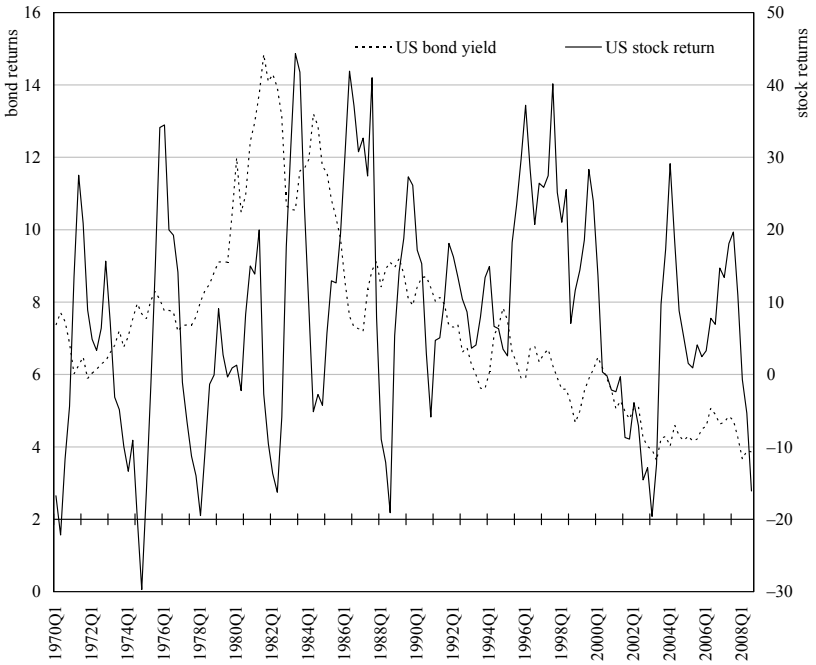
3 On "The Impact of the Financial Crisis on Funded Pension Saving" by Robert Gillingham, Adam Leive and Anita Tuladhar

As already mentioned, the paper by Gillingham, Leive and Tuladhar is a descriptive study of the effects of the financial crisis on pension funds. According to the evidence reported equity is a relevant part of pension funds assets (45 per cent in 2007), and pension funds in the U.S., the U.K., Australia, the Netherlands, Canada and Sweden, seem more prone to the effects of the 2008 crisis, while there is a broader predominance of defined benefits PAYGO systems in the EU. Moreover, and not surprisingly, the richest income quintiles are more exposed to a crisis situation and the ensuing loss in market value of assets in the capital markets. Still, government assistance to pension plans in a situation of crisis should be targeted to

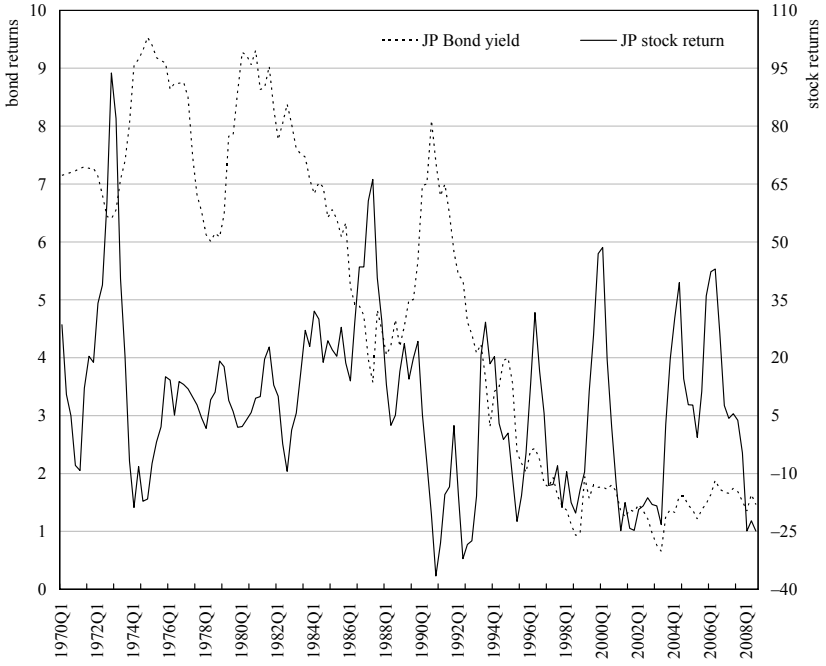
Figure 1

Excess Equity Return

a) United States



b) Japan



Source: International Financial Statistics, IMF. Quarter-on-quarter stock returns.

