

POLICY RESEARCH WORKING PAPER

4720

General Trends in Competition Policy and Investment Regulation in Mandatory Defined Contribution Markets in Latin America

Mariam Dayoub
Esperanza Lasagabaster

The World Bank
Latin America and Caribbean Region
Finance and Private Sector Development Unit
September 2008



Abstract

Following Chile's pension reform in 1981, a wave of multi-pillar pension reforms took place in Latin America (LAC). Their implementation has revealed new policy challenges. To shed light on these issues, this paper reviews the structure and performance of mandatory DC pillars in LAC. The review highlights three important points. First, it suggests overall positive outcomes from reforms in the LAC countries that implemented multi-pillar pension systems. There is, however, scope for increasing efficiency. Second, management fees have declined but remain relatively high whereas decreases in operational costs have only been partially passed through to consumers reflecting inadequate competition. Limits on transfers and related measures have been ineffective in curtailing management fees but created new barriers to entry. In recent years, a few countries in LAC introduced or are in the process of introducing a combination of new

measures that focus more directly on the two root causes of inadequate competition—the inelasticity of demand to fees and selective elimination of barriers to entry by facilitating unbundling of services. These new measures show some promise. Third, the paper's review indicates that a greater diversification of pension fund portfolios in LAC appears to be necessary. Portfolio concentration owes to the adoption of strict quantitative investment regulations, underdeveloped capital markets and volatile macroeconomic environments. A gradual relaxation of these restrictions is now in progress in several countries. Regulators have become more conscious of the costs imposed by such regulations and macroeconomic conditions have improved. Greater overseas diversification seems inevitable given the development stage of local capital markets.

This paper—a product of the Finance and Private Sector Development Unit, Latin America and Caribbean Region—is part of a larger effort in the department to analyze competition policy of multi-pillar pension systems. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at elasgabaster@worldbank.org and mariam.dayoub@arsenalinv.com.br.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

General Trends in Competition Policy and Investment Regulation in Mandatory Defined Contribution Markets in Latin America

Mariam Dayoub
The World Bank

Esperanza Lasagabaster
The World Bank

The views expressed here are those of the authors and do not represent the opinions of the World Bank or of its Executive Directors or of the countries that they represent.

Corresponding Author

Esperanza Lasagabaster, The World Bank, 1818 H Street, NW, Washington DC 20433 USA
Email: elasagabaster@worldbank.org

We are grateful to Gregorio Impavido for his comments and guidance in the elaboration of this piece. We appreciate the insightful comments from Lily Chu, Augusto de la Torre, Paloma Anos Casero, Rossana Polastri, Roberto Rocha, David Rosenblatt, Heinz Rudolph, and Carlos Silva-Jauregui. We thank Aquiles Almansi, Montserrat Pallares-Miralles and Emily Sinnot for their help with the data on return on equity, coverage and fiscal indicators, respectively, as well as Pablo Castañeda, Richard Hinz, Ed Palmer, and Roberto Rocha.

I. Introduction

Twenty-six years ago, Chile embarked on a radical pension reform. Its mandatory pay-as-you-go (PAYG) system was replaced with a fully-funded defined contribution (DC) scheme – a paradigm shift that became highly influential in other emerging countries. Since the early 1990s, nine countries in Latin America (LAC) and eleven countries in Eastern Europe introduced mandatory DC schemes as part of broader multi-pillar pension systems.¹ The details of the DC pillars and their role within the larger multi-pillar pension system vary across countries. All these reforms, however, aimed at increasing the level of funding through a mandatory individual savings pillar and changing the approach toward intergenerational risk sharing. In addition, high-income OECD countries are actively promoting the expansion of voluntary pillars through occupational or retail plans and, in a number of these countries, such as Australia, Sweden, and the UK, funded schemes are increasingly important components of the mandatory pension system.^{2, 3}

In most reformed countries in LAC and Eastern Europe, the paradigm shift was initially motivated by the need to reduce the fiscal pressure created by generous mandatory defined benefit (DB) plans. In addition, such costly systems were frequently characterized by low coverage.⁴ In LAC, such moves coincided with increased macroeconomic stability and the pursuit of greater fiscal prudence after having experienced highly unstable times, often coupled with a decline in real GDP per capita in the 1980s. Countries of Eastern Europe witnessed not only a fundamental transformation of their societies and economies in the 1990s, but also of their retirement schemes (Fultz and Ruck 2000, and Müller 2002a) and many of them, including Hungary and Poland, decided to improve the financial health of their public pension insurance with a series of parametric reforms or a switch to a Notional Defined Contribution (NDC) PAYG system, while complementing it with a mandatory private tier.^{5, 6} The paradigm shift, thus, has reduced fiscal imbalances created by generous DB plans, facilitated portability, and, in

¹The effective years of implementation of initial reform are: (a) LAC: Peru (1992), Argentina and Colombia (1994), Uruguay (1996), Bolivia and Mexico (1997), El Salvador (1998), Costa Rica (2001), and the Dominican Republic (2003); and (b) Eastern Europe: Hungary and Kazakhstan, (1998), Poland (1999), Latvia and Macedonia (2001), Bulgaria, Croatia, Estonia, Kosovo and Lithuania (voluntary also for new entrants) (2002), and Slovakia (2005).

² Australia's mandatory system relies solely on funded schemes, occupational or personal plans.

³ The coverage of occupational schemes in countries such as Denmark and the Netherlands is large enough to consider them quasi-mandatory schemes.

⁴ See, for example, Aiyer (1997), Holzmann (1998) and Gill et al. (2005).

⁵ With few exceptions (e.g., the Czech Republic), the transition period in Eastern Europe caused a sharp decline in the public revenue base due to increased informality and unemployment (World Bank 2002). At the same time, expenditures soared as many workers benefited from early retirement provisions and, in some cases, used disability insurance as a means to avoid unemployment, especially in Poland. The combination of these two factors resulted in high and unsustainable fiscal deficits.

⁶ Bulgaria, Croatia, Estonia, Latvia, Lithuania and Macedonia also decided to implement a multi-pillar pension scheme with a mandatory funded tier, while Kosovo shifted to a large mandatory funded pillar. The Czech Republic and Slovenia are a few of the Eastern European countries that did not pursue a mandatory second tier.

some cases, increased domestic savings depending on how the transition to the new system was financed.

Experience has also revealed many policy challenges. Coverage ratios have generally either stagnated or declined, which has raised public concerns about the DC system. Other factors, however, could have a greater bearing on participation, such as development in the formal labor market and GDP per capita.⁷ Another important challenge is improving the system's efficiency in terms of administration costs and fees, and investment performance. In most LAC countries, management fees remain relatively high and declines in operational costs have not been fully passed through to consumers, pointing out market deficiencies. In addition, a common problem is that pension fund administrators (PFAs) have been unable to adequately diversify their portfolios. The policy debate on the performance of DC plans is intensifying and policymakers are exploring how to address these challenges as replacement rates could otherwise prove to be low or a significant share of the population could remain uncovered by the pension system. For example, 27 years since inception, the Chilean Congress approved in January 2008 a reform of the country's pension system that seeks to expand coverage and the investment choices made by PFAs on behalf of contributors as well as to promote greater competition.

To shed more light on these issues and contribute to the ongoing policy debate, this paper reviews the structure and performance of mandatory DC schemes in LAC and, whenever relevant, offers comparisons with other key DC reforms undertaken in emerging economies and in OECD countries, in particular Sweden. The review highlights important points. First, broadly speaking, it suggests that there has been overall positive progress in pension systems in countries that implemented a shift to a multi-pillar system where the mandatory DC component has an important role. There is, thus, scope for increasing efficiency, which should have a positive impact on future replacement rates and reduce unnecessary welfare losses. Second, management fees have been declining but remain relatively high, and the cross-country data gathered indicate that decreases in operational costs have only been partially passed through to consumers. Third, initially, regulators in LAC focused on limiting transfers (to discourage marketing and sales agents' costs) and imposed other legal requirements, but these measures did not prove to be very effective. Unintentionally, they have created new barriers to entry.

In recent years, Mexico and Chile have introduced or are in the process of introducing a set of measures that focus more directly on the two root causes of inadequate competition – reducing market barriers to new entrants and the inelasticity of demand to fees. The latter is proving to be particularly challenging, and while increasing financing literacy and education is a necessary condition, it does not seem to be sufficient. Although the details of the approach implemented in Mexico since the early 2000s and the new one approved in Chile vary, the two rely on the automatic assignation of an important share of the market (new affiliates in Chile and unallocated affiliates in Mexico) to the PFA(s) with the lowest fee to compensate for the high inelasticity of demand. (The paper presents the details regarding the two approaches.) In Mexico, the

⁷ See Rofman (forthcoming).

authorities also relaxed restrictions on transfers. The combination of these measures accelerated the reduction in the average fee of pension funds and the profits of PFAs. The automatic assignment of a fraction of participants (especially those more likely to be inertial participants) along with measures to reduce barriers to entry could be of interest to other emerging countries that have implemented similar multi-pillar reforms and are seeking to encourage healthy competition and to overcome the problem of demand inelasticity. It is important that the same investment regime applies to the PFAs receiving the automatically assigned affiliates and other pension fund administrators in the market in order to have a basis of comparison and generate the incentives for the former to maintain good investment management.

During the second half of 2007, the Law was amended in Mexico to change *inter alia* the rule for assigning unallocated affiliates from the lowest fee to the highest net rate of return. The new measures came into effect in March 2008. It is too premature to assess its impacts, but it could pose new challenges since past rates of return do not seem to be good predictors of future performance.

The paper's review indicates that greater diversification of pension fund portfolios in LAC appears to be necessary, but the pace of change should depend on country-specific characteristics. To a large degree, portfolio concentration owes to the adoption of strict quantitative investment regulations (as opposed to a "prudent person rule" regulation) by the supervisors, in view of the high exposure of affiliates to volatile domestic capital markets and the lack of experienced fund managers. Over time, regulators have become more conscious of the costs of these restrictions on portfolio performance. Hence, a gradual relaxation of restrictions is in progress in many countries and, most significantly, in Chile. While this relaxation of quantitative restrictions needs to continue, the scope and pace of reforms has to be a function of the capacity of the pension fund managers and pension fund supervisors across countries. A relaxation of quantitative restrictions needs to be accompanied by a move towards a risk-based supervisory framework to deter principal-agent problems. Chile and Mexico are already piloting elements of a risk-based supervisory method and are encountering challenges that highlight the need to enhance the capacity of both supervisors and supervisees and implement such systems only when countries present the adequate conditions to do so effectively.

In the remainder of this paper, Section II provides a description of these DC schemes and their present situation in terms of coverage. Section III reviews the system's performance in terms of market structure, costs, and fees, followed by an assessment of asset allocation, portfolio diversification, and capital market development in Section IV. In Section V, the supervision framework and initial efforts to move toward a risk-based approach is reviewed. Section VI concludes and identifies areas for further research.

II. Overview of Mandatory DC Schemes in LAC

Mandatory pension schemes have had a long tradition in LAC. Chile and Uruguay led the way with the establishment of such systems in the early 1920s. Over the following half century, all other LAC countries set up mandatory schemes of their own. Mandated coverage varied across countries and often a multitude of separate schemes were created for public sector workers (e.g., Argentina, Colombia, Guatemala, and Mexico). Over the years, these schemes largely evolved into DB programs operating on a PAYG basis, although younger programs are still managing a modest amount of assets.

In this section, the focus is on the basic features of pension funds in LAC and in other emerging economies, whenever relevant. It discusses some history behind the reform processes in LAC, presents the basic features of the structural pension reforms implemented in 10 LAC countries, examines the fiscal impacts of the pension reforms focusing on the implicit and explicit public pension debts and studies coverage using cross-country data. This last subsection finds a positive relationship between GDP per capita and pension coverage and, using data compiled by Rofman and Lucchetti (2006), it shows that, in general, coverage has either stagnated or declined in reformed LAC countries when data for the 2000s are compared with those for the 1990s due to economic shocks and other labor market developments.

II.1. Basic Features of Mandatory Funded Pillars

A radical transformation of pension systems in LAC countries started in 1981 when Chile moved from a PAYG to a funded scheme of mandatory individual retirement accounts. A decade later, the region experienced a wave of pension reforms mainly spurred by the need to both enhance the long-term financial sustainability of these schemes and improve intergenerational fairness. Other objectives were also weighed in, such as reducing inequities within cohorts, expanding coverage, and promoting the development of the domestic capital market. From 1992 through 2001, eleven additional countries enacted legislation that involved a transformation of purely DB PAYG schemes into multi-pillar structures including a mandatory DC pillar, but only nine of them in fact implemented the reforms (Table 1).^{8,9} Although these reforms share the introduction of mandatory individual retirement accounts, there are also important differences regarding the size and the role afforded to the different pillars, the provision of life and disability insurance, affiliates' choices, the role of the state, and the institutional arrangements to manage the new pension schemes.

Four basic structures can be distinguished according to the level of choice among pillars and the degree of funding of mandatory retirement income (Figure 1). In Bolivia,

⁸ Nicaragua and Ecuador enacted pension reform legislations in 2000 and 2001, respectively, but have never implemented the new laws.

⁹ Panama is currently implementing the pension reform legislation enacted in 2006 to streamline its PAYG scheme and, in parallel, introduce a mandatory funded pillar to be publicly managed for high-income workers. Brazil has introduced changes to the PAYG schemes for public and private sector workers and implemented other initiatives to facilitate the growth of voluntary pension arrangements but has not introduced a mandatory DC pillar (World Bank forthcoming).

Chile, Dominican Republic, El Salvador, and Mexico, individual retirement accounts became the primary form of mandatory retirement income and the PAYG scheme was closed.^{10,11} On the other hand, in Colombia and Peru, new entrants can choose between participating in the reformed PAYG scheme or the DC scheme. In Colombia, workers can switch every three years between the PAYG and the DC scheme, a fact that creates several problems, such as uncertainty over the future liabilities of the PAYG scheme due to the open-ended option for switching across schemes as well as the creation of a moral hazard for participants in the DC pillar who may prefer to select riskier fund options knowing that they can always switch back to the PAYG scheme.

In Costa Rica and Uruguay, workers participate in a two-pillar system – a reformed PAYG scheme and a DC scheme.¹² In Argentina, all workers contribute to the PAYG scheme for a basic flat pension and, in addition, they can choose either a PAYG or a DC scheme for the complementary earnings-related component. Initially, the DC scheme was set as the default option for undecided workers, but following legal reforms in 2007, undecided workers will be automatically assigned to the public system. Moreover, once every five years, affiliates will be able to switch from one scheme to the other – the last time they can switch is prior to being 10 years apart from retirement (50 years-old for women and 55 years-old for men). In Argentina, Colombia, and Peru, the PAYG schemes were significantly downsized at the time of the reform, while they remain fairly generous in Costa Rica and Uruguay.

Financial markets and institutions administering long-term savings were largely undeveloped in most countries when the pension reforms were implemented. To control for possible risks related to the administration of mandatory workers' savings, reformed LAC countries established a highly restrictive regulatory framework that required the creation of a specialized industry of pension providers and imposed strict quantitative restrictions on the asset management of pension funds by private administrators in contrast with the practice in OECD countries (e.g., Australia, Sweden and the UK) with more developed markets. As sections III and IV of the paper will show, these tight restrictions have posed challenges to the efficient performance of the system.

The reformed systems in LAC also comprise voluntary components with similar design features to the mandatory component, but the former have barely taken off. In 2002, Chile eased restrictions by expanding the market for tax-preferred voluntary savings to banks, insurance companies, mutual funds, and housing funds (IMF and World Bank 2004). Chile and Mexico also eased withdrawal restrictions to encourage participation, and the more recent pension reform in Chile has authorized the development of collective schemes sponsored by employers but managed by authorized financial institutions and has instituted further fiscal incentives targeted at middle-income workers.

¹⁰ In Mexico, the PAYG scheme still works as insurance for disability as well as life and labor risks.

¹¹ In Bolivia, the government recently announced a new pension reform that could possibly replace the two private pension fund administrators with a public one and could include a partial reinstatement of the PAYG for low income workers. Discussions on the reforms are at a preliminary stage.

¹² In Uruguay, the participation of low- and middle-income workers in the two-pillar is optional.

Table 1: Main features of structural reforms to old-age, disability and death systems in reformed LAC countries

Feature	Chile	Peru	Colombia	Argentina	Uruguay	Mexico	Bolivia	El Salvador	Costa Rica	Dominican Republic
Year(s) of reform	1981	1992-1993	1994	1994	1996	1997	1997	1998	1995/2000 ^e	2001
Contribution-related PAYG system	Closed	Remains	Remains	Remains	Remains	Closed ^c	Closed	Closed	Remains	Closed
Total payroll tax rate, pre-reform (%)	33	18	17.8	42	40	20	19	11.8	22	9.25
Total payroll tax rate, post-reform (%)	20	20.5/22.0 ^a	33.8	46 ^f	40	26	24	13.5	26	20
IRA contribution (%)	10	8	10	7.72	12.27	12.07	10	10	4.25	10
Participation of new workers	Mandatory	Voluntary	Voluntary	Voluntary	Voluntary	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
Participation of self-employed workers	Mandatory	Voluntary	Voluntary	Mandatory	Mandatory	Voluntary	Voluntary	Voluntary	Voluntary	Mandatory
Separate system for civil servants	No	No	Yes	No	No	Yes	No	No	N/A	Yes
Payout options	Annuity or scheduled withdrawal	Annuity or scheduled withdrawal	Annuity or scheduled withdrawal	Annuity or scheduled withdrawal	Annuity only	Annuity or scheduled withdrawal	Annuity and scheduled withdrawal	Annuity or scheduled withdrawal	Annuity or scheduled withdrawal	Annuity or scheduled withdrawal
Minimum return on investments	Relative to average	Relative to average	Relative to average	Relative to average	Relative to average	Unregulated	Unregulated	Relative to average	Unregulated	Relative to average
Minimum contributory pension	Yes	Yes ^b	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Social assistance pension	Yes	No	No	Yes	Yes	No	Yes ^d	No ^g	Yes	Yes

Notes: ^a20.5 percent for private pension system, 22.0 percent for national system. ^bOnly for affiliates born before 1945. ^cIn Mexico, the PAYG scheme still works as insurance for disability as well as life and labor risks. ^dOnly affiliates born before 1974. ^eCosta Rica introduced voluntary retirement accounts in 1996 but made private individual retirement saving mandatory as a complement to the DB system in 2000. ^fThe payroll tax rate was subsequently reduced during the crisis of the late 1990s and early 2000s. ^gMexico has offers some non-contributory schemes at the subnational level. N/A means not available.