Table 1

Excess Equity Return Statistics, 1970:1-2008:3

	U.S.			Japan		
	Average	**Maximum**	**Minimum**	**Average**	**Maximum**	**Minimum**
Bond return	7.4	14.8	3.6	4.9	9.5	0.7
Equity return	8.2	44.3	–29.7	8.1	93.7	–36.5
Excess equity return	0.8	29.5	–33.3	3.2	87.3	–43.9

Data source: International Financial Statistics, IMF.

lower-income households. Finally, a natural concern of such government interventions is how the fiscal impact of the financial crisis may impinge on fiscal sustainability.

This paper provides us input for some questions and further thinking on how governments should react under a crisis in terms of supporting the losses suffered by pension funds. For instance, should the government step in to assist depleted pension funds, if they are privately owned and run? On the other hand, if the existence of such pension schemes was mandatory, then the authorities cannot disregard lightly the losses in portfolios. Moreover, if higher (current and future) taxes are needed to finance such assistance, does it matter how big was the share of non-risk free assets in the pension funds' portfolios? In the end, if higher income households are more represented in such pension funds doesn't government help distort income distribution policies?

What policy makers and the public face are, to some extent, alternative ways of thinking government intervention. The simple, somewhat demagogical query seems to be: do we want to pay taxes to finance minimum subsistence social networks or to bail out private business, be it pension funds or not, as for instance in the financial hiccups of 2008? In the end, and after full consideration, pragmatism should help and prevail when dealing with the problem of allowing past private profits to become current of future public losses.

4 On "Pension Funds' Contribution to the Enhancement of Aggregate Private Saving: A Panel Data Analysis for Emerging Economies" by Ernesto Rezk, Mariano Irace and Vanina Ricca

The paper by Rezk, Irace and Ricca assesses the effect of pension fund assets on private saving rates. The main intuitions in the paper draw on Feldstein (1974) well-known study, which discussed how the introduction of social security impinges on private saving. The paper estimates a private saving reaction function in a panel of six Latin American countries for the period 1995-2006. The thesis of the study and the conclusion from the empirical results is that mandatory pension fund regimes have a positive impact on private saving. Interestingly, different results can be found in other studies (see Freitas and Martins, 2009, for OECD countries).

For the simple rationalisation of the issue at end, the standard text-book relationship between external and budgetary imbalances, investment and saving is useful (see the Appendix), in order to recall that the two main sources of saving are private domestic saving and foreign capital inflow (due to the current account deficit), which are used to finance the two main sources of demand for financial capital: private investment and the government budget imbalances.

One alternative way to address the question studied by the authors would be to use a consumption specification as in Feldstein (1974, 1982) to assess how pension funds' assets

impinge on private consumption. In addition, the authors could also link to the current account balances, on the basis of its relationship with private saving, government saving and investment (Afonso and Rault, 2008, provide panel evidence for the EU).

Other points that came to my mind when reading the paper, relate to the need to check formally whether indeed a fixed effects specification is superior (different) to simple OLS or random effects; how to deal with the endogenous behaviour from pension funds; and that instead of short-term interest rates, long-term interest rates (or eventually excess equity returns), could be used in the analysis. In addition, instead of the demographic variable used, the authors could use the old-age dependency ratio, which more clearly proxies the aging burden on saving decisions. Finally, given the rather small sample size (around 60 observations) used in the panel, one necessarily needs to read the results with some care.