Source: Adapted from Gill et al. (2005) and updated by the authors.

Figure 1: Mandatory pension systems for reformed LAC countries, by type

No Choice	Choice
<p>FF System</p> <ul style="list-style-type: none"> • Bolivia • Chile • Dominican Republic • El Salvador • Mexico 	<p>PAYG or FF system</p> <ul style="list-style-type: none"> • Colombia • Peru
<p>PAYG and FF System</p> <ul style="list-style-type: none"> • Costa Rica • Panama • Uruguay 	<p>PAYG or PAYG and FF System</p> <ul style="list-style-type: none"> • Argentina

Note: FF means fully funded. In Uruguay and Panama, the funded pillar is mandatory for high-income workers.

Source: Adapted from Gill et al. (2005) and updated by the authors.

As a safety net, all reformed LAC countries except Peru provide a minimum pension guarantee on the contributory pillars for low-income workers and workers whose retirement benefits turn out to be low due to poor investment returns.¹³ A minimum contributory period, usually around 20 to 25 years but as high as 35 years (in Uruguay), is necessary to be eligible for this guarantee. These provisions are inadequate for many workers given the low coverage rates as discussed below, and many countries extend social assistance programs to the elderly poor (Table 1).¹⁴

II.2. Fiscal Impacts

Overall, the long-run fiscal sustainability of pension systems has significantly increased as a result of structural reforms. According to Zvinieni and Packard (2002), Bolivia, Chile, El Salvador, and Mexico showed the largest falls in the implicit pension debt since the reforms closed the PAYG pillar, but the implicit pension debt also declined in countries where a PAYG pillar was retained with the rationalization of the public pillar. More importantly, simulations for the total pension (explicit) debt point out to marked savings after the reforms, most notably in Bolivia, Chile, El Salvador, and Uruguay. For Argentina, such simulations showed a slight increase in the public pension debt as a share of GDP after the reform due to the decline in employer contributions and the public policy of assuming pension liabilities related to provincial civil servants.¹⁵

¹³ In Peru, it only applies to workers who were born before 1945.

¹⁴ In Bolivia, all citizens who were 21 or older at the end of 1995 have the right to receive a basic pension when reaching 65 years-old.

¹⁵ Simulations do not take into account the Peso devaluation of 2001-2002. See Table A1 in Appendix 1.

While the trends point to a reduced cumulative pension debt over the long run, governments have had to deal with higher pension deficits in the short run since shifting from a PAYG to a funded scheme requires the repayment of implicit pension debts. Most countries in the LAC region have resorted to borrowing and, in some cases, to the privatization of revenues in order to manage the transition cost (e.g., Argentina, Bolivia, and Mexico). The bulk of the new explicit debt has been acquired by pension funds. Chile has been an exception having prepared well for the 1981 pension reform by tightening its fiscal policies prior to the reform to make room for its envisaged fiscal requirements.¹⁶ Authors such as Holzmann (1998) make the case for a mix of budgetary and debt financing with the split determined by the country's circumstances to prevent a double burden on the transition generation. Therefore, debt financing needs to be used with caution to avoid a "privatization of the PAYG scheme." Relying on debt financing can aggravate the domestic macroeconomic vulnerabilities as in the cases of Argentina and Bolivia.¹⁷

II.3. Coverage

Expanding coverage has often been regarded as one important reason for shifting from the PAYG to the funded DC system. By establishing closer links between contributions and benefits as well as stronger property rights over future benefits through individual accounts, it was expected that participation in the pension system would expand. Increases in coverage rates, however, have remained elusive in most countries that implemented such structural reforms.

A positive relationship between GDP per capita and pension coverage is observed, which holds true globally and for other LAC countries that did not undertake structural pension reforms (Figure 2). When the evolution of pension coverage from the mid-1990s (around the time that many of these reforms were undertaken in LAC) to the early 2000s is considered, coverage rates increased in El Salvador and Peru, but stagnated or declined in the other reformed LAC countries (Figure 3). Besides the design of the pension system, other factors played a critical role in determining participation in the system.

Much of the literature argues that industry, the degree of unionization, and firm size are important determinants of the access of workers to pensions and the social security (Marquez and Pages 1998 and Mesa-Lago 2000). These factors can more than offset other positive effects resulting from changes in the pension design. Thus, the growing participation in the economy of self-employment, micro and small enterprises, and informality in most of these countries over the past decade have not favored coverage expansion (World Bank 2007).¹⁸ Rofman and Luccetti (2006), who conducted a review of social security coverage in 15 LAC countries based on household surveys, confirm that there is a positive relationship between the coverage of wage earners and firm size – a

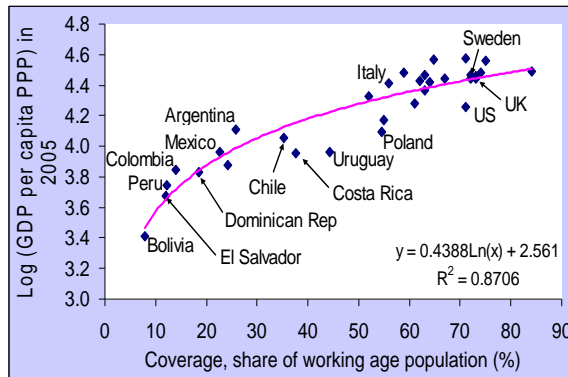
¹⁶ Debt financing in the peak years was less than 2 percent of GDP compared to a deficit of close to 5 percent of GDP (Holzmann 1998).

¹⁷ See Perry and Servén (2003) for details.

¹⁸ See World Bank (2007) for an analysis of rising informality trends in the LAC region, its plausible causes, and recommendations to address it.

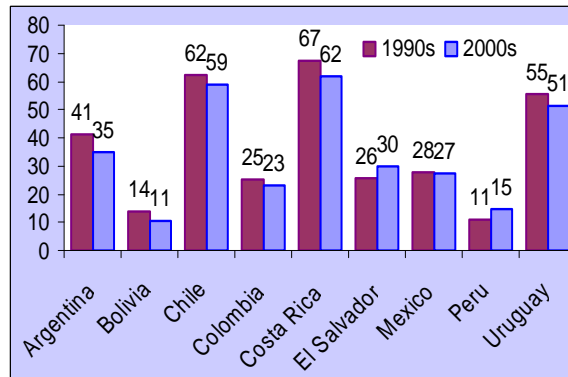
relationship that applies both to countries that underwent structural reforms and those that did not, such as Brazil.

Figure 2: Coverage of pensions as shares of the working age population vs. GDP per capita for selected countries



Note: The year for coverage data varies between 2000 and 2005.
Sources: World Bank (forthcoming) and WDI.

Figure 3: Coverage rates: contributors as shares of economically active populations for selected LAC countries, 1990s and 2000s (percent)



Note: Data available are not identical across countries, representing the closest years to 1995 and 2004: Argentina (1995, 2004), Bolivia (1999, 2002), Chile (1996, 2003), Colombia (1996, 1999), Costa Rica (1995, 2004), El Salvador (1995, 2003), Mexico (1998, 2002), Peru (1999, 2003), and Uruguay (1995, 2004).
Source: Rofman and Lucchetti (2006)

Socio-demographic characteristics are also determinants of contribution patterns. Rofman and Lucchetti (2006) confirm that there is significantly lower participation among younger, female and low-income workers, with the poorest quintile being practically excluded from the social security system in most countries. In some countries, there was an observed drop in the coverage of the lowest income quintile (e.g., Chile, Costa Rica, Uruguay, and Argentina).

Several studies suggest that there is a substantial movement of individual workers in and out of the formal and informal sectors, rather than a pure dichotomy. This flow between formality and informality ultimately results in a low density of contribution histories for many workers (World Bank 2007). Based on data from the Mexican Social Security Institute (*Instituto Mexicano de Seguridad Social, IMSS*), Levy (2006) notes that only 11.6 percent of low-wage workers affiliated to the IMSS spent the entire previous nine-year period in the IMSS system. Data from the Social Security Bank (*Banco de Previsión Social, BPS*) in Uruguay confirms that there is considerable labor movement in and out of the formal sector (Bucheli et al. 2006). The gaps in contribution histories, even among some of the countries with the highest pension coverage, such as Argentina, Chile, and Uruguay, raised concerns that membership density may not be sufficient to provide significant replacement rates for the covered population. The 2008 reform to the Chilean pension system places great emphasis on expanding coverage.¹⁹

¹⁹ See Appendix 2.

III. Highly Concentrated and Costly Markets

The long-term success of the reforms to a DC system will not only be measured in terms of sustainability and coverage but also on the replacement rate that they will afford participants. For a given contribution rate, asset management performance and fees charged to affiliates will be key determinants of the balances accumulated during their active years and the future replacement rate.²⁰ Despite a declining trend, fees of PFAs remain relatively high in most reformed countries. The industry is highly concentrated and appears to show less than adequate competition. The ensuing welfare losses have attracted the attention of the public, and policy-makers in a few of the reformed countries are exploring new ways to foster healthier competition. At the same time, asset portfolios tend to be highly concentrated, partly due to strict quantitative restrictions, and policy-makers in some of the reformed countries are also revaluing their investment regulations.

The remainder of this section analyzes the market structure of DC systems in LAC and the factors affecting competition, whereas the next section analyzes portfolio performance. It discusses the market structure around which funded pension systems are organized and the factors behind the high industry concentration in LAC markets. It also discusses the cross-country dispersion in management fees and examines the cost and profitability of the pension fund industry in LAC countries, finding that its operational costs have significantly declined during the 2000s, but affiliates have only partially benefited from the decline in operational costs. Finally, it analyzes the two main factors explored in the literature that prevent the development of more competitive markets in pension fund management in LAC countries: barriers to entry and the low demand elasticity of affiliates.

III.1. Market Structure

The introduction of mandatory privately managed individual accounts created the need for a new legal and regulatory framework as well as for the definition of entities that could manage pension funds. In view of the limited experience with pension fund management at the time of the reform and concerns about principal-agent problems, the Chilean pension law (1980) determined the creation of new financial entities with the exclusive purpose of managing pension funds – the PFAs. It was considered that the “sole purpose” pension fund manager would be easier to supervise, but the licensing and the requirement of PFAs to be specialized financial entities imposed entry barriers in the pension fund industry, which contributed to high industry concentration.

Similar models that require administrators with the exclusive purpose of managing pension funds have been adopted in other countries in the LAC region and Eastern Europe, such as Hungary and Poland. This model differs from the practice of other jurisdictions with mandatory DC plans and more mature financial markets, such as Australia, Sweden, and the UK, which have permitted a wider range of financial institutions to manage DC plans (Bateman 2000, and Palmer 2004).

²⁰Life expectancy and other factors will also affect the purchase value of an annuity at retirement. While these issues are also important, this paper focuses on the accumulation phase.

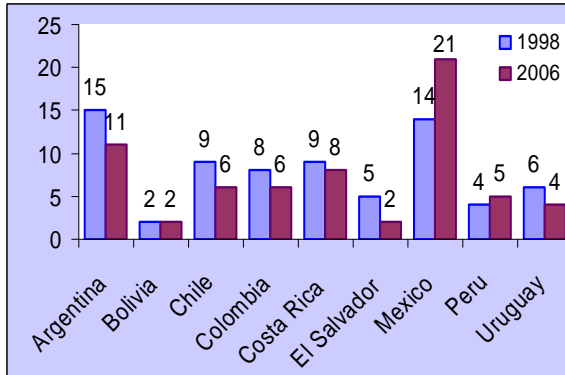
The market for mandatory pension fund administration is fairly concentrated in LAC, and, for the most part, concentration has increased over time through mergers and acquisitions. Industry concentration is particularly high in small countries, such as Bolivia and El Salvador, where two PFAs cover the entire market. In Bolivia, the government initially granted operating licenses for two PFAs, with an exclusivity period of five years, through an international bidding process. A new bidding process was launched at the end of the exclusivity period in 2002, but the process was declared barren since there were no interested parties. Political uncertainties, a small market, and minimal competition between the two operators explain the lack of interest by third parties. In El Salvador, five pension fund managers were initially set up in 1998. Two years later, three of these merged and the license of a fourth one was revoked for operating without sufficient capital.

Even in larger and more mature markets, such as Chile, there is a relatively high level of concentration (Figure 4 and Figure 5). In 2006, the three largest Chilean PFAs managed about 73 percent of pension funds assets, equivalent to about 40 percent of GDP. This high concentration can be related to an intensive industry consolidation in the late-1990s.²¹ Argentina and Mexico show a more diversified market, while concentration in the latter country as well as in Peru declined due to regulatory changes implemented in recent years that eased the entry of new comers. However, following the approval of the 2007 amendment to the pension law in Mexico, the trend has been reversed and the number of PFAs has declined to 18. High concentration is also found in jurisdictions outside the LAC region with specialized pension fund administrators. In 2004, there were 75 voluntary pension funds in operation in Hungary from the 315 in 1998 and the six largest administrators accounted for 83 percent of the total assets under management (IMF and World Bank 2005a). In Poland, the three largest pension fund administrators accounted for about 64 percent of the assets under management in the system in 2005, while this share was about 76 percent for Slovakia in 2006 (IMF and World Bank 2007). By contrast, Australia, the UK, and Sweden present a far more diversified industry. That said, the concentration of assets under management of the world's largest 500 fund managers has increased in recent years and the top 20 fund managers' share rose from 29 percent in 1996 to 36 percent in 2004 (International Financial Services London, 2006).

Reformed LAC countries charge different administrative fees, which makes international comparisons among managers particularly difficult (Table 2). Corvera et al. (2006) analyzed comparable indicators for 67 PFAs in LAC, finding that dispersion for pension management charges is large, both across and within countries (Table 3 and Table 4). Cross-country dispersion in fees can be partially explained by differences in the services that the pension managers are forced to provide as well as to the degree to which the pension system's architecture in each country takes advantage of economies of scale. However, they found that intra-country fee dispersion seems to be related to lack of competition and the presence of state-owned managers, which tend to charge lower fees.

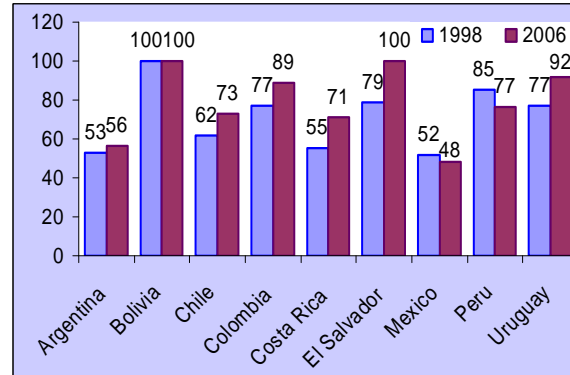
²¹ In the early 1990s, a large number of small and most inefficient operators entered the market which unleash an aggressive competition war and resulted in higher costs and inefficiencies. At the peak point in 1995, there were as many as 21 operators. The lack of viability of the small operators and changes in regulations led to a wave of mergers and acquisitions and, as of July 2007, six PFAs operate in Chile.

Figure 4: Number of PFAs in reformed LAC countries, 1998 and 2006



Sources: SAFJP, SPVS, SAFF, *Superintendencia Financiera de Colombia*, SUPEN, *Superintendencia de Pensiones*, Consar, SBS, and *Banco Central de Uruguay*.

Figure 5: Assets managed by the three largest PFAs as shares of total assets in reformed LAC countries, 1998 and 2006



Sources: SAFJP, SPVS, SAFF, *Superintendencia Financiera de Colombia*, SUPEN, *Superintendencia de Pensiones*, Consar, SBS, and *Banco Central de Uruguay*.

Table 2: Average administrative fees charged in LAC countries in early 2006

Country	Proportional charge on flows (% salary)	Fixed charge on flows (US\$)	Charge on assets under management	Charge on nominal returns	Charge on excess returns
Argentina	1.27% ^a	--	--	--	--
Bolivia	0.50%	--	0.2285% ^b	--	--
Chile	1.60%	\$0.90	--	--	--
Colombia	1.57%	--	--	--	--
Costa Rica	0.14%	--	--	7.50%	--
El Salvador	1.40%	--	--	--	--
Mexico	1.20% ^b	--	0.34%	--	--
Peru	1.99%	--	--	--	--
Dominican Republic	0.50%	--	--	--	28.57% ^c
Uruguay	2.07%	\$0.26	--	--	--

Notes: ^aThe 2007 legal reform sets a charge ceiling of 1 percent. ^bDifferent charges apply depending on the fund size. ^cThe fee applies to the excess return paid over the interest rate of commercial banking cash deposits.