APPENDIX

The identity for GDP, *Y*, in an open economy can be written as:

$$Y = C + I + G + X - M \tag{1}$$

where:

C = private consumption

I = private investment

G = government expenditure

X = exports of goods and services

M = imports of goods and services

Private saving *S* is given by disposable income net of consumption expenditure and taxes, *T*:

$$S = Y - C - T \tag{2}$$

Equations (1) and (2) relate the current account balance (*CA=X–M*) to the difference between national investment and national saving, the sum of private and public saving and the government balance (*BUD=T–G*). Thus, the current account balance is usually written as:

$$(X - M) = (S - I) + (T - G) \tag{3}$$

$$CA = (S - I) + BUD\,, \tag{4}$$

and it is evident that the current account (*CA=X–M*) balance is related to the budget balance (*BUD=T–G*) through the difference between private saving and investment. In other words, the current account balance of a given country is by definition identical to the difference between national saving and domestic investment.

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COMMENTS ON SESSION 2
PENSION REFORM AND CAPITAL MARKETS

Laura Muriel Cuccaro[*]

1 Comments on "Pension Systems in EMES: Implications for Capital Flows and Financial Markets" by Ramón Moreno and Marjorie Santos

The first paper, "Pension System in Emerging Economies: Implications for Capital Flows and Financial Markets", written by Mr. Moreno and Mr. Majorie Santos, explores the effects of the pension system on capital flows, saving and investment, and the deepening of financial markets.

The authors analyze three relevant aspects: the stage in the demographic transition, the pension system design and the pension fund asset accumulation and financial deepening. One of the most important conclusions of the paper is that the implications of demographic changes for saving and investment would depend on the stage in demographic transitions. However, according to the ambiguity of some results, the authors conclude that other factors than demographic can play an important role in influencing national saving and investment.

As a second conclusion, it is not clear the expected effects with a funded pension scheme. One of the statement used to justify the introduction of a funded pension system is that could increase the incentive to save and reduce the evasion. The authors list several factors that may have limited the impact of pension reforms on national saving: the lack of financial literacy, the reduction of precautionary saving, the transitional costs, the declining pension coverage of workers and the high administrative costs.

Finally, the authors analyze the assets accumulation and the financial deepening and conclude that in spite of the growth of accumulated assets in emerging economies, the levels in terms of GDP are still lower than in develop economies. At the same time, the portfolio composition of the managed funds in emerging economies is limited, with an important participation of public debt. According to the authors, as pension fund assets have grown, emerging securities markets have deepened in recent years. However, financial markets in emerging economies are still not as deep as in developed countries.

The paper explores in an interested way the effects of the pension reforms on national saving and investment and on domestic capital markets. Most of the explanations provided by the authors help to understand the developments after the 1994 pension reform in Argentina.

In spite of the authors' mention of the relevance of the informal labor sector to explain the declining in pension coverage of workers, it is important to emphasize this effect, taking in account that the informal labor sector has an important participation in the majority of emerging economies.

In addition, the lack of the institutional framework in some emerging economies is important to understand the portfolio composition of the pension managed funds. In this sense, for example, the fiscal cost of the transition has covered in part through the pension funds, explaining the high composition of government debt on the total pension managed funds.

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2 Comments on "Reforming the Pension Reforms: The Recent Initiatives and Actions on Pension in Argentina and Chile" by Rafael Rofman, Eduardo Fajnzylber and German Herrera

The paper "Reforming the Pension Reforms: the recent initiatives and actions on pension in Argentina and Chile", written by Rofman, Fajnzylber and Herrera, is a very complete description of the recent pension measures that have been adopted in Argentina and Chile and a compared analysis of the institutional and political framework in both countries. The paper describes the most relevant components of the recent reforms, explaining why and how they were introduced, discussing their impacts and the remaining challenges.

According to the authors, the introduced reforms during the recent years in Argentina and Chile recognize similar origin: the concerns about coverage, equity and efficiency of the systems, as well as a renew interest in defining the role of the state in the system. However, the measures and the process were very different in both cases. While in Chile there was a wide public debate, in Argentina the reforms were adopted through decrees or through laws whit little discussions about the contents and the goals. This difference reflects the disparity in political and institutional framework of the countries. Therefore, the expected results of recent reforms are also different.

The authors provide an incredible summary of the pension measures introduced in Argentina during the recent years. Since 2002, the minimum benefit has been increased to compensate for inflation and also increase the real value. The government has introduced increases in other benefits than the minimum up to the year 2006. The minimum pension benefit rose more than 70 per cent in real terms from 2002 to 2008, meanwhile the average pension benefit lost real value of around 4 per cent during the same period. As a result, the benefit pyramid has been reduced.

The constitution of Argentina obligates the authorities to adjust the pension benefit according to the evolution of the market wages. However, the government, up to the year 2008, had adjusted the pension benefit using discretionary decisions due to the historical tightening fiscal position. However, in August 2006 the supreme court ruling for a specific beneficiary (called "Badaro case") ordered that the pension benefit of that beneficiary be adjusted for the period between January, 2002 and December, 2006 on the basis of the annual changes in the level of the wage index (formal and informal wages) published by the national official statistics institution (INDEC). A class action ordering the extension of the benefit adjustments to all beneficiaries was approved in June 2008.

In this context, the government introduced a mobile adjusted rule on the basis of the minimum result of the simple average between the six-monthly increase in wages for the registered workers and the year over year evolution of tax revenue for the National Social Security Institution (ANSES) and the year over year rate of the total resources of ANSES. As it was indicated in the paper, originally the index had some technical mistakes because it was estimated using a semiannual rate together with an inter-annual rate.

After the decision of introducing the mobile index of pension's adjustments, the government changed the annual for a semi-annual rate to estimation. Nevertheless some details of the index's estimation have not been provided yet by the government. At the present, there are some doubts regarding the calculation. For example, the updated number of beneficiaries of the pension system is unknown and it is key information to estimate the mobile index.

The anticipated retirement and the moratorium plans are two of the most important measures that have been taken during recent years. The plans were closed at the beginning of 2007, however according to the administrative steps; some new beneficiaries were registered into the pay-as-you-go system during 2008. According to the official information, as of March 2008 more than 1.8 billion people entered to the pay-as-you-go system through these plans.

In 2007, the government introduced a pension system reform. According to the government, the main goals of that reform were to: increase the pension coverage rates, increase the replacement rates, allow contributors to choose between the two schemes, reduce the commission of the funded system and improve the portfolio composition of the managed funds by the pension administrators. However, the voluntary transfers to the pay-as-you-go system were limited and the composition of the pension funds has not registered significant changes.

In spite of the lower rate of voluntary transfers from the funded scheme to the pay-as-you-go scheme, in 2008 the congress approved the nationalization of the funded pension scheme proposed by the executive branch, introducing marginal changes to the original plan. The recent pension measures have had fiscal impacts in the short-term but also in the medium and long-term. As the paper describes, there are not enough official information of the total fiscal impacts.

The anticipated retirement and the moratorium plans generated a net fiscal cost in 2007 (when the majority of people were registered) of 0.7 per cent of GDP. Under the design of the plans, after five years, people will receive the total pension benefit, so the estimated net fiscal cost of these measures will increase during the next years with an important impact on the year 2012 of around 1.3 per cent of GDP.

The 2007 pension system reform included non-voluntary transfers from the funded scheme to the unfunded scheme for some professionals and old-age people that had low levels of accumulated assets in their individual capital accounts. The transfer of the accumulated assets generated extraordinary resources for the government by around 1.0 per cent of GDP during 2007. As of the end of the year 2008 the managed funds by the pension fund administrators were transferred to the National Social Security Institution (ANSES), but this transfer was not accounted as fiscal revenues such as was the case in 2007. The managed funds represent around 8 per cent of GDP. At the same time, during 2009 the government will receive in net terms 4 billion dollars (more than 1 per cent of GDP) of additional cash funds from the nationalization of the pension system.

It is important to explain the fiscal framework in which these measures were implemented. The authors cite that the improvement in the fiscal position in Argentina and Chile during the recent years has permitted to the governments adopt the described pension measures. However, the introduction of a briefly analysis of the fiscal framework could be provide a most complete description of the context in which pension reforms were adopted.