Source: Corvera et al. (2006).

Table 3: Reformed LAC countries: 25-year equivalent fee as a share of assets under management (percent)

Country	Min	Max	Range	Weighted average	Standard deviation	Coefficient of variation
Argentina	1.18	2.54	1.36	1.62	0.38	23.40
Bolivia	0.56	0.56	0.00	0.56	0.00	0.00
Chile	0.97	1.30	0.32	1.08	0.12	11.16
Colombia	0.81	1.01	0.21	0.91	0.09	9.86
Costa Rica	0.59	1.06	0.47	0.99	0.17	16.81
Dominican Republic	0.94	1.15	0.20	1.14	0.08	6.71
El Salvador	0.86	0.86	0.00	0.86	0.00	0.00
Mexico	0.71	1.64	0.93	1.19	0.26	22.07
Peru	1.16	1.82	0.66	1.54	0.26	16.95
Uruguay	0.80	1.31	0.51	1.00	0.23	23.10

Source: Corvera et al. (2006).

Table 4: Reformed LAC countries: 40-year equivalent fee as a share of assets under management (percent)

Country	Min	Max	Range	Weighted average	Standard deviation	Coefficient of variation
Argentina	0.68	1.45	0.77	0.92	0.22	23.30
Bolivia	0.42	0.42	0.00	0.42	0.00	0.00
Chile	0.56	0.74	0.18	0.62	0.07	11.13
Colombia	0.46	0.58	0.12	0.52	0.05	9.84
Costa Rica	0.59	0.94	0.36	0.89	0.13	14.69
Dominican Republic	0.49	0.49	0.00	0.49	0.00	0.00
El Salvador	0.71	0.91	0.20	0.91	0.08	8.39
Mexico	0.48	1.08	0.60	0.78	0.16	20.36
Peru	0.67	1.04	0.38	0.88	0.15	16.90
Uruguay	0.46	0.75	0.29	0.57	0.13	23.04

Source: Corvera et al. (2006).

The pension management charges of the most expensive plans are about two to three times higher than the least expensive one. Corvera et al. (2006) found that Argentina, Mexico, and Peru offered the most expensive plans in a 25-year horizon, and Argentina, the Dominican Republic, and the Costa Rica offered the most expensive plans in 40-year horizon. Bolivia, Colombia, and El Salvador, offered the least expensive plans and presented low price dispersion across administrators. In these three countries, either the regulator or the law stipulates price ceilings that have largely become price floors.²² Corvera et al. (2006) showed that fees have stagnated over the years and are unlikely to decline in the medium term due to insufficient competition, especially in El Salvador and Bolivia where there is a duopoly market structure.

Mandatory DC funds in other emerging countries that have structures similar to those of DC plans in the LAC region also face high fees; in contrast, OECD fees are usually lower. In Poland, total fees amount to 160 basis points of assets, an outcome largely due to a highly regulated fee structure, but are expected to decline to 50-60 basis points by 2020 due to the caps and asset growth (IMF and World Bank 2006). The total fees charged by Hungarian pension fund managers are around 190 basis points of assets but expected to decline to about 50 basis points by 2025 (Rocha and Hinz 2007). The Swedish pillar, in operation since 2000, charges fees of about 77 basis points and authorities expect these fees to decline to less than 30 basis points by 2025 (Rocha and Hinz 2007). These charges compare to 50 and 100 basis points for large US occupational funds and mutual funds, respectively. The average fee for stock funds, bond funds, and money market funds – more relevant comparators given the portfolio structure of pension funds in LAC – hover around 30-70 basis points (Table 5). The annual fees charged by the Thrift Savings Plan in the US are only between 3 and 7 basis points.

²² The 2007 legal reform in Argentina sets a charge ceiling of 1 percent on workers' salaries that has largely become a price floor.

Table 5: Total mutual fund fees and expenses in the US, 2000-2005 (basis points)

Fees and expenses	2000	2001	2002	2003	2004	2005
Stock Funds						
Load fees (annualized)	30	25	24	23	22	22
Expense ratio	98	99	100	99	95	91
Total fees and expenses	128	124	124	122	117	113
Bond Funds						
Load fees (annualized)	27	22	20	20	20	20
Expense ratio	76	74	73	74	72	70
Total fees and expenses	103	97	93	94	92	90
Money Market Funds						
Load fees (annualized)	n .a.	n.a.	n.a.	n.a.	n.a.	n.a.
Expense ratio	49	47	45	43	42	41
Total fees and expenses	49	47	45	43	42	41

Notes: Fees measured as asset weighted averages. The expense ratio is the amount of expenses that a fund charges its shareholders every year. n.a. means not available.

Source: Investment Company Institute (2006).

III.2. Expenses and Profits

Overall, there has been a dramatic decline in the operational costs of the pension fund industry (Table 6), accompanied by increasing returns on equity to fund managers but smaller changes in the fees charged to affiliates.²³ Operational expenses per contributor show even greater dispersion across countries than fees. In Argentina, they are about five times higher than in Bolivia. Expenditures were particularly high in the early years of the reform due to small asset and affiliate bases as well as important inception-related costs, such as marketing costs incurred by pension fund managers with the hiring of sales agents to attract affiliates, and restrictions imposed by regulators on transfers of affiliates across PFAs.²⁴ Marketing costs remain high in many countries and, in 2006, they accounted for about 26 and 11 of total operating expenses of pension fund managers in Mexico and Argentina, respectively, but have declined substantially in Chile to 4 percent (AIOS 2006). In contrast with most LAC systems, marketing costs as a share of total operating costs in Hungary have been small (about 2.1 percent of the total operating costs in 2004).²⁵

Table 6: Reformed LAC countries: Operational expenses of PFAs, 2000 and 2006

Country	Per member (US\$)		Over assets (%)	
	2000	2006	2000	2006
Argentina	75.80	26.95	3.12	1.04
Bolivia	18.16	5.48	1.37	0.24
Chile	34.52	38.37	0.60	0.33
Colombia	n.a.	39.56	n.a.	1.66
Costa Rica	n.a.	16.72	n.a.	2.53
El Salvador	76.43	17.34	13.44	0.74
Mexico	42.22	25.55	4.34	1.43
Peru	31.32	39.54	2.60	1.08
Dominican Rep.	n.a.	8.35	n.a.	1.88
Uruguay	53.14	20.69	3.79	0.58
Total	48.34	28.18	2.27	0.96
Mean	47.37	23.85	4.18	1.15
Std. deviation	22.32	12.46	4.29	0.73

Note: n.a. means not available.

Source: AIOS.

²³ Lasaga and Pollner (2003), for example, analyze the case of Peru.

²⁴ See Table A2 and Table A3 in Appendix 1.

²⁵ It is possible that some marketing activities are performed by other companies in the same financial group and the associated costs are hidden in the asset management fee (IMF and World Bank 2005a, page 16).

The pension industry has been enjoying exceptionally high rates of return on equity (ROE) in many reformed LAC countries (Table 7). This result is not surprising, as the pension fund industry is primarily an asset management business with relatively low capital requirements. Also, declines in operating expenses over time (particularly marketing costs) were only partially passed to members as lower fees. In Chile, for example, after 1997, operating costs significantly fell due to reduced expenditures in marketing services; the decrease in fees was substantially smaller leading to a remarkable increase in PFAs' ROEs, which reached 51 percent in 2000. ROEs started to fall thereafter partly to absorb an increase in insurance premiums. In El Salvador, a small country with a duopoly market, the ROE in 2005 was as high as 38.8 percent.

Table 7: Annual results of pension fund administrator in reformed LAC countries as shares of assets under management, 2000 and 2006 (basis points)

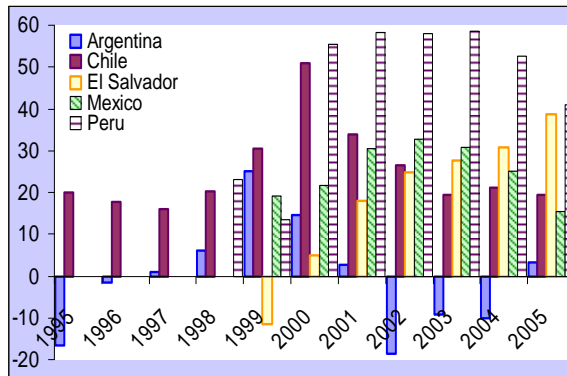
Country	Fees		Costs		Operating Profits	
	2000	2006	2000	2006	2000	2006
Argentina	428	121	312	104	120	17
Bolivia	121	55	137	24	23	58
Chile	89	69	60	33	29	36
Colombia	n.a.	149	n.a.	166	n.a.	89
Costa Rica	n.a.	283	n.a.	253	n.a.	33
El Salvador	2,058	141	1,344	74	33	66
Mexico	537	189	434	143	103	45
Peru	471	118	260	108	212	10
Dominican Republic	n.a.	301	n.a.	188	n.a.	114
Uruguay	346	94	379	58	-7	36

Note: n.a. means not available.

Source: AIOS (2006).

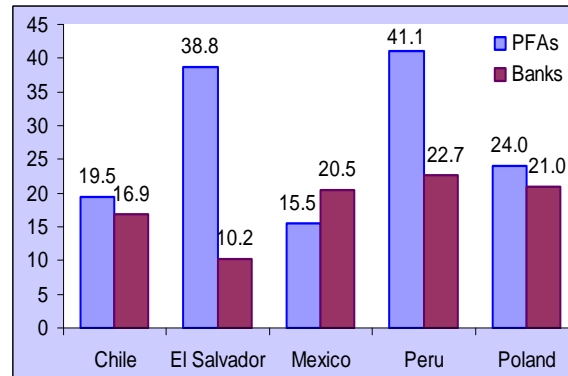
By contrast, ROEs have decreased in Mexico since 2002 when competition started to increase as a result of regulations based on low cost for automatically assigning workers who do not select a pension fund manager and reduced restrictions on transfers across PFAs. Similarly, the ROE has been declining in Peru since 2004 mostly due to regulatory changes that encouraged the entry of new operators (Figure 6). Hungarian and Polish PFAs have also been able to recover their start-up costs within relatively a few years and to generate high ROEs recently. For example, the ROE of Polish PFAs was 22 percent in 2004 and 24 percent in 2005 (Rudolph and Rocha 2007). Moreover, the average ROEs of pension fund administrators have been higher than the average ROE of banks (except for Mexico), which are subject to stricter capital requirements, manage a more complex business, and bear higher risks (Figure 7).

Figure 6: Selected LAC countries: Return on equity of PFAs, 1995-2005 (percent)



Source: AIOS.

Figure 7: Selected countries: Return on equity of PFAs and commercial banks, 2005 (percent)



Sources: AIOS, Bankscope, Fitch Ratings (2007), IMF and World Bank (2005a).

III.3. What Factors Explain the High Fee Structure of PFAs?

A body of literature has emerged trying to explain the factors that impede the development of more competitive markets in pension fund management in LAC countries. The two main factors explored in the literature are barriers to entry and the low demand elasticity of affiliates.²⁶

Barriers to Entry

Several factors have impaired the development of more competitive markets and the entry of new PFAs despite both the high yields on net worth in most LAC countries and operations that are less risky than those taken by other financial institutions. Restrictions on affiliates' transfers have created market barriers by making it more difficult for new entrants to capture a number of affiliates that is large enough so they can attain an optimal operating size. There are other legal barriers that require a minimum entry capital and, in several reformed LAC countries, a reserve fund to back up the minimum rates of return on investments of pension funds.^{27, 28, 29} In a few LAC countries, the law prohibits banks (e.g., Chile and El Salvador) and insurance companies (e.g., El Salvador) from managing pension funds. This prohibition was imposed because there were concerns about potential conflicts of interest, such as the cross-selling of products, and excessive concentration of assets in a few institutions. Nevertheless, it can leave potential new-comers with relevant experience in financial asset management outside the industry. In Mexico, the law stipulates that 51

²⁶ See, for example, Barrios and Bussofiene (2001), García and Rodríguez (2002), Apella and Maceira (2004), Marinovic and Valdés (2004), Melendez (2004), Berstein and Ruiz (2005), Valdés (2005), Aguilera et al. (2006), and Masías and Sanchez (2006).

²⁷ Minimum capital requirements vary across countries. In Mexico, the requirement is one of the highest in the region (US\$2.5 million). In Chile, it is much lower, about US\$130,000, increasing with the number of affiliates and subjected to a ceiling of US\$500,000 (World Bank 2006).

²⁸ In LAC, Argentina, Chile, Colombia, El Salvador, Peru, and Uruguay impose relative minimum rates of return on investments of pension funds.

²⁹ In Mexico, there is no minimum rate of return, but the law requires PFAs to keep a reserve of 0.8 percent of the assets under management for basic funds and one percent for voluntary and complementary contributions. Reserves would be used to compensate the fund in case there were losses related to regulatory violations.

percent of the capital of a pension fund manager has to be Mexican.³⁰ This limit is waived for financial institutions from countries with which Mexico has international agreements, and they can set up a pension fund manager as a subsidiary. Nonetheless, the literature points out to other sources of barriers to entry.

The institutional design of pension systems has not allowed the industry to benefit from economies of scale in the provision of certain services and has favored personal contact (sales agents) as the main distribution channel, which has resulted in competition via costly sales forces. A number of studies with varying methodologies have been undertaken to estimate the cost function of the pension fund industry. Barrieros and Bussofiane (2001) and Marinovic and Valdés (2004) for Chile, Apella and Maceira (2004) for Argentina, and Melendez (2004) for Mexico found that there are significant economies of scale in the industry. The estimates of Marinovic and Valdés (2004) also suggest that, without marketing costs, the minimal efficiency scale declines substantially from about one million contributors (or 2 million affiliates) to about 150,000 contributors (or 300,000 affiliates).³¹ Apella and Maceira (2004) found that economies of scale in the Argentinean pension industry declined after 1997 in response to a regulatory change regarding the transfers of affiliates across PFAs, but remain significant. For Mexico, Melendez (2004) found that the minimum efficiency scale is close to 1.15 (1.05) million affiliates for pension fund managers that do (not) belong to a financial conglomerate. Nevertheless, Aguilera et al. (2006) suggest that previous studies used mis-specified cost curves. Using a semi-parametric cost function, they found that economies of scale are low in Mexico (about 800,000 affiliates or 2 percent of the market share) and that the industry has dramatically reduced its costs since 2002 when a series of regulatory changes to promote competition in fees started to be implemented.³²

The unbundling of services would allow for a better use of economies of scale in basic administrative services, reduce barriers to entry for financial management, and boost competition. Several studies have argued for the unbundling of services, in particular separating financial management, which presents low economies of scale, from the collection, record-keeping, and provision of information to affiliates, which show high economies of scale. Valdés (2005) proposes a bidding process to select operators to provide basic administrative services under a 10-year concession contract with different regional coverage, which would allow for price comparability. But he discourages the establishment of a central operator by PFAs to prevent the creation of a cartel that could set/impose fees for its services substantially above its costs. In addition, the creation of new distribution channels could also assist workers in the search for pension fund managers through a bidding process. Valdés (2005) proposed that these distribution channels would reduce economies of scale associated with marketing costs and, in turn, decrease entry barriers in

³⁰ For example, the shareholders of the Mexican Afore *Bancomer* are: the Mexican financial institution *Bancomer* (51 percent), Aetna International (33 percent), the multinational financial services institution BBVA (11.2 percent), and the Chilean PFA *Provida* (4.8 percent).

³¹ Contributors refer to individuals who are registered and are paying into the fund; affiliates may be either unemployed or do not pay their contributions.

³² Aguilera et al. (2006) found that production costs fell by 30 percent between 1999-2001 and 2002-2004.

the industry. This research influenced the reform approved by the Chilean Congress in January 2008, which established a bidding mechanism for affiliates joining the system.

Is the Elasticity of Demand Low?

A well functioning market for retail DC plans requires informed consumers that react to relevant price parameters, such as administrative fees and real rates of return. These were the implicit assumptions when mandatory DC plans were implemented in emerging economies. Preliminary evidence, however, suggests inadequately informed affiliates and low elasticity of demand with respect to commissions. Twenty-five years after the reform, affiliates in Chile remain unapprised of critical factors in the system. Based on the 2004 the Social Protection Survey (*Encuesta de Previsión Social*, EPS), only 50 percent of respondents claimed to know their pension account balances and less than 2 percent knew about their PFA's fixed and/or variable commissions (Arenas de Mesa et al. 2006). Such comprehensive surveys are not yet available throughout LAC, but one can presume that other countries in region face similar challenges. Affiliates, especially new members to the system, also display a passive behavior. In Argentina, around 80 percent of new affiliates were assigned by the pension supervisory agency in 2006.³³ In Mexico, about 70 percent of new affiliates were automatically assigned to an *Afore* by Consar in 2006. Similarly, as of April 2007, around 70 percent of the Chilean system's 8.63 million affiliates had been automatically assigned by the regulator.

Although few studies on demand elasticity have been conducted, results generally point to low elasticity. Berstein and Ruiz (2005) estimated the demand elasticity in the Chilean pension system using two panels of data covering 1995-1997 and 1998-2002. In the first period, featured by aggressive competitive strategies through sale agents, net transfers were found to be positively (negatively) correlated with differentials in rates of return (commissions). The number of sales agents increased (decreased) the elasticity of demand to rates of return (commissions). In the second period, after new regulations come into effect reducing the both the number of salesmen and transfers across PFAs, parameters related to fees and commissions were not found to be significantly related to the elasticity of demand. Thus, the massive number of salesmen during 1995-1997 helped to increase the elasticity towards price variables, in particular rates of return, but at a high cost.