In Argentina, tax collection has increased at unprecedented rate during the last six years (2003-2009) helped by the economic expansion, the increase in exports volumes, the high commodities prices and the local inflation. Tax resources represented 25.9 per cent of GDP in 2008, the highest level during the last fifteen years. At the same time, the primary fiscal expenditures of the Non-financial National Public Sector have been increased too, but at a lower rate, and represented in 2008 24.5 per cent of GDP.

According to the evolution of tax collection, the transfers to the provinces, that include the tax share, have accounted for the highest increase during the last few years. At the same time, the current transfers to the private sector have risen 1.6 percentage points of GDP from 2002 boosted by the subsidies to some key sectors (such as energy and public transport) to reduce the impact of the high commodity prices on local inflation.

The third primary expenditure item that has registered the highest increase has been the pension benefits, increasing from 2.8 per cent of GDP in 2002 to 4.4 per cent in 2008. As a result, of the evolution of the fiscal revenues and expenditures, the primary fiscal balance and the overall fiscal balance of the Non-financial National Public Sector have reached a historical surplus, representing 3.1 and 1.4 per cent of GDP, respectively, in 2008.

During the last few years, the National Social Security Institution (ANSES) has increased their composition of the total primary surplus of Non-financial National Public Sector from 0.1 per cent of GPD in 2002 to 0.7 per cent of GDP in 2008. This increase has been helped by the evolution of tax collection. In particular, by the increases in vat and income taxes, both of which are shared with the pension public system. However, considering only the resources of the pay as you go system (that is the pension contributions) and the pension benefit expenditures, the chronic pension system deficit has not eliminated. The participation of the resources other than contribution to the pension system has increased during the last few years.

Regarding the pending challenges, all the challenges described by the authors are very important and constitute part of the core. However, Argentina has been characterized by a pro-cyclical fiscal policy. The recent pension measures are reflecting the pro-cyclical behavior of the fiscal policy. Therefore, one additional challenge is the reduction of the pro-cyclical behavior of the policy makers. For the short-term, the challenge is the management of the pension system in a less favorable fiscal environment. Additionally, the government has had limited access to the capital market, responding to some local factors, such as the absence of a final solution of part of the defaulted public debt, and the external financial crisis.

In this context, the national treasury has financed their gap through other public entities such as the National Social Security Institution (ANSES). Therefore, the intra public sector debt has increased during the last few years. At the same time, the nationalization of the private pension scheme increased the composition of the intra public sector debt. As of October 2008, more than 50 per cent of total managed funds by the private scheme was allocated to public debt corresponding to the national treasury. As a result, the composition of the pension funds are concentrated in national treasury's debt. In this sense, the fiscal solvency and the improvements in public debt management are important challenges to preserve the real value of the pension contributions and to guarantee the sustainability of the system.

Finally, the enhancement of the institutions and the independency of the social security institutions are the most important long-term challenges. Legal framework to guarantee the transparency, efficiency and predictability of the pension fund administration are other pending issues.

COMMENTS ON SESSION 2
PENSION REFORM AND CAPITAL MARKETS

Frank Eich[*]