In Mexico, affiliates seem to be particularly sensitive to marketing strategies of PFAs. García and Rodríguez (2002) estimated the demand elasticity function for Mexico and found that the only significant parameters were those related to marketing, while those related to fees and rates of return were neither significant nor significantly different from zero. Melendez (2004) found an affiliate's decision to transfer her accounts across Mexican PFAs to be highly associated with the sales efforts of the manager and less associated with fees and rates of return; but he points out that the importance of these two last factors has significantly increased over time. By contrast, in Peru, positive and significant correlations between the elasticity of demand and the number of sales agents and price variables were found (Masías and Sanchez 2006).

³³ The 2007 legal reform defined the PAYG as the default option for undecided workers. See Appendix 3.

Improving the literacy of workers and making more information available could help to increase the elasticity of demand with respect to price variables.³⁴ In recent years, several agencies, in particular the Chilean Superintendence of Pension Fund Administrators (*Superintendencia de Administradoras de Fondos de Pensiones*, SAFP) and the Mexican Consar have made efforts to improve the information provided to affiliates by PFAs, and their websites present a vast amount of information that can be easily accessed by affiliates. In Mexico, for instance, the account statement sent by the managers to affiliates compared commissions and rates of return in the industry and it now includes information on the “net rate of return.” For the most part, however, information provided to members is less than adequate across the LAC region and far more can be done in educating workers.

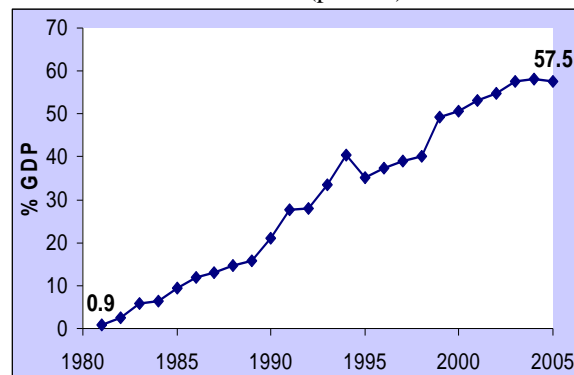
IV. The Determinants of Overly Concentrated Pension Fund Portfolios

Pension fund assets in the LAC countries that implemented DC pillars have grown and continue to grow at a rapid pace, but portfolios remain overly concentrated which can affect rates of return and thus future replacement rates. This section reviews portfolio composition and performance and examines the factors that have led to such portfolio concentration.

IV.1. Rapid Asset Growth

The growth of pension fund assets in LAC has been impressive. In Chile, the pioneer reformer in LAC, assets managed by pension funds reached almost 58 percent of GDP in 2005 (Figure 8). The average for other LAC countries that implemented structural pension reforms has already reached 18 percent of GDP (Figure 9). When OECD countries are considered, only 11 out of its 30 members had larger pension assets as shares of GDP in 2005 than the LAC average (Figure 10). At least two factors can be related to this asset growth: (a) in some countries, such as El Salvador, coverage has expanded in the 2000s, and (b) contribution rates (as shares of wages). This increasing trend is likely to continue in the foreseeable future and rates of return are expected to be the main driving source of growth.³⁵ In 2015, assets in the funded pension systems as shares of GDP are projected to reach around 90 percent in Chile, 44 percent in Bolivia, 31 percent in Argentina, 28 percent in Peru, 26 percent in Mexico, 25 percent in Colombia and 13 percent in Uruguay (Palacios 2003).

Figure 8: Chile: Pension fund assets as a share of GDP, 1981-2005 (percent)

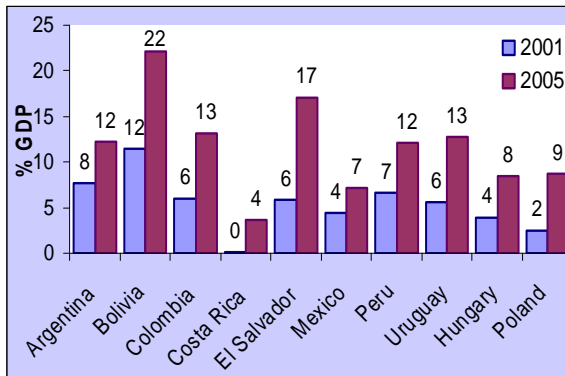


Source: Based on data from FIAP, SAFP, and WDI.

³⁴ See Appendix 4.

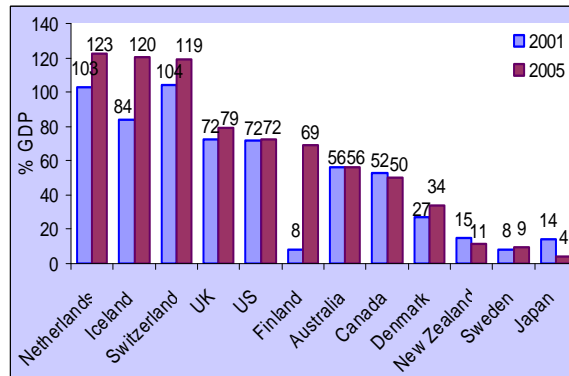
³⁵ See, for example, Davis (2003) and OECD (2006b).

Figure 9: Selected emerging markets: Pension fund assets as shares of GDP, 2001 and 2005 (percent)



Source: Based on data from FIAP, WDI, and OECD.

Figure 10: Selected OECD countries: Pension fund assets as shares of GDP, 2001 and 2005 (percent)



Source: OECD.

IV.2. Overly Concentrated Portfolios

The asset allocation of pension funds in reformed LAC countries, except for Chile, the Dominican Republic, and Peru, remains concentrated on government securities; although there has been an overall improvement in portfolio diversification. In 1999, with the exception of Peru, pension funds were invested almost exclusively in instruments issued by the public and the financial sectors. Data for 2006 show that PFAs in LAC (excluding Chile, Mexico and Costa Rica) increased the allocation of their portfolios in instruments issued by the public sector and, with regard to securities issued by other sectors, a wider set of instruments is being used (Figure 11 and Figure 12).

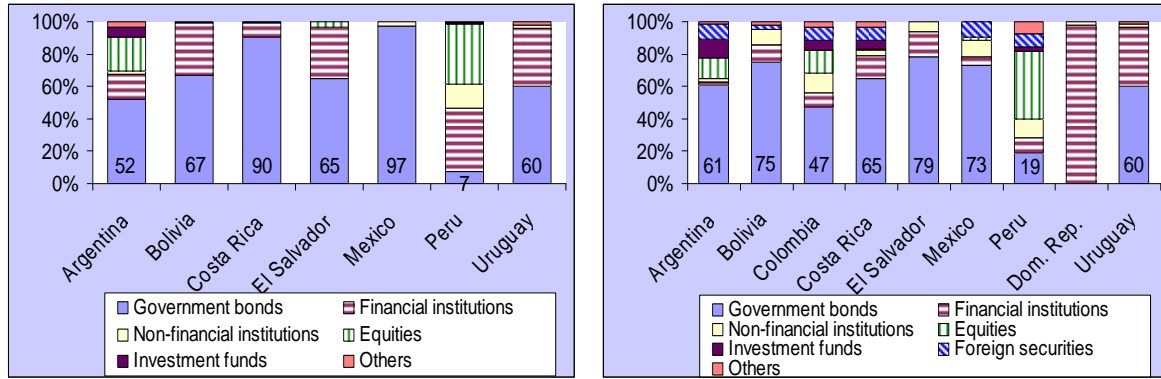
The only country in LAC where asset allocation of pension funds is relatively well diversified is Chile. Over the past 25 years, it has changed significantly, mainly due to relaxations of the investment regime and the domestic capital market development. Initially, pension funds were allowed to be invested only in domestic fixed-income instruments. In 1985, funds were allowed to invest in domestic equities, a regulatory change that took place in order to have their participation in the country's privatization of public utilities. In 1990, investment limits were further relaxed and pension funds were allowed to be invested in foreign-issued instruments, whose participation in their portfolios has been increasing since then. Nevertheless, the share of funds invested in foreign-issued assets remained low considering the relatively small size and low diversification of the Chilean economy. To address it, the 2008 reform further liberalizes foreign restrictions.³⁶

In contrast, the allocation of pension funds in OECD countries tends to be concentrated in corporate bonds and stocks, which usually represent more than half of their portfolios, except for Hungary and Poland. Investments in mutual funds are particularly important for Canadian, English, and American pension funds, while the asset allocation of pension funds to government bonds respond for less than 25 percent of their portfolios. The

³⁶ For Fund A, it increases the potential ceiling to as much as 100 percent. On the basis of the parameters set in the law, the Central Bank will issue a regulation specifying the specific foreign ceiling for each fund and the percent applying to the aggregate investment of the five funds.

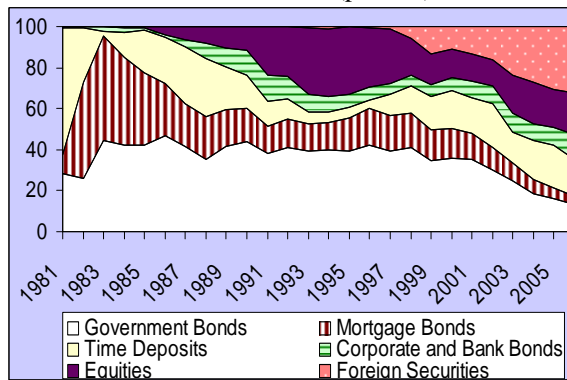
two exceptions are Hungary and Poland, where pension funds allocate more than 60 percent of their assets to government securities (Figure 13).

Figure 11: Selected LAC countries: Portfolio composition of pension funds by sector issuer (percent)
(a) 1999 (b) 2006



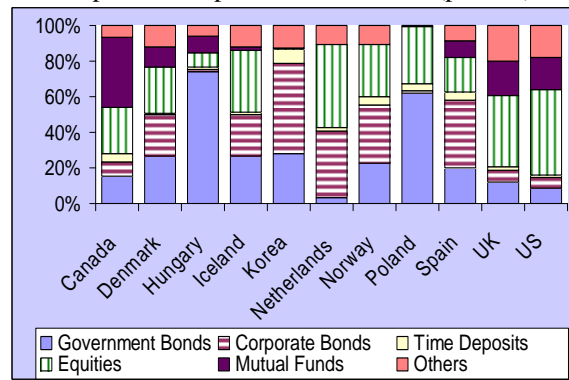
Source: AIOS.

Figure 12: Chile: Portfolio composition of pension funds, 1981-2006 (percent)



Source: SAFP.

Figure 13: Selected OECD countries: Portfolio composition of pension funds, 2005 (percent)



Source: OECD.

Overall, pension funds in reformed LAC countries have posted reasonable rates of return on their investments. For the period 2000-2006, real rates of return varied significantly within and across LAC countries. In 2006, the annual real rates of return since the systems' inception were between 6.7 percent (in Costa Rica) and 11.8 percent (in Uruguay) (Table 8). These numbers compare favorably with those of developed countries. For example, the real rates of return generated by UK pension funds in the past four years averaged 14 percent in 2003, 8 percent in 2004, 17 percent in 2005 and an estimated 7 percent in 2006. Over the 44 years since 1963, UK pension funds have generated real annual returns averaging 4.5 percent (International Financial Services London 2007). Comparisons of rates of return between pension funds and domestic benchmarks are a difficult task. Auguste and Artana (2006), controlling for regulatory differences, evaluate the performance of PFAs in Argentina, Chile, Colombia, and Peru. They found that the real return on individual contribution accounts in these countries were higher than those of hypothetical distribution systems. In addition, historical rates of return of PFAs compare relatively well with other domestic investment options when adjusted for risk.

Table 8: Real rates of return, 2000-2006 and since inception (percent)

Country	2000	2001	2002	2003	2004	2005	2006	Since inception
Argentina	3.9	-10.4	31.0	11.1	4.6	4.6	14.0	9.8
Bolivia	10.9	14.7	15.5	7.9	5.7	3.5	2.8	8.8
Chile	4.4	6.7	3.0	10.5	8.9	4.6	17.0	10.2 ^a
Colombia	n.a.	n.a.	n.a.	n.a.	10.4	19.0	6.6	6.9
Costa Rica	n.a.	n.a.	7.1	9.8	2.5	4.1	11.3	6.7
El Salvador	7.9	7.7	2.4	4.8	2.3	1.5	1.2	8.8
Mexico	7.2	6.1	4.7	6.2	4.5	8.0	8.4	7.8
Peru	-6.7	11.1	11.2	21.2	5.6	18.4	26.8	9.9
Dominican Rep.	n.a.	n.a.	n.a.	n.a.	-3.8	9.0	n.a.	n.a.
Uruguay	7.1	5.5	40.6	27.6	6.6	4.6	9.8	11.8
Poland	n.a.	n.a.	n.a.	10.0	9.4	14.2	9.8	n.a.

Notes: ^aFor Fund C. n.a. means not available.

Source: AIOS and FIAP.

IV.3. Factors Conditioning Asset Allocation

IV.3.1. Investment Regulations

Regulations on investments of pension funds in LAC have followed the rigid quantitative criteria set by regulatory bodies, while high-income OECD countries have adopted a behaviorally-oriented approach known as the “prudent person rule.”³⁷ A quantitative regulation is simply defined as a quantitative limit on holdings of a given asset class. Typically, instruments whose holding is limited are those with high price volatility and/or low liquidity (Davis 2001). The adoption of a regulatory framework based on the quantitative criteria has five main reasons: (a) reformed pension systems are the core of the social security systems in several emerging economies, which makes contributors more exposed to capital market volatility, (b) the lack of experience of fund managers and the absence of adequate risk assessment tools, which may lead pension funds to take undue risk, (c) underdeveloped domestic capital markets may put the sustainability of the pension reform at risk, (d) the transition cost to a fully funded system may be prohibitively high, and (e) avoiding potential conflicts of interest associated with control.^{38, 39}

Quantitative Limits

In emerging markets, countries that reformed their pension systems have opted for a mix of strict quantitative limits combined with some prudent guidelines. In LAC and some Eastern European countries quantitative limits – per instrument, per issuer, per group of instruments, and per risk factor – are the core of the regulatory framework, being combined with some form of behaviorally-oriented guidance (e.g., diversification requirements,

³⁷ The reasons that justify such quantitative regulations are: (a) for most contributors, the financial resources in their individual accounts are their only financial assets and perhaps the largest assets they will manage to accumulate during their entire working life (Bolak 2003), and (b) regulation aims to create an environment in which asset management can obtain the highest rates of return at acceptable levels of risk. See Appendix 6.

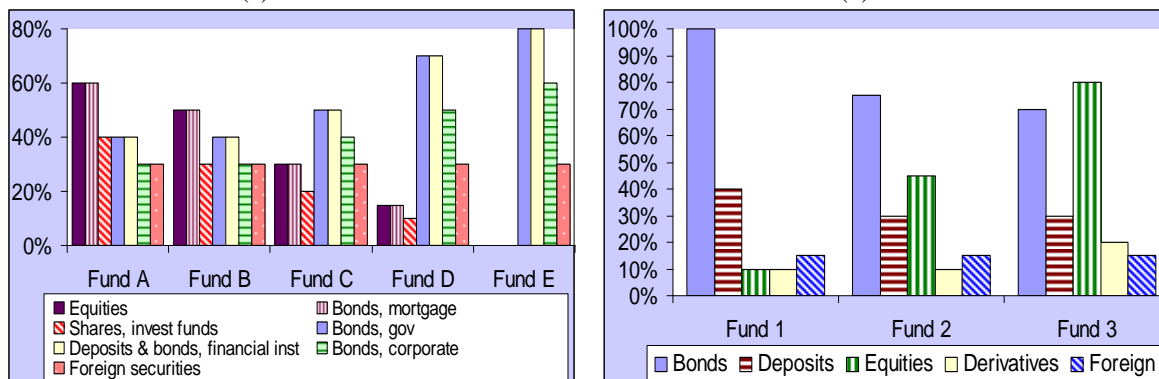
³⁸ For a summary of the pros and cons of adopting quantitative limits, see Candia (1998).

³⁹ Vittas (1996) argues that portfolio restrictions might be necessary in the initial stages of pension reforms when there is a lack of qualified asset managers and capital markets lack strength and transparency.

conflicts of interest, and ownership concentration limits).⁴⁰ Figure 14 and Table 9 show quantitative investment limits by instrument for selected emerging economies.

Investment regulations have been used by governments in countries that reformed their pension systems as mechanisms to achieve policy objectives unrelated with the social security system. Several emerging economies have imposed investment floors on the investments of pension funds, which have been regarded as even greater sources of distortion of portfolio diversification and performance of investments than quantitative ceilings. In Uruguay, investment floors on government securities aimed at easing the fiscal cost of the transition to a funded pension system. In Costa Rica and El Salvador, these regulations aimed at providing housing finance while offering PFAs attractive long-term investments. An investment floor on inflation-linked securities was imposed in Mexico for Basic Fund 1 (*Siefore*) aimed at ensuring a stable real rate of return to contributors.⁴¹ In Argentina, the 2007 pension reform instituted a requirement to invest a minimum of 5 percent and a maximum of 20 percent of the portfolio on debt instruments that support productive or infrastructure projects in Argentina. In Bolivia, there is no specific investment floor, but the two PFAs are required to buy for 15 years (i.e., 1998-2013), in proportionate shares, up to 180 million per year in government securities that are directly sold by the government at pre-defined terms (Table 10).

Figure 14: Investment limits by type of fund per instrument, August 2007 (percentage of fund assets)
(a) Chile (b) Peru



Source: SAFP.

Source: SBS.

Some emerging economies have started to recognize that strict quantitative regulations have imposed significant costs on the asset allocation strategies of pension fund managers and have been gradually allowing for greater diversification.⁴² Policies to address portfolio diversification constraints in emerging markets include the relaxation of the

⁴⁰ Quantitative limits have been relaxed in some LAC countries as their respective regulatory and supervisory frameworks were established or reformed to ensure a proper functioning of capital markets.

⁴¹ See Appendix 7.

⁴² For Chile, Berstein and Chumacero (2006a) constructed a (conservative) counterfactual scenarios for the evolution of total assets and returns that pension fund managers would have administered had the quantitative regulation been absent (during 1987-2002). They found that the costs have been high and that in the absence of such limits: (a) total assets under management could have been at least 10 percent higher, (b) investment limits may have been binding about 90 percent of the times, (c) affiliates might have been exposed to more volatility, and (d) each affiliate lost, on average, US\$500 to US\$1,000.

investment regime combined with the implementation of multi-fund schemes. In terms of investment limits, the main trends have been: (a) allowing for a wider set of instruments in which pension funds may invest, (b) decreasing the limits imposed on fixed-income instruments, especially government bonds, and (c) increasing the limits for variable-income and foreign-issued instruments. A recent trend in individual accounts schemes is the introduction and expansion of investment alternatives to contributors. In emerging markets, this trend has been realized through the creation of multi-fund schemes, which allow affiliates to choose among different funds with different risk profiles based on their life cycles. In LAC, Chile has been the pioneer in relaxing the investment regime governing pension funds and implementing a multi-fund scheme. Changes in Mexico, albeit more gradual, are also worth mentioning. Mexico allowed two funds in 2002 and five since 2007, a change that was combined with the gradual relaxation of quantitative investment restrictions and a value at risk measure. In 2005, Peru also introduced a multi-fund framework and has thus far allowed three types of funds.

The Case of Chile

First, in Chile, since the enactment of the pension law in 1981, the investment regime has evolved in order to allow managers to increase the depth and breadth of the asset allocation of pension funds across asset classes. The recent legal reform opened the way for further liberalizing the investment regime.⁴³ Nevertheless, the regulatory regime remains fairly complex.⁴⁴ Figure 15 shows the evolution of investment limits in Chile by group of instruments and how pension fund administrators have in fact taken advantage of the gradual relaxations of the regulatory regime for the period 1981-2001.

Until March 2000, PFAs in Chile managed only one fund (Fund 1). Since then, another fund (Fund 2) was introduced in the system – but its resources could only be invested in fixed-income instruments. In August 2002, an amendment to the law established the multi-fund scheme and each PFA was required to offer four different funds (B, C, D and E) with the option of offering a fifth one (Fund A).⁴⁵ Under this new set, contributors have to choose the fund(s) that best fits their risk-return preferences and can place their balances in up to two of the five funds offered by each PFA. If affiliates do not choose the fund(s) in which they want to invest their contributions within a 90-day period after joining the system, they are automatically assigned to funds B, C or D depending on their age. The reform approved in January 2008 keeps the five fund structure but relaxes quantitative restrictions, especially on foreign securities. As of December 2006, 78 percent of active contributors to the Chilean pension system were enrolled in Funds B and C, the result of both automatic assignment rules and affiliates' choices. The age distribution of members across the five funds is consistent with the objective of the multi-fund regime: young affiliates were primarily enrolled in Funds A and B (riskier), middle-aged affiliates in Fund C, and older affiliates in Funds D and E (more conservative) (Table 11).

⁴³ The specific investment regime will be issued by the regulator (and the Central Bank in the case of foreign investments) on the basis of the quantitative parameters set in the law

⁴⁴ For a more detailed analysis on the evolution of the regulatory regime in Chile (see SAFP 2007).

⁴⁵ Fund C is the new name of the old Fund 1, while Fund E is the new name for the old Fund 2.

Table 9: Investment limits per instrument for selected emerging markets, August 2007 (percentage of fund assets)

Instrument	Argentina ^a	Bolivia ^a	Colombia	Costa Rica ^a	El Salvador ^a	Uruguay ^a	Hungary	Poland ^d
Fixed-Income								
<i>Public Sector</i>					80			
State issued	50	No limit	No limit	75		60	No limit	No limit
Central Bank				50	30			
Central Government					50			
Decentralized institutions	30	10	20		20	30		40
<i>Financial Institutions</i>		60	72					
Deposits and bonds	30	50	32	Bonds: 10	40	30	No limit	
Mortgage bonds	40	50	40		60	30	25	40
<i>Corporate Sector</i>								
Bonds	50	45	30	70	40	45	10	40
Variable-Income								
Stocks	50	40	30	10	20	45 ^b	Listed: no limit Non-listed: 10	47.5
Investment funds	20	15	10	10	20		50	25
Foreign Investment		12	20			15	^c	5
Fixed-income								
State issued/Decentralized institutions	10						10	
Corporate sector	10						10	
Variable-income				10				
Hedging	10						5	
Others	30	5			10			

Notes: ^aMinimum investment limits are also imposed. ^bRefers to (a) securities issued by public and private companies and shares in domestic investment funds (25 percent) and a maximum in fixed and variable income securities issued by private companies (20 percent). ^cWithin investments made abroad, the ratio of investments made in non-OECD countries shall not exceed 20 percent. ^dRefers to open pension funds (OPF).

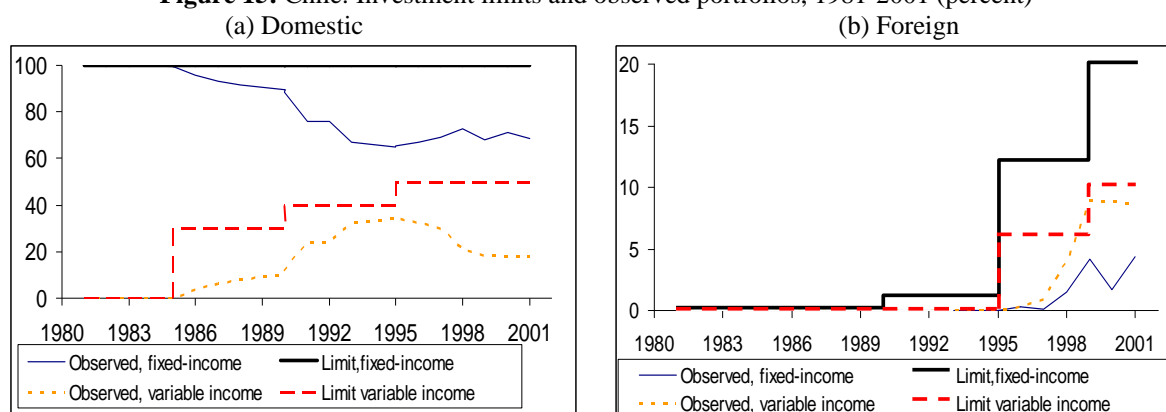
Sources: SAFJP, SPVS, *Ministerio de Hacienda y Crédito Público de Colombia*, SUPEN, Consar, *Banco Central del Uruguay* and OECD (2006a).

Table 10: Investment floors by country, August 2007

Country	Description of investment floor regulations
Argentina	The 2007 pension reform instituted a requirement to invest a minimum of 5 percent and a maximum of 20 percent of the portfolio on debt instruments that support productive or infrastructure projects in Argentina.
Costa Rica	Minimum of 15 percent of pension funds must be invested in mortgage securities, with returns of at least the average return of the mandatory complementary pension system.
El Salvador	Minimum of 30 percent of pension funds must be invested in securities issued by the Social Housing Fund (<i>Fondo Nacional de Vivienda</i> , FSV) in the 1 st year of the system's operation, decreasing by 1 or 2 percent per year until reaching 10 percent from the 15 th year on.
Mexico	Minimum of 51 percent of pension funds assets must be invested in inflation-linked or inflation protected securities (only for Basic Fund 1).
Uruguay	Pension funds must invest 40 to 60 percent of their assets in government securities.

Sources: SPVS, SUPEN, El Salvador's Pension Supervisor, OECD (2006a), *Banco Central del Uruguay*.

Figure 15: Chile: Investment limits and observed portfolios, 1981-2001 (percent)



Source: Based on data from SAFP and on Bernstein and Chumacero (2006a).

Table 11: Chile: Average age, wage, balance and size per fund, December 2006

Indicator	Fund				
	A	B	C	D	E
Average age (years)	32	30	44	58	47
Average wage (1,000 Pesos)	514	322	345	355	395
Average balance (1,000 Pesos)	13,745	3,137	6,311	6,697	10,941
Number of affiliates (1,000)	861	3,443	3,320	760	57
Number of active contributors (1,000)	548	1,462	1,252	176	36

Source: SAFP.

The asset allocation of Chilean pension funds is consistent with the objectives of multi-fund schemes. The risk-return decreases systematically from Fund A to Fund E (Table 12). As of December 2006, Fund A, which was designed to offer the highest risk-return combination, allocated the largest shares of its assets in foreign assets (53.1 percent) and domestic equity (22.2 percent). Fund E, known as the “safe fund,” allocated its assets almost exclusively in domestic fixed-income instruments (99.7 percent). Fund C

Table 12: Chile: Real annual rate of return per fund, 2002-2006 (percent)

Fund	2002	2003	2004	2005	2006
A	0.68 ^a	26.94	12.86	10.71	22.25
B	-0.52 ^a	16.02	10.26	7.32	18.83
C	2.98	10.55	8.86	4.58	15.77
D	-1.03 ^a	8.94	6.80	2.84	11.46
E	8.90	3.34	5.44	0.94	7.44

Notes: ^a Period October 2002 to December 2002.

Source: SAFP.

still accounts for about 45 percent of the total assets managed by the six PFAs and remains reasonably conservative with a small share of its assets allocated in domestic equity (around 20 percent) and a large share invested in fixed-income instruments (almost 60 percent) (Table 13). These portfolio compositions are related, to some degree, to the regulatory framework aforementioned. Dayoub et al. (forthcoming), analyzing data on asset allocation of Chilean pension funds from July 1996 to December 2005, found that while investment restrictions at the macro level for domestic instruments do not seem to be constraining the asset allocation of pension funds, quantitative restrictions for investments in foreign instruments imposed high costs on their asset allocation. In addition, evidence shows that herding behavior across pension fund administrators has resumed.⁴⁶

Table 13: Chile: Portfolio composition of pension funds, by fund and instrument, December 2006 (percent)

Instrument	Fund				
	A	B	C	D	E
Claims on the Public Sector	4.3	10.3	19.6	31.5	31.7
Central Bank of Chile	2.8	6.6	13.3	21.7	14.2
Central Government	0.6	1.3	2.4	3.5	2.7
Recognition bonds	0.9	2.4	3.9	6.3	14.8
Claims on the Financial Sector	20.2	24.8	28.5	15.1	46.3
Mortgage bonds	1.3	2.7	5.4	8.0	18.3
Time deposits	16.3	18.4	16.9	0.1	13.4
Bonds of financial institutions	2.0	2.9	5.2	6.3	14.5
Shares of financial institutions	0.7	0.9	0.9	0.7	0.0
Claims on the Corporate Sector	23.0	26.6	30.2	35.9	24.6
Equity	16.4	18.0	16.8	11.6	0.0
Bonds	2.6	5.2	9.7	21.5	24.6
Units of investment funds	4.1	3.5	3.6	2.7	0.0
Claims on the Foreign Sector	53.1	39.8	25.5	23.9	0.3
Units of mutual funds and shares	50.5	38.3	24.5	22.7	0.0
Others	2.6	1.6	1.0	1.2	0.4
Total assets (US\$ million)	16,846.0	20,367.2	40,281.4	9,632.9	1,410.0

Source: SAFP.

The Case of Mexico

The reform of the Mexican pension system took place in 1996 and its operational framework has been evolving gradually towards the implementation of a multi-fund scheme. The 1997-economic crisis negatively impacted investment opportunities for pension funds. Therefore, given the country's domestic macroeconomic conditions and the strict quantitative regulations on variable-income and foreign-issued instruments, it has been difficult for pension fund managers (*Afores*) to diversify their portfolios.

⁴⁶ See Appendix 7.

In 2004, each PFA was allowed to offer two different funds. The old fund (*Siefore 1*) was then allowed to invest up to 20 percent of its assets in foreign fixed-income instruments. The new fund (*Siefore 2*) was allowed to invest up to 15 percent of its assets in variable-income instruments, using diversified instruments linked to indexes and with capital protection.⁴⁷ Yet, as of December 2006, the asset allocation of the two funds did not differ significantly (Table 14). In 2007, the Mexican pension system was reformed. In order to improve the investment regime of PFAs, taking into account the lifecycle and risk-profile of affiliates, each *Afore* has the option of starting up to three new pension funds.⁴⁸ These funds are allowed to invest larger shares of their portfolios in variable-income instruments. As of August 2007, nine *Afores* were offering an additional third fund, which can invest up to 20 percent of its assets in variable-income instruments. Since 2002, the gradual relaxation of quantitative investment limits has been combined with a value at risk measure.

Table 14: Mexico: Portfolio composition of pension funds, by fund and instrument, December 2006 (percent)

Instrument	<i>Siefore</i>	
	1	2
Fixed-income	100.0	92.2
Public sector	76.3	73.6
Financial sector	6.4	4.9
Corporate sector ^a	11.2	9.5
Foreign sector	6.1	4.2
Variable-income	--	7.8
Domestic		2.0
Foreign		5.8
Total assets (LCU million)	54,106	471,617

Note: ^a*Afores* can only invest in private bonds rated A or higher.

Source: Consar.

The Case of Peru

The reform of the Peruvian pension system took place in 1992 and it has also been moving slowly towards a multi-fund regime, initially implemented in 2005. The portfolio of Peruvian pension funds has been more diversified in comparison to other reformed LAC countries, while being consistent with the objectives of a multi-fund scheme. The risk-return decreases from Fund 1 (Capital Preservation Fund) to Fund 2 (Mixed Fund, the old fund) to Fund 3 (Capital Appreciation Fund). Data for 2006 show that the most conservative fund invests more than half of its assets in fixed-income instruments, while the assets of the most aggressive fund are mostly invested in equities (Table 15). But it is important to acknowledge that portfolio composition is related, to some degree, the country's regulatory framework. In the multi-fund scheme, affiliates younger than 60 years-old can a fund according to their risk-return preferences.⁴⁹ Whenever a worker joins the private pension system, his or her employer must name the administrator that will manage the worker's contributions – as long as the worker, in a 10-day period, informs that he or she wants to remain in or join the public system.

⁴⁷ Capital protection means that pension funds must be invested in zero coupon bonds with no restrictions on maturity together with variable-income instruments in a 1:1 rate.

⁴⁸ See Table A4 in Appendix 1.

⁴⁹ Workers older than 59 years-old are automatically assigned to Fund 1.

Relative Minimum Rates of Return

Minimum rates of return and high market concentration aggravate herding behavior in the pension industry.⁵⁰ In order to limit the risk faced by contributors of mandatory DC pension systems, some emerging economies have imposed regulations on minimum rates of return, relative to the industry average, on investments made by pension fund administrators. In LAC, five reformed countries impose relative minimum rates of return on investments of pension funds, namely Argentina, Chile, Colombia, El Salvador and Uruguay (Table 16).⁵¹ Even though this feature of the regulatory framework aggravates the herding behavior in the pension fund industry, herding has also been observed in other pension systems, including the developed ones with thousands of funds and behaviorally-oriented investment regimes, such as the UK.⁵² In these cases, herding behavior resumes because managers are pressured by boards of pension funds to show satisfactory performances, which usually involves comparisons with peers and/or industry benchmarks, and tend to opt for defensive strategies so as to avoid underperforming relative to the benchmark and losing their affiliates. Even though portfolios may be similar across different pension fund managers due to herding, the average portfolio can and does drift over time.⁵³

Table 15: Peru: Portfolio composition of pension funds, by fund and instrument, December 2006 (percent)

Instrument	Fund		
	1	2	3
Claims on the Public Sector	29.4	19.0	8.0
Central Bank of Peru	1.8	1.3	0.9
Central Government	27.6	17.7	7.1
Claims on the Financial Sector	20.6	18.3	15.2
Mortgage bonds	0.1	0.1	0.0
Time deposits	6.9	5.4	4.4
Bonds of financial institutions	8.7	2.0	0.4
Shares of financial institutions	0.6	9.3	9.3
Debt	4.3	1.5	1.1
Claims on the Corporate Sector	43.9	53.4	72.1
Shares	9.2	33.2	64.5
Bonds	32.3	15.3	6.6
Units of investment funds	2.0	2.6	0.6
Others	0.4	2.4	0.4
Claims on the Foreign Sector	4.8	9.0	4.1
Units of mutual funds and shares	3.8	6.6	3.1
Debt	0.9	2.1	0.5
Time deposits	0.1	0.2	0.5
Others	5.9	7.0	4.3
Total assets (LCU million)	2,693.6	41,044.8	2,311.8

Source: SBS.

⁵⁰ See, for example, Shah (1997), Vittas (1997, 1998), Queisser (1999), Srinivas and Yermo (1999), Srinivas, Whitehouse and Yermo (2000), and Olivares (2005).

⁵¹ In Peru, the legal framework refers to a minimum rate guarantee that is to be defined by the Ministry of Economy and Finance. The regulation, however, has not yet been issued.