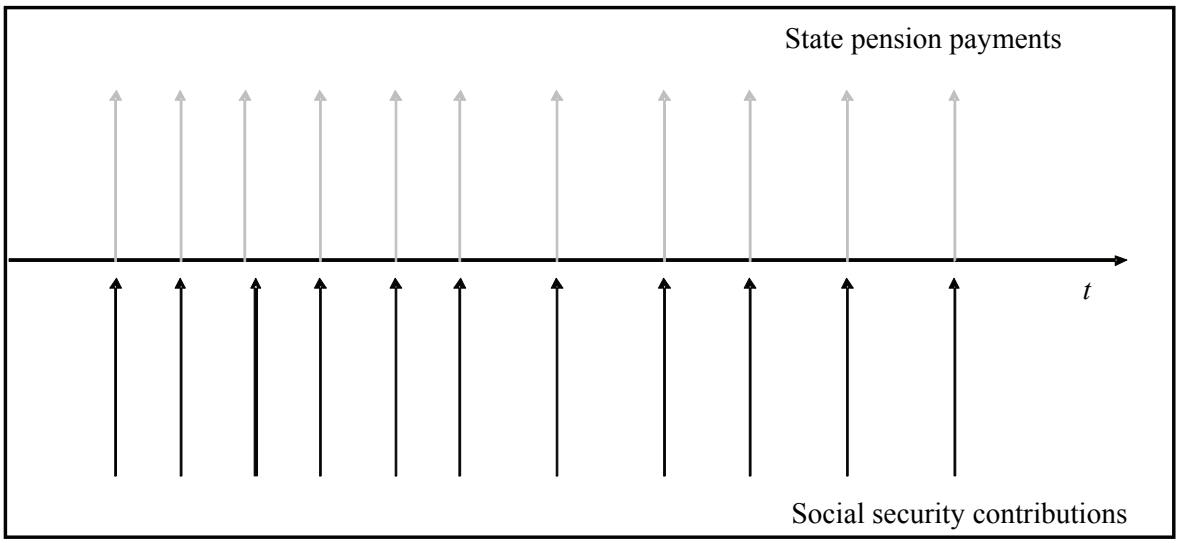
1 Comments on "Pension Privatization and Country Risk" by Alfredo Cuevas, María Gonzáles, Davide Lombardo and Arnoldo López-Marmolejo

1.1 Brief summary and motivation

The paper looks at how rating agencies factor in explicit government debt and implicit pension debt (IPD) in their assessment of country risk. The motivation for the paper is that rating agencies could change risk assessment during the transition phase from unfunded pay-as-you-go (PAYG) to funded private pensions, requiring counter-balancing actions from governments to maintain their ratings. Figure 1 illustrates the set up of the simple unfunded pay-as-you-go system.

Figure 1

A Simple Illustration of a (Sustainable) Unfunded Pay-As-You-Go Pension System



The paper argues that the issue under consideration has arisen in the context of unsustainable PAYG pension systems but the basic story holds even when the PAYG system is sustainable, as is illustrated in Figure 1. To see this, assume that the unfunded PAYG arrangement is mature and sustainable, with population stable and parameters set in a way that revenue meets spending at any point in time. In Figure 1 the black lines are the contributions to the PAYG system made by today's workers. At any point in time the inflow equals the outflow to pensioners, depicted by the grey

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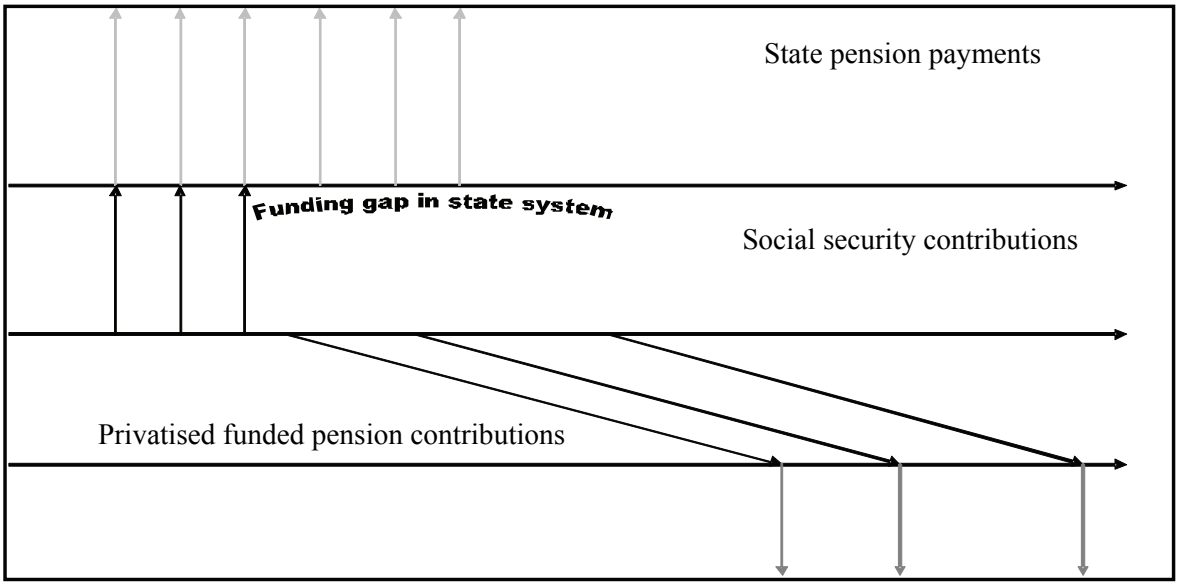
The opinions expressed herein are those of the author and do not necessarily reflect those of the European Central Bank or the Eurosystem.