⁵² The extreme herding behavior in the UK is well discussed in Blake et al (2000) and Myners (2002).

⁵³ Even within a small band, each fund manager has the freedom to slightly deviate from the average, and the direction towards which managers find preferable to deviate does matter (Valdés 1999).

Table 16: Profitability rules by country, April 2007

Country	Description of profitability regulations
Argentina	Each administrator must guarantee that the average real rate of return in the last 12 months is equal to at least 70 percent the system's average or this same profitability minus two percentage points (whichever is the lowest).
Chile	Each administrator must guarantee that the average real rate of return in the last 36 months is not lower than the lesser of (a) the average real return of each fund minus 2 percentage points for funds C, D, and E and 4 percentage points for funds A and B, or (b) 50 percent of the average real return of all the funds.
Colombia	Each administrator must guarantee that the average real rate of return in the last 36 months is equal to at least 70 percent the system's average.
El Salvador	Each pension fund administrator must guarantee that the average real rate of return in the last 12 months is equal to (a) at least the system's average minus 3 percentage points, or (b) 80 percent of the average real return of all the funds (whichever is the lowest).
Uruguay	Each administrator must guarantee an annual average real rate of return, calculated every month, that is the lowest of 2 percent or the system's average minus 2 percentage points.

Sources: SAFJP, SAFP, *Superintendencia Financiera de Colombia*, El Salvador's Pension Supervisor and *Banco Central del Uruguay*.

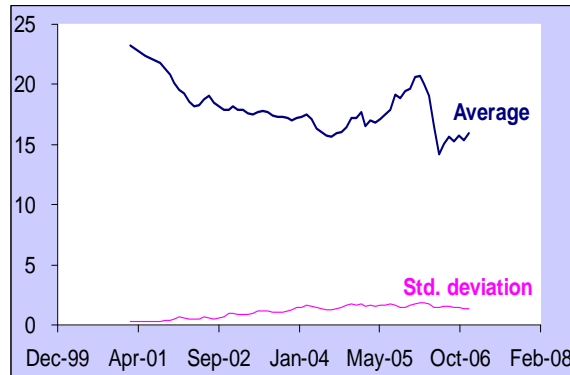
Overall, rates of return have been similar across different pension fund managers since the inception of the reformed pension systems. This similarity of returns across managers reflects the similar composition of their portfolios – the herding behavior that has been well documented in the literature.⁵⁴ In Colombia, modest increases in the dispersion of real rates of return across pension fund administrators are due to increases in portfolio diversification, especially with respect to foreign-issued instruments, but they remain relatively low indicating herding behavior in the industry (Figure 16). For Argentina and Peru, the averages and standard deviations of real rates of return have been more volatile than in the case of Colombia and the low coefficient of variation across administrators points to possible herding behavior (Figure 17 and Figure 18).

IV.3.2. Under-Developed Capital Markets

Portfolio allocation of pension funds in emerging markets is also related to relatively small, illiquid, and concentrated domestic capital markets. The growth of assets managed by pension funds, due to both reasonably high rates of return and mandatory contributions, has been higher than the development of domestic capital markets, especially in LAC (Figure 19). This resulted in a situation of “pension funds in search of additional assets,” which has constrained asset allocation and portfolio diversification.

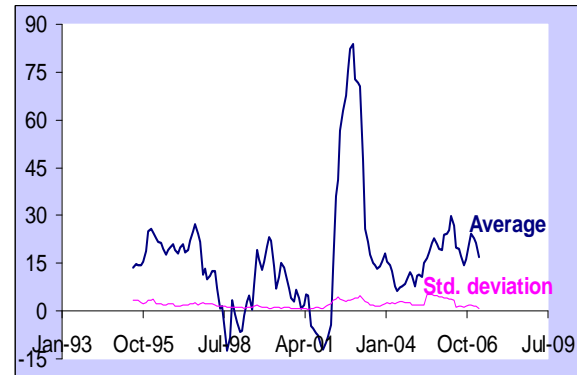
⁵⁴ See, for example, Queisser (1999), and Srinivas et al. (2000).

Figure 16: Colombia: Real 3-year rates of return of pension funds, average and standard deviation, March 2001-December 2006 (percent)



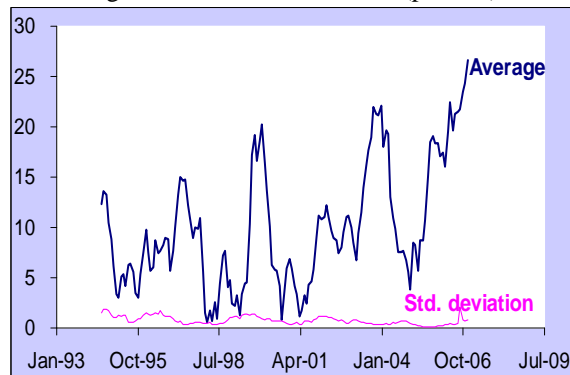
Source: Based on data from *Superintendencia Financiera de Colombia*.

Figure 17: Argentina: Real annual rates of return of pension funds, average and standard deviation, July 1995-March 2007 (percent)



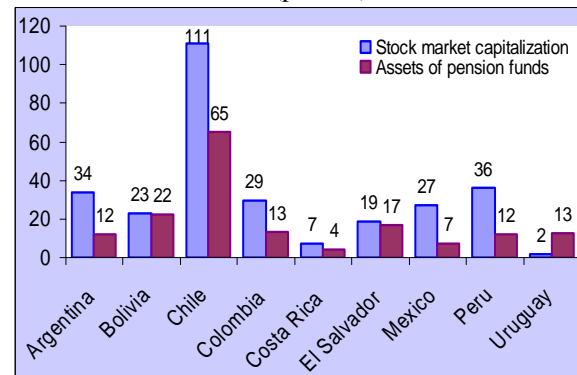
Source: Based on data from SAFJP.

Figure 18: Peru: Real annual rates of return of pension funds, average and standard deviation, August 1994- December 2006 (percent)



Source: Source Based on data from SBS.

Figure 19: Selected LAC countries Pension fund assets and stock market capitalization as shares of GDP (percent)



Sources: AIOS and the World Bank Financial Development Database.

Despite intense reform efforts in LAC during the 1990s, capital markets remain underdeveloped relative to both developed and other emerging economies. Given the region's economic and institutional fundamentals, the development of stock markets is below what it was expected to be. De la Torre et al. (2006) found a shortfall in domestic stock market activity in the LAC region, even after controlling for variables, such as per capita income, macroeconomic policies, and the legal and institutional environments. On domestic bond markets, both developed and emerging economies have shown substantial growth since the early 1990s. In LAC, most of the expansion took place in public bond markets, whereas private bond markets remain underdeveloped (Table 17).

Table 17: Capital market development in Latin America, G-7, and East Asia, 1990 and 2004 (percent)

Market development indicator	Latin American countries ^a		G-7 countries ^b		East Asian countries ^c	
	1990	2004	1990	2004	1990	2004
Domestic stock market						
Market capitalization/GDP	12.4	42.3	48.2	93.6	53.5	147.1
Value traded domestically/GDP	2.0	6.1	23.9	92.2	82.7	104.5
Capital raised domestically/GDP	0.4	0.5	0.9	1.4	3.4	5.9
Domestic bond market						
Amount outstanding of domestic public sector bonds/GDP	12.3	20.7	50.5	67.9	13.9	25.6
Amount outstanding of domestic private sector bonds/GDP	4.4	10.7	38.6	47.7	15.9	36.3

Notes: ^aAverages for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. ^bAverages for Canada, France, Germany, Italy, Japan, UK, and US. ^cAverages for Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Taiwan, and Thailand.

Source: Bank for International Settlements, S&P Emerging Markets Database, World Bank and World Federation of Exchanges in de la Torre et al. (2006).

Pension funds already have a substantial participation in the markets for some instruments (Figure 20). In 2005, their holdings of public sector bonds was around half of the total in Chile and Peru and about one-third of the total in Argentina, Colombia, and Mexico. For the other three instruments shown in Figure 20 – except for time deposits in Chile with pension funds holding more than one-third of the total in 2005 – the participation of pension funds is not as concentrated, which might be partially due to local regulatory frameworks, but it has been showing an overall increasing trend.

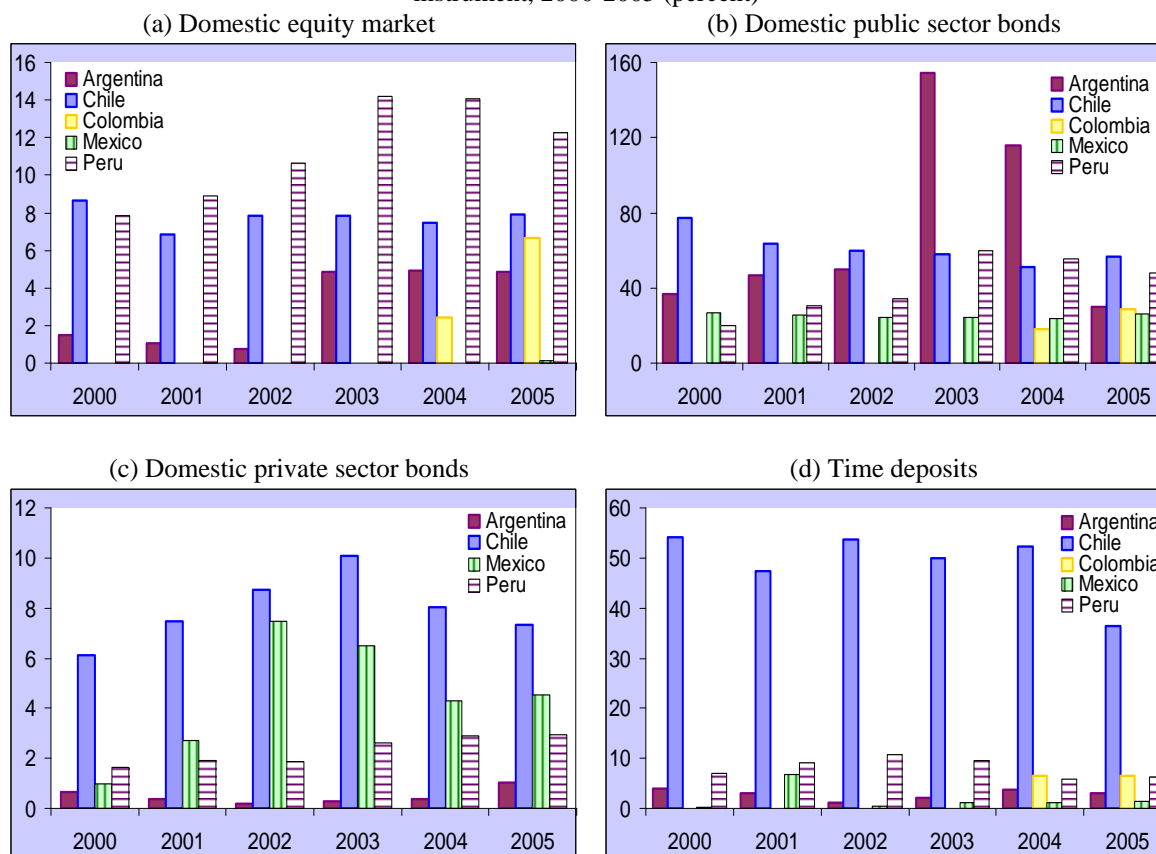
The under-representation of pension funds in equity markets is to some extent due to local capital market limitations. Domestic equity markets in LAC are generally illiquid, particularly in the case of small and medium caps, reducing the attractiveness of this asset class. Although PFAs are not active traders in equity markets, illiquid shares prove to be challenging since they make market exit difficult while creating valuation problems, which may negatively affect rates of return. This could be worsened with the inclusion of additional small cap shares, which would impose higher research and monitoring costs without significantly improving the portfolio's risk-return profile (IMF and World Bank 2004). In Chile, as of December 2006, pension funds were allowed to invest in 91 listed stocks approved by the Risk Rating Commission, but they were actually invested in 70 stocks and total investments were below the quantitative ceiling for this asset class. Yet, given their importance as institutional investors, the lack of interest of pension funds for such instruments may, in turn, discourage their issuances.⁵⁵

The view that pension funds have contributed to the development of the domestic capital market prevails. Several analyses of the interactions between the growth of pension funds and capital market development highlight the influence of PFAs in: (a) the development of better regulations, (b) their fundamental role in the creation of important institutions (e.g., central custodian and electronic stock exchange), (c) their role in the development of specific instruments (e.g., mortgage bonds and corporate bonds), and (d)

⁵⁵ See also Catalán (2003).

their positive influence in the quality of corporate governance (IMF and World Bank 2004). Walker and Lefort (2002), for example, show that the pension reform significantly contributed to improvements in the financial regulatory and legal framework as well as in transparency and corporate governance in Argentina, Chile, and Peru.⁵⁶

Figure 20: Selected LAC countries: Pension fund participation in the domestic capital markets per instrument, 2000-2005 (percent)



Note: Participation of Mexican pension funds in the domestic equity market was zero percent in 2000-2004 and 0.1 percent in 2005.

Sources: Based on data from AIOS and the World Bank Financial Development Database.

However, the contribution of pension funds to capital market development should not be exaggerated. For example, the contribution of pension funds to market liquidity in Chile has been overestimated by many analysts, particularly earlier analyses that preceded the decline in turnover ratios for both stocks and fixed income instruments in the mid-1990s. Pension funds are not very active traders, either in stocks or bonds. Moreover, the increasing concentration of the Chilean industry in the 1990s probably further aggravated the liquidity problem. Neither have pension funds contributed to the creation of a credit curve due to the concentration of their investments in equity and bonds in highly rated issuances, and their contribution to the development of a private equity market has also been limited (IMF and World Bank 2004). In addition, a recent

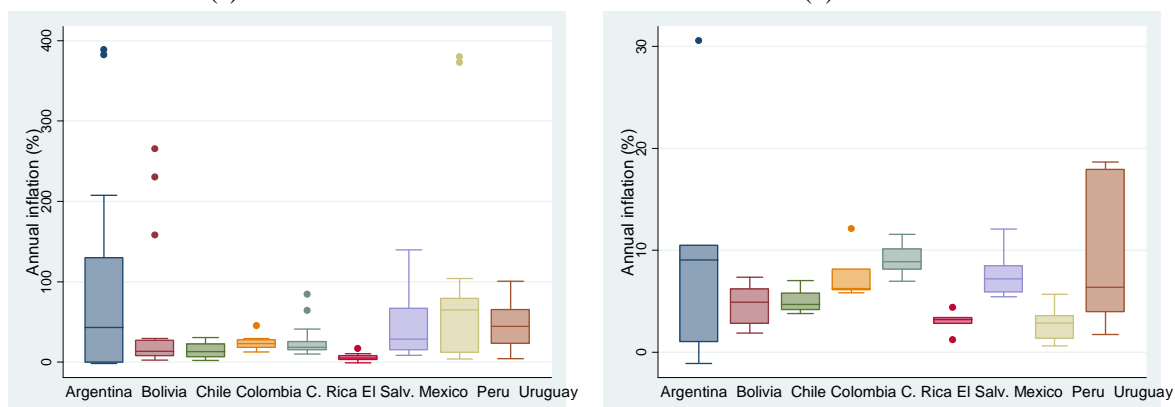
⁵⁶ See Holzman (1996), Acuña and Iglesias (2001), Impavido et al. (2003), Cifuentes et al. (2002), Agosin and Pasten (2003), and Roldos (2004).

study further analyzed the contribution of pension funds to capital market development in Chile, finding that the growth of pension fund assets has impacted the size and the structure of the domestic financial market. However, the investment strategy of administrators had little effect on the market efficiency (Yermo 2005).

IV.3.3. Macroeconomic Environment

At the time of the pension reforms, some LAC countries presented unstable macroeconomic environments (Figure 21 and Figure 22) or were emerging from an economic crisis that resulted from unsustainable fiscal and monetary policies coupled with weak financial systems (Singh and Cerisola 2006).⁵⁷ It was only in the mid-1990s that most countries managed to control inflation and to decrease average public debt levels.⁵⁸ The current account imbalances have improved with the fiscal discipline undertaken by governments in the region. Real GDP per capita growth in LAC has been very volatile and more than 70 percent of this volatility was due to country-specific shocks (IMF 2005).

Figure 21: Selected LAC countries: Annual inflation, boxplot (percent)
(a) 1980-1999 (b) 2000-2005



Notes: Values above 500 percent were not included in (a), which occurred in Argentina, Bolivia, and Peru. Boxplot is a graph of the five-number, in which the central box spans the 25th and the 75th percentiles, the line in the box marks the median, lines extend from the box out to the minimum and the maximum observations and “dots” represent outliers.