Figure 2

Transition from Unfunded PAYG to Funded Arrangements



arrows. Overall the PAYG pension system is neutral for the public finances. It could be part of general government finances or a closed system as in some countries.

Now assume that the government introduces pension reforms and closes the unfunded PAYG system in favour of a funded defined contribution scheme in the private sector. During the transition phase, the government would have to continue to pay the state pension for several cohorts of actual pensioners or those who have build up entitlements to receive a state pension in the future.

During the transition phase funds will be diverted away from financing these state pensions and a funding gap in the social security system will emerge. Everything else equal, the public finances would deteriorate. Eventually accrued liabilities in the state scheme will be unwound and there would be no longer a funding gap but in the meantime the public debt will go up. So while the pension reform reduces future government exposure to pension liabilities, in the short to medium term the government will have accumulated additional debt. Figure 2 shows the inflows and outflows into the system during the transition phase towards a funded regime.

1.2 Explicit debt versus implicit pension debt

The paper finds that rating agencies care more about explicit debt than IPD when assessing risk, which could be due to:

- myopia, with agencies focussing primarily on short term; and/or
- explicit debt being qualitatively different to implicit pension debt, reflecting hierarchy of spending commitments.

At the top of the hierarchy of spending commitments is non-discretionary spending (legal obligations) such as debt interest payments, which a government will have to honour. Breaking these commitments would generally come with an extreme loss in reputation (e.g., debt defaults).

Second are the social/moral obligations such as state pensions, which can and are being renegotiated unilaterally by government. Renegotiating these social obligations might be unpopular with the electorate – and hence might be difficult to do in practice – but unlike with non-discretionary spending, the government is at least not legally bound. Third is discretionary spending, which governments frequently alter as policy objectives and priorities change, or which are made possible by generous tax revenues (or conversely impossible by weak tax revenues).

1.3 Short-term versus long-term considerations

Rating agencies are not alone facing the challenge of translating long-term trends into an assessment of the public finances. Following the reforms of the Stability and Growth Pact, the European Commission for example has put greater emphasis on long-term budgetary developments in its assessment of EU public finances. One innovation over recent years has been to incorporate implicit pension liabilities into medium-term public finance objectives for the member states. To derive its assessment, it uses quantitative and qualitative indicators, e.g. to weigh up potential long-term benefits of reforms against potential short-term fiscal costs. Admittedly, many countries have not been very successful themselves deriving clear policy objectives from the analysis of long-term trends.

2 Comments on "Pension Funds and Financial Markets: Evidence from the New EU Member States" by Nadine Leiner-Killinger, Christiane Nickel and Michal Slavík

1.1 Brief summary and motivation

The paper studies the role of funded private pensions in pension provision in new EU member states (NMS). It finds that all NMS have funded private pension schemes and minimum pension/social assistance but only a few have occupational pensions. It shows that investment strategies vary across NMS, e.g. in Hungary private schemes have been obliged to invest in government bonds and bills. The paper seems motivated by the authors' concerns about credibility of multi-pillar pension.

1.2 Private pensions in NMS

Funded private pensions in NMS are exposed to inflation and investment risk, which:

- existed before current crisis but which latter has crystallised; and
- raises question regarding feasibility & credibility of pension strategy and regarding efficiency, fairness and sustainability of the structures created in the NMS (longevity risk important too).