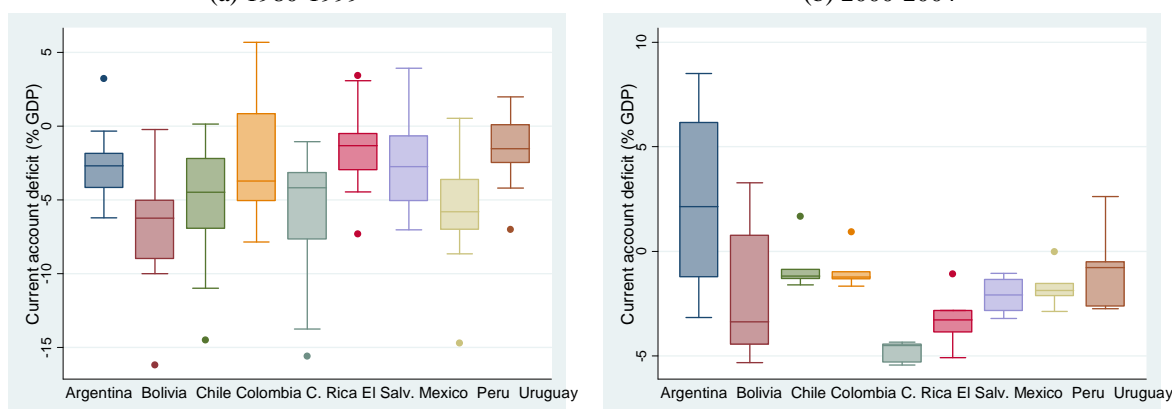
Source: WDI.

The uncertain macroeconomic landscape did not favor the asset allocation of pension funds.⁵⁹ In these circumstances, it was common to restrict investments of pension funds in variable-income and foreign-issued instruments, thus favoring their asset allocation in government debt – some governments also applied such restrictions to help manage the fiscal costs of the transition from a PAYG to a funded system instead of relying on increased public savings.

⁵⁷ See Zettelmeyer (2006) and Jaeger (2007).

⁵⁸ Since the early 2000s, public deficits and indebtedness have been trending downwards. Active debt management and reforms are helping LAC countries to develop capital markets (Singh and Cerisola, 2006). See also Carstens and Jácome (2005).

Figure 22: Selected LAC countries: Current account deficit as a share of GDP, boxplot (percent)
 (a) 1980-1999 (b) 2000-2004



Note: Boxplot is a graph of the five-number, in which the central box spans the 25th and the 75th percentiles, the line in the box marks the median, lines extend from the box out to the minimum and the maximum observations and “dots” represent outliers.

Source: WDI.

Macroeconomic improvements coupled with relaxation of the investment regime and measures to develop securities markets will contribute to the improved asset allocation of pension funds in the future. Greater foreign diversification will be necessary to compensate for the developing nature of local capital markets.

V. The Approach to Pension Supervision

Consistent with the restrictive investment regulation approach discussed above, most supervisor authorities of mandatory DC pension systems in the LAC region were designed as proactive agencies expected to closely monitor the performance of pension funds and pension fund managers. A similar approach was adopted in some Eastern European countries. Specialized pension supervisors were generally set up to safeguard the stability and resilience of the new pension systems. Over time, some countries, including El Salvador, Hungary, and Peru, moved towards a more integrated supervisory approach of financial services, consolidating the supervision of all financial entities under a single agency.⁶⁰ Consolidation can facilitate the supervision of financial conglomerates and ensure better use of scarce supervisory resources, especially in small countries.⁶¹ By contrast, most OECD countries follow a reactive approach towards pension supervision, although a new paradigm has emerged. For instance, Australia, Denmark, and the Netherlands moved towards a risk-based supervision model.

The monitoring activity by pension supervisors in LAC has generally been intense. But the effective surveillance capability of supervisors has remarkably varied across the region, with some agencies requesting more information than they can effectively analyze (Acuña 2005). Enforcement tools, such as power to issue warnings,

⁵⁹ See Appendix 8.

⁶⁰ Argentina, Chile, Costa Rica, Dominican Republic, and Mexico have specialized pension supervisors.

⁶¹ See Taylor and Fleming (1999) and Abrams and Taylor (2000) for discussions on lessons from integrating financial supervision and issues related to the unification process.

impose sanctions, and cancel operating licenses, have generally been available to safeguard the system's stability and protect workers' retirement savings. Many agencies have actively used sanction powers to prevent and correct for non-compliance but, in some cases, such powers were not well-defined in the law. Enforcement of the supervisor's decisions in small countries with weak governance and institutional environments has been a challenging task. In El Salvador, for instance, the supervisor (*Superintendencia de Pensiones, El Salvador C.A.*) generally found it difficult to impose sanctions on non-compliant PFAs, especially in the system's early years of operation, which were made even more complicated due to legal and institutional deficiencies (Acuña 2005).

Although the pension surveillance approach has been successful in avoiding fraud and major irregularities, it has focused on compliance without considering the costs imposed by the regulatory framework on pension fund performance. Berstein and Chumacero (2006a) estimated the average costs of quantitative investment restrictions in Chile for the period 1987-2002 to be around 10 percent of the system's 2002-account balances. However, a relaxation of quantitative restrictions needs to be accompanied by an alternative risk-based supervisory method to avoid principal-agent problems. In addition, the traditional compliance-based supervisory approach cannot properly address all potential operational risks that can arise due to the lack of adequate internal control. Recognizing these gaps, Mexico has started to implement a risk-based supervisory framework and Chile is reconsidering its surveillance approach and designing a transition framework towards risk-based supervision.

Among the countries that have introduced risk management tools based on value-at-risk (VaR) principles, Mexico is a prominent example. It took the first steps toward a risk-based supervision framework in 2002, when quantitative provisions of the investment regime were partially relaxed and a VaR limit was introduced together with guidelines for managing it (Berstein and Chumacero 2006b). Portfolio composition and asset value are reported daily at market value, allowing for close estimation of probability distributions for returns. Risk exposure is also managed with investment rules that restrict asset categories, counterpart exposure limits, and benchmarking of liquidity indicators. This approach replaced an older system that measured risk using average weighted maturity calculations. As VaR tools are introduced, the weight of quantitative restrictions in the risk-management-tools portfolio has been decreasing. In 2005, the first version of a more comprehensive risk-based supervision framework was implemented in the country, based on a scoring system assessing: (a) operations, (b) internal control, and (c) financial performance. Several upgrades and revisions have taken place since 2005, such as the development of an early warning system and new regulations on operational risks and the role of compliance officers.⁶²

It is early to evaluate the results of the new risk-based framework applied in Mexico, but several lessons can be drawn by other LAC countries. The shift towards a risk-based supervision framework entails a learning curve for both the supervisor and the fund managers, requiring the establishment of a transition period with selective and

⁶² See Berstein and Chumacero (2006b) for more details.

gradual relaxation of quantitative regulations. Cognizant of this learning process, Consar has kept its traditional compliance approach, while testing the new supervisory model. Therefore, it may be the case for relaxing quantitative investment limits, but not to fully replace them with a pure risk-based measure.

Based on the experiences of Mexico and other countries, the risk-based supervisory framework is likely to demand substantial adjustments in the areas of corporate governance, internal procedures for risk management, and transparency. It will be necessary for the regulatory framework to clearly define the fiduciary and accountability duties of directors and senior managers to ensure that they act in the best interest of affiliates as well as to set minimum standards for the development of sound risk management plans. While in some countries, such as Chile, managers have started to adopt risk management tools, progress has been uneven (IMF and World Bank 2004). In addition, internal audit departments will need to be strengthened, and regulations defining common standards on internal auditing will have to be issued. In parallel, a scoring model will need to be defined to systematically rate the risk of pension funds.

In defining new regulations and scoring models, LAC countries will be able to draw upon lessons from the risk-based approach already applied to banking supervision (Basel 2) and from the limited (and recent) OECD experiences with risk-based pension supervision, in particular from Australia where DC pension plans are starting to prevail.⁶³ The aforementioned changes will also demand new skills mixes in most agencies, emphasizing investment and operational risk analysis. Many LAC countries, especially Chile with a more mature pension system and possibly Argentina, Colombia, Peru, and Uruguay, should be ready to initiate a gradual move from a compliance-based towards a risk-based supervision framework. However, the pace of change should take into account the industry's development as well as the supervisor's capacity.

VI. Conclusions

Following the lead of Chile, several emerging economies embarked on social security reforms in the 1990s, replacing their PAYG systems with funded DC schemes. As was well put by Roldos (2007), "pension reform is an ongoing process and there are a number of areas in which countries could focus so as to achieve its primary objectives of improving consumption smoothing and alleviating old-age poverty." Overall, the outcomes of the reforms contributed to decreasing the fiscal imbalances of the old systems with positive effects on macroeconomic performance as well as improvements in the rate of return on investments made by pension fund administrators. The long-term fiscal savings could have been even higher and the transition smoother, if more countries had relied on increased public savings, rather than increased borrowing, to finance the transition. However, looking forward, the reformed pension systems have a number of challenges to overcome, particularly if the growth of asset bases continues at current levels. A key matter to be carefully considered is how to well diversify the portfolio of pension funds. In addition, fees charged by administrators are binding and there is ample

⁶³ See Appendix 9.

room for further decline and, if these reductions are passed to affiliates, to reduce social welfare losses.

The pension industry has been highly concentrated with a trend towards decreasing the number of fund managers, mostly through mergers and acquisitions, in order to take advantage of economies of scale. In most LAC countries, management fees remain relatively high and declines in operational costs have not been fully passed through to consumers, reinforcing the presence of market deficiencies. A new body of literature has emerged trying to explain the factors that impede the development of more competitive pension markets in LAC countries. The two main factors are barriers to entry and the low demand elasticity of affiliates, which is further aggravated due to the prevalence of inadequately financially literate consumers, a problem also found in OECD countries. While minimum entry requirements, such as capital, experience and integrity, to the industry responsible for managing mandatory old-age savings are necessary, other restrictions such as controls on transfers have created artificial market barriers by making it more difficult for new entrants to capture a number of affiliates that is large enough so that they can attain an optimal operating size.

Policymakers, aware of such problems, have developed a number of reforms to promote competition in DC pension markets. Some countries, such as Bolivia, have tried to address these issues by stipulating price ceilings that have largely become price floors. Mexico tried to lower barriers to entry in the industry as well as to address the concern on inelasticity of demand to fees. In 2002, it implemented new legislation that required the regulator to automatically assign new affiliates who did not choose a PFA to the administrator with the lowest fees. Transfer rules were subsequently made more flexible. The combination of these two measures brought about a reduction in the average management fee. More recently, Mexico has changed the indicator for automatic affiliation to the highest “net rate of returns” for the last 12 months and tightened transfer rules. It is too early to assess the impact of this amendment but this measure could face new challenges since past performance is not a predictor of future performance.

Chile has attempted to address both demand and supply concerns and focused more on the root causes of inadequate competition (inelasticity of demand to fees and decreasing market barriers to new entrants). In January 2008, Congress approved a reform of the country’s pension system, which encompasses an integrated solidarity pillar; a strengthened contributory pillar, based on improved incentives to expand coverage of both the mandatory and voluntary pillars, increased competition, and enhanced diversification of the investment portfolio. To enhance price competition, it will organize a bidding mechanism for new affiliates, assigning them for a 24-month period to the PFA charging the lowest commission. Existing affiliates of the winning PFA will be charged the lowest commission at the time of the bidding. The reform will also facilitate unbundling of services to allow for a better use of economies of scale, especially on administrative services, and education of affiliates will be further promoted. It is important that the same investment regime applies to the pension fund administrators receiving the automatically assigned affiliates and other pension fund administrators in

the market so that this system creates a basis for comparison of PFAs and generates incentives for the former to keep good investment practices.

In several emerging economies, the reformed pension systems became the core of their social security systems, making contributors more exposed to capital market volatility. This fact, along with the lack of experience of fund managers and the absence of adequate risk assessment tools and underdeveloped domestic capital markets, justified the adoption of quantitative regulatory frameworks. As a result, the portfolios of pension funds are not well diversified, but overly concentrated. Countries that had not built fiscal space prior to the implementing the pension reform or that went through severe economic crises have used pension funds as captive sources of financing to the public debt. Thus, it is not uncommon to have pension funds overly allocated in government securities.

In the presence of a more sound and stable macroeconomic environment, some countries have started to realize the high costs imposed by the strict quantitative regulations on the asset allocation of pension funds as well as in terms of achieved real rates of return. As a result, a gradual relaxation of investment limits has been taking place, favoring investments in equities and foreign-issued instruments, combined with some form of behaviorally-oriented approach. Such relaxation should continue on a gradual manner in coordination with sovereign debt management and evolvments in regulations governing capital markets. As the regulatory framework evolves, so does supervision. In this case, it is appropriate to develop an alternative risk-based supervisory method. Overall, pension reforms have had a modest and positive effect in the development of local capital markets; but this has been limited to public debt markets in most countries. Chile is one of the few countries where the effects have been broader and the growth of pension fund assets has impacted the size and structure of the domestic financial market; but the investment strategy of administrators had little effect on market efficiency.

In sum, although several challenges remain, the overall progress achieved in countries that implemented pension reforms has been positive. Policymakers should continue revising the legal, regulatory, and supervisory frameworks, with a focus on the investment management of pension funds and the fee structure of administrators. This would allow the systems to evolve along with sustained growth of pension funds, and, ultimately, to improve consumption smoothing and alleviate old-age poverty. Finally, the lessons learned from pension reforms in the LAC region are relevant for other emerging economies trying to embark in similar reforms.

References

- Abrams R. and M. Taylor (2000). "Issues in the Unification of Financial Sector Supervision." IMF Working Paper 00/213. Washington. D.C.: International Monetary Fund.
- Acuña, R. (2005) "Pension Reform in El Salvador." Human Development Network, Social Protection Discussion Paper Series No. 0507. Washington. D.C.: The World Bank.
- Acuña, R. and A. Iglesias (2001) "Chile's Pension Reform After 20 Years." Social Protection Discussion Paper, No. 0129. Washington, D.C.: The World Bank.
- Agosin, M.R. and E. Pasten (2003) "Corporate Governance in Chile." Working Papers Central Bank of Chile, No. 209. Santiago, Chile.
- Aguilera, N., S. Rodríguez, C. Velázquez, and J.C. Zepeda. (2006). "Are there Economies of Scale in the Pension Fund Managers Industry? A Semi-Parametric Approach." Mimeo.
- Andrade, L., D. Farrell, and S. Lund (2007) "Fulfilling the Potential of Latin America's Financial Systems." *McKinsey Quarterly*, Web exclusive. June 2007.
- AIOS/Asociación Internacional de Organismos de Supervisión de Fondos de Pensiones (2006) *Boletín Estadístico* 16 (December). Available at <http://aiosfp.org>.
- Apella, I. and D. Maceira (2004). "Economías de Escala y Barreras a la Entrada en el Mercado Argentino de AFPJ." CEDES y Facultad de Ciencias Económicas, Universidad de Buenos Aires. Mimeo. Buenos Aires.
- Arenas de Mesa, A., D. Bravo, J. Behrman, O. Mitchell, and P. Todd (2006) "The Chilean Pension Reform Turns 25: Lessons from the Social Protection Survey." NBER Working Papers No. 12401. Cambridge, MA: National Bureau of Economic Research.
- Auguste, S. and D. Artana (2006) "Desempeño de las Inversiones de los Fondos de Pensiones: El Caso de Argentina, Colombia, Chile y Peru." Federación Internacional de Administradoras de Fondos de Pensiones. Mimeo. Available at <http://www.fiap.cl>.
- Ayer, S. (1997) "Pension Reform in Latin America: Quick Fixes or Sustainable Reform?" World Bank Policy Research Working Paper 1865. Washington. D.C.: The World Bank.
- Barrientos, A. and A. Boussofiane (2001) "The Efficiency of Pension Fund Managers in Latin America." University of Manchester Centre on Regulation and Competition Paper No. II. Manchester.
- Bateman H (2000) "The Role of Specialized Financial Institutions in Pension Fund Administration." In *Policy Issues in Pension Reform*, Asian Development Bank, pp. 121-147.
- Bateman, H., G. Kingston, and J. Piggott (2001) *Forced Saving: Mandating Private Retirement Income*. Cambridge, UK: Cambridge University Press.
- Bertranou, F.M., W. van Ginneken, and C. Solorio (2004) "The Impact of Tax-Financed Pensions on Poverty Reduction in Latin America: Evidence from Argentina, Brazil, Chile, Costa Rica and Uruguay." *International Social Security Review*, Vol. 57, No. 4, pp. 3-18.

- Berstein, S. and R. Chumacero (2006a) “Quantifying the Costs of Investment Limits for Chilean Pension Funds.” *Fiscal Studies*, Vol. 27, Issue 1, pp. 99-123.
- _____ (2006b) “Risk-based Regulation and Supervision of Pension Funds, Country Study: Mexico.” Prepared for the World Bank. Mimeo.
- Berstein, S. and J. Ruiz (2005) “Sensibilidad de la Demanda con Consumidores Desinformados: El Caso de las AFP en Chile.” Superintendencia de AFP de Chile Documento de Trabajo No. 4. Santiago.
- Bolok, I.V. (2003) “Comments.” In: International Federation of Pension Fund Administrators, *Pension Reforms: Results and Challenges*, pp. 433-440. Santiago, Chile: Corporación de Investigación, Estudio y Desarrollo de la Seguridad Social.
- Brunner, G., R. Rocha, and R. Hinz (2006) “Risk-Based Supervision of DC Pensions Systems: The Experiences of Australia and Mexico.” OECD Seminar on *Pension Fund Regulation and Risk Management*, November 9, 2006. Istanbul.
- Bucheli, M., N. Ferreira-Coimbra, A. Corteza, and I. Rossi (2006) “El Acceso a la Jubilación o Pensión en Uruguay: Cuántos y Quiénes lo Lograrían?” Departamento de Economía, Facultad de Ciencias Sociales, Universidad de la República, Documento de Trabajo No. 01/06. Montevideo.
- Campbell, J.Y and L.M. Viceira (2002) *Strategic Asset Allocation: Portfolio Choice for Long-Term Investors*. Clarendon Lectures in Economics, Oxford University Press.
- Candia, F. (1998) “International Diversification for LAC Funds: Why or Why not?” Paper presented at the IMD/EDI World Bank Conference *LAC Pension Systems: Investing for the 21st Century*. July 27-29, 1998. Washington, D.C.
- Carstens, A. and L.I. Jácome (2005) “Latin American Central Bank Reform: Progress and Challenges.” IMF Working Paper No. 05/114. Washington, D.C.: International Monetary Fund.
- Caskey, J.P. (2006) “Can Personal Financial Management Education Promote Asset Accumulation by the Poor?” Indiana State University, Networks Financial Institute Policy Brief 2006-PB-06.
- Catalán, M. (2004) “Pension Funds and Corporate Governance in Developing Countries: What Do We Know and What Do We Need to Know?” *Journal of Pension Economics and Finance*, Vol. 3, No. 2, pp. 197-232.
- Chan, S. and A.H. Stevens. (2004). “Do Changes in Pension Incentives Affect Retirement? A Longitudinal Study of Subjective Retirement Expectations.” *Journal of Public Economics*, Vol. 88, pp. 1307-1333.
- Chlon, A., M. Gora and M. Rutkowski (1999) “Shaping Pension Reform in Poland: Security through Diversity.” Pension Reform Primer Series Paper No. 15. Washington, D.C.: The World Bank.
- Cifuentes, R., J. Desormeaux and C. Gonzalez (2002) “Capital Markets in Chile: From Financial Repression to Financial Deepening.” In BIS Papers No. 11, The Development of Bond Markets in Emerging Markets.
- Consar/Comisión Nacional del Sistema de Ahorro para el Retiro (2006) *Avances y Retos del Sistema de Ahorro para el Retiro, 2001-2006*. Mexico, DF.
- Consejo Asesor Presidencial para la Reforma Previsional (2006) *Informe Final: Diagnóstico y Propuesta de la Reforma* (Vol. I). Mimeo. Santiago. Available at <http://www.consejoreformaprevisional.cl>.

- Corvera, J., M. Lartigue, and D. Madero (2006) "Comparative Analysis of Administrative Fees of Pension Funds in Latin America." Mimeo. Mexico, DFs.
- Davis, E.P. (2001) "Portfolio Regulation of Life Insurance Companies and Pension Funds." The Pensions Institute, Discussion Paper PI-0101.
- _____ (2002) "The European Pension Management Industry." Working Paper PI-0212, The Pensions Institute. Birkbeck College.
- _____ (2003) "Pension Funds and European Financial Markets." *Berichte and Studien*, Austrian National Bank.
- Dayoub, M., C. Raddatz, S.L. Schmukler and J.P. Xandri-Antuña (forthcoming) "Investment Behavior of Chilean Pension Funds." Mimeo.
- de la Torre, A., J.C. Gozzi and S.L. Schmukler (2006) "Capital Market Development: Whither Latin America?" The World Bank Policy Research Working Paper Series, Paper No. 4156. Washington, D.C.: The World Bank.
- Devenon, A. and I. Welch (1996) "Rational Herding in Financial Economics." *European Economic Review* 40, pp. 603-615.
- Edwards, S. and A. Cox-Edwards (2002) "Social Security Privatization Reform and Labor Markets: The Case of Chile." NBER Working Papers No. 8924. Cambridge, MA: National Bureau of Economic Research.
- Fernandez, R.B., C. González, S. Pernice and J.M. Streb (2007) "Loan and Bond Finance in Argentina, 1985-2005." Universidad del Cema, Serie Documentos de Trabajo, Área Economía y Finanzas, No. 343. Buenos Aires, Argentina.
- Fitch Ratings (2007) *El Salvador Report Especial – Bancos Salvadoreños: Resultados Semestrales y Perspectivas*. Mimeo.
- Fultz, E. and M. Ruck (2000) "Pension Reform in Central and Eastern Europe: An Update on the Restructuring of National Pension Schemes in Selected Countries." ILO-CEET Report No. 25. Budapest: International Labour Office.
- Galer, R. (2002) "Prudent Person Rule Standard for the Investment of Pension Fund Assets." *Financial Market Trends*, No. 83, November 2002. Paris: OECD.
- García H. and T. Rodríguez. (2002) "La Organización de Mercado de Ahorro para el Retiro en México durante la Etapa de Acumulación." Tesis de Licenciatura., Itam. Mimeo. México.
- Gill, I., T. Packard, and J. Yermo (2005) *Keeping the Promise of Social Security in Latin America*. Washington, D.C.: The World Bank and Stanford University Press.
- Gustman, A.L. and T.L. Steinmeier (2001a) "What People Don't Know about their Pensions and Social Security." In W.G. Gale, J.B. Shoven and M.J. Warshawsky (eds.), *Public Policies and Private Pensions*, pp. 57-119. Washington, D.C.: Brookings Institution.
- _____ (2001b) "Imperfect Knowledge, Retirement and Saving." NBER Working Paper 8406. Cambridge, MA: National Bureau of Economic Research.
- Hirshleifer, D. and S.H. Teoh (2001) "Herd Behavior and Cascading in Capital Markets: A Review and Synthesis." *European Financial Management* Vol. 9, No. 1, pp. 25-66.
- Holzman, R. (1996) "Pension Reform, Financial Market Development, and Economic Growth: Preliminary Evidence from Chile." *IMF Staff Papers*, Vol. 44, No. 2, pp. 149-179.

- _____ (1998) “Financing the Transition to Multipillar.” Human Development Network, Social Protection Discussion Paper Series No. 9809. Washington, D.C.: The World Bank.
- Holzmann R. and E. Palmer (2006) *Pension Reform: Issues and Prospects for Non-financial Defined Contribution (NDC) Schemes*. Washington, D.C.:The World Bank.
- IMF/International Monetary Fund (2005) “Chapter II: Output Volatility in Emerging Markets and Developing Countries.” In IMF, *World Economic Outlook* (April 2005). Washington, D.C.
- IMF/International Monetary Fund and World Bank (2004) *Chile, The Pension Fund Sector. Financial Sector Assessment Program*. Mimeo. Washington, D.C.
- _____ (2005a) “Technical Note: Pension – Competition and Performance in the Hungarian Second Pillar.” Financial Sector Assessment Program Update, Hungary. Mimeo. Washington, D.C.
- _____ (2005b) “Colombia: Financial Sector Assessment Update.” Latin America and the Caribbean Region Vice-Presidency and Financial Sector Presidency. Board Report No. 34599. Washington, D.C.
- _____ (2006) “Competition and Performance in the Polish Second Pillar.” Mimeo. Washington, D.C.
- _____ (2007) “Technical Note on the Second Pillar of the Pension System.” Financial Sector Assessment Program Update, Slovak Republic. Mimeo. Washington, D.C.
- Impavido, G., A.R. Musalem and T. Tressel (2003) “The Impact of Contractual Savings Institutions on Securities Markets.” World Bank Policy Research Working Paper, No. 2948. Washington, D.C.
- Investment Company Institute (2006) *Fees and Expenses of Mutual Funds 2005*, Vol. 15, No. 4. Washington, D.C.
- International Financial Services London (2006) Fund Management. *City Business Series*, August 2006. Available at <http://www.ifsl.org.uk>.
- _____ (2007) “Pension Reform.” January 2007. Available at <http://www.ifsl.org.uk>.
- Jaeger, M. (2007) “Latin America Needs Pro-Growth Reforms and Fiscal Policy is the Place to Start.” Deutsche Bank Research, *Talking Point*. March 27, 2007.
- Lasaga, M. and J. Pollner (2003) “Peru’s Private Pension System: An Analysis of its Evolution, Current Market Structure and Recommendations for Reform.” Background paper for Analytical and Advisory Assistance to the Government of Peru, Social Protection Sector Unit, Latin America and the Caribbean Regional Office. Washington, D.C.: The World Bank.
- Levy, S. (2006) “Social Policy, Productivity, and Growth.” Background paper for the Latin America and Caribbean Regional Flagship Study on Informality, Office of the Chief Economist for Latin America and the Caribbean. Washington, D.C.: The World Bank.
- Luchak, A. and M. Gunderson (2000) “What Do Employees Know About their Pension Plan?” *Industrial Relations*, Vol. 39, No. 4, pp. 646-670.
- Lusardi, A. and O.S. Mitchell (2006) “Financial Literacy and Planning: Implications for Retirement Wellbeing.” Pension Research Council Working Paper 2006-1. Philadelphia, PA: The Wharton School of the University of Pennsylvania.

- Mander, B. (2005) "Markets: Heady growth is based on solid foundations." In *The Financial Times, Mexico and Globalization 2005*. December 12, 2005.
- Marinovic, I. and S. Valdés (2004) "La Demanda y los Costos de las AFP Chilenas, 1992-2002." Mimeo. Presented at the CEP-SAFP Pension Seminar, November 11-12. Chile.
- Marquez, G. and C. Pages (1998) "The Ties that Bind: Protecting Employment and Labor Trends in Latin America." Paper presented at the annual meeting of the Board of Governors, Inter-American Development Bank. Cartagena, Colombia.
- Matías L. and E. Sánchez. (2006). "Competencia y Reducción de Comisiones en el Sistema Privado de Pensiones: El Caso Peruano." *Superintendencia de Banca, Seguros, y AFP. Revista de Temas Financieros*. Volum III. Número 1.
- Mathieson, D., J. Roldos, R. Ramaswamy and A. Ilyina (2004) "Emerging Local Securities and Derivatives Markets." *World Economic and Financial Surveys*. Washington, D.C.: International Monetary Fund.
- McKinsey (2000) "Asset Management in Europe." *The McKinsey Quarterly*, 2000 No. 2, pp. 8-11.
- Melendez, J. (2004) "La Industria de la Afore: Un Análisis de su Estructura y Recomendaciones de Política de Competencia y Regulación." Instituto Mexicano de Seguridad Social. Mimeo. México, D.F.
- Mesa-Lago, C. (2000) "Social Assistance, Pensions and Health Care for the Poor in Latin America and the Caribbean." In N. Lustig (ed.), *Shielding the Poor: Social Protection in the Developing World*. Washington, D.C.: Brookings Institution Press and Inter-American Development Bank.
- Ministerio de Hacienda y Crédito Público (2007) *Colombia: Old Worries, Strong Results, New Challenges*. Bogota, Colombia: Ministerio de Hacienda y Crédito Público, República de Colombia.
- Mitchell, O.S. (1988) "Worker Knowledge of Pension Provisions." *Journal of Labor Economics* No. 6, Vol. 1, pp. 21-39.
- Müller, K. (2002a) "Pension Reform Paths in Central-Eastern Europe and the Former Soviet Union." Forthcoming in: *Social Policy and Administration*, 36 (2).
- _____ (2002b) "Explaining Pension Reform." In E. Fultz (ed.) *Pension Reform in Central and Eastern Europe, Restructuring of Public Pension Schemes: Case Studies of the Czech Republic and Slovenia*. Budapest: International Labour Office.
- Myners, P. (2001) *Institutional Investment in the United Kingdom: A Review*. London, UK: HM Treasury.
- OECD (2005) *Improving Financial Literacy: Analysis of Issues and Policies*. Paris: France.
- _____ (2006a) "Survey of Investment Regulations of Pension Funds." June 2006. Paris: OECD.
- _____ (2006b) *Pension Markets in Focus*. Newsletter Issue 3, October. Paris: OECD.
- Olivares, J.A. (2005) "Investment Behavior of the Chilean Pension Funds." Financial Management Association *European Conference*, Paper No. 360419. Siena: June 8-11.
- Queisser, M. (1999) "Pension Reform: Lessons from Latin America." OECD Development Center, Policy Brief No. 15.

- Palacios, R.J. (2003) "Pension Reforms in Latin America: Design and Experiences." In: International Federation of Pension Fund Administrators (2003) *Pension Reforms: Results and Challenges*, pp. 13-122. Santiago, Chile: Corporación de Investigación, Estudio y Desarrollo de la Seguridad Social.
- Palmer, E. (2001) "Swedish Pension Reform: How Did it Evolve and What Does it Mean for the Future?" In M. Feldstein and H. Siebert (eds.) *Coping with the Pension Crisis: Where Does Europe Stand?* Chicago: University of Chicago Press.
- _____ (2004) "Sweden's New FDC Pension System." Presented at the CEP-SAFP Pension Seminar, November 11-12, 2004. Chile.
- Perry, G. and L. Servén (2003) "The Anatomy of a Multiple Crisis: Why Was Argentina Special and What Can We Learn from It?" Policy Research Working Paper No. 3081. Washington, D.C.: The World Bank.
- Rocha, R. and R. Hinz (2007) "Mandatory Private Pension Systems: Can They Meet Expectations?" Presented in the Financial & Private Sector Development Forum 2007 Finance and Markets for All: What, Why, When, and How? The World Bank, April 25-26. Washington, D.C.
- Rocha, R. and D. Vittas (2002). "The Hungarian Pension Reform: A Preliminary Assessment of the First Years of Implementation." In Feldstein, M. and H. Siebert (eds.) *Social Security Pension Reform in Europe*. Chicago: University of Chicago Press for National Bureau of Economic Research.
- Rofman R. (forthcoming) "The Pension System in Argentina." In Kay, S.J. and T. Sinha (eds.) *Lessons from Pension Reforms in the Americas*. Oxford University Press.
- Rofman R. and L. Lucchetti (2006) "Social Security in Latin America: Concepts and Measurement of Coverage." Human Development Network, Social Protection Discussion Paper Series No. 0616. Washington. D.C.: The World Bank.
- Roldos, J.E. (2004) "Pension Reform, Investment Restrictions, and Capital Markets." IMF Policy Discussion Paper No. 04/04. Washington, D.C.: International Monetary Fund.
- _____ (2007) "Pension Reform and Macroeconomic Stability in Latin America." IMF Policy Discussion Paper No. 07/108. Washington, D.C.: International Monetary Fund.
- Rozinka, E. and W. Tapia (2007) "Survey of Investment Choice by Pension Fund Members." OECD Working Paper on Insurance and Private Pensions, Paper No. 7.
- Rudolph, H. and R. Rocha (2006) "Competition and Performance in the Polish Second Pillar." Mimeo. Washington, D.C.
- SAFP/Superintendencia de Administradoras de Fondos de Pensiones. (2007) "El Sistema Chileno de Pensiones." Santiago, Chile: SAF. 6th Edition, January 2007. Available at <http://www.safp.cl>.
- Salop, S., and J. Stiglitz (1977) "Bargain and Rip-offs: A Model of Monopolistically Competitive Price Dispersion." *Review of Economic Studies*, No. 4, pp. 493-510.
- Shah, H. (1997) "Towards Better Regulation of Private Pension Funds." World Bank Policy Research Working Paper No. 1719. Washington, D.C.: The World Bank.
- Singh, A. and M. Cerisola (2006) "Sustaining Latin America's Resurgence: Some Historical Perspectives." IMF Working Paper No. 06/252. Washington, D.C.: International Monetary Fund.

- Skog, J. (2006) “Who Knows What About Their Pensions? Financial Literacy in the Chilean Individual Account System.” Mimeo. Philadelphia, PA: The Wharton School of the University of Pennsylvania.
- Srinivas, P.S., E. Whitehouse and J. Yermo (2000) “Regulating Private Pension Fund’s Structure, Performance and Investments: Cross-Country Evidence.” Social Protection Discussion Paper Series, Paper No. 0113. Washington, D.C.: The World Bank.
- Srivitas, P.S. and J. Yermo (1999) “Do Investment Regulations Compromise Pension Fund Performance? Evidence from Latin America.” The World Bank Latin American and Caribbean Studies, *Viewpoints*. Washington, D.C.
- Schwartz, M. (2007) “Reformas al Sistema de Pensiones Mexicano 2007.” Assembly of AIOS/Asociación Internacional de Organismos de Supervisión de Fondos de Pensiones. Mimeo.
- Tarziján, J.M. (2002) “Justificación para Inversión en el Extranjero de los Fondos de Pensiones de El Salvador.” Mimeo.
- Taylor, M. and A. Fleming (1999) “Integrated Financial Supervision: Lessons of the Northern European Experience” World Bank Policy Research Working Paper No. 2223. Washington, D.C.
- Valck, E. and E. Walker (1995) “La Inversión de los Fondos de Pensiones: Historia, Normativa y Resultados.” In Baeza, S. and F. Margozzini (ed.), *Quince Años Después: Una Mirada al Sistema Privado de Pensiones*, pp. 131-164. Santiago, Chile: Centro de Estudios Públicos.
- Valdés, S. (1999) “Reply to the article ‘Do Investment Regulations Compromise Pension FundP? Evidence from Latin America’ by P.S. Srinivas and J. Yermo.” *Revista de Análisis Económico*, Vol. 14, No. 1, pp. 67-120.
- _____ (2005) “Para Aumentar la Competencia entre las AFPs.” *Estudios Públicos*, No. 98, pp. 87-142. Centro de Estudios Públicos de Chile. Santiago.
- Vittas, D. (1996) “Pension Funds and Capital Markets.” World Bank Public Policy for the Private Sector Note No. 71. Washington, D.C.
- _____ (1997) “Private Pension Funds in Argentina’s New Integrated Pension System.” World Bank Policy Research Working Paper No. 1820. Washington, D.C.
- _____ (1998) “Regulatory Controversies of Private Pension Funds.” World Bank Policy Research Working Paper No. 1893. Washington, D.C.
- Walker, E. and F. Lefort (2002) “Pension Reform and Capital Markets: Are There Any (Hard) Links?” World Bank Social Protection Discussion Paper Series No. 