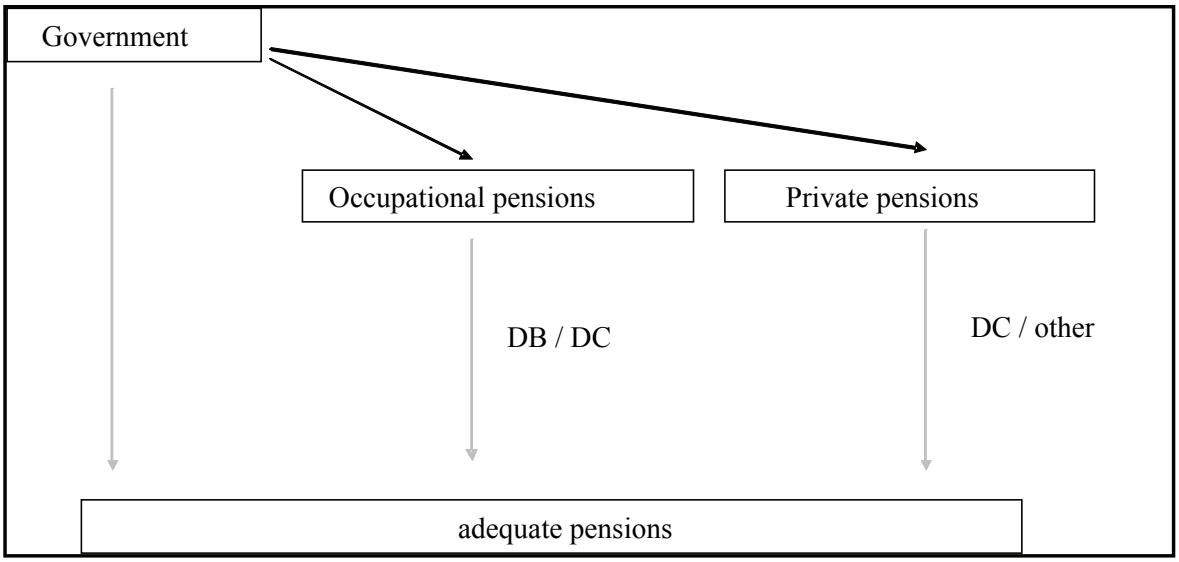
The paper concludes that shifting the burden to the private sector has not been without its problems and that an assessment of fiscal sustainability needs to take account of private sector arrangements. This is because the role of government in providing pensions in the future will to a large degree depend on the future role of occupational and private pensions. All these points seem valid for other countries too.

1.3 Some reflections on moving to three pillar pension provision…

Over the last decade governments have tried to reduce future exposure to pension spending by making state pensions less generous, for example by raising retirement age, encouraging more

Figure 3

Providing for Adequate Pensions: The Three-pillar Approach



generous occupational pensions and incentivising individuals to save more themselves for their retirement.

International organisations such as the OECD supported (or even encouraged) the move to three pillar pension provision and have assessed fiscal sustainability based on this formal allocation of responsibilities. Figure 3 shows the three-pillar approach to pension provision.

1.4 ...but who really owns the future liabilities/how credible is the arrangement?

Is it realistic though for a government to disown itself from future pension spending? It might seem fine *ex ante* on paper but will the outcome look similar? This will to a large extent depend on the performance of occupational and private pensions over the coming decades.

The current economic crisis shows that occupational pensions – whether defined benefit or contributions – are under immense pressure and private pensions have also done badly in most countries. The crisis has also demonstrated the usefulness of a strong mixed system, with unfunded social security pensions complementing funded occupational or private pensions. With pensioners representing an ever larger share of the electorate (and the baby boom cohorts considered to be particularly demanding), can a government realistically assume that future pensioners would accept disappointing pension incomes if and when occupational and private pensions fail to perform as expected/hoped for? Would the electoral process not put pressure on the political system to make up for potentially disappointing pension incomes? Indeed, how efficient, fair and sustainable are these arrangements? Starting today, as a minimum it appears that governments ought to be determined to ensure that occupational and private pensions can be long-term successful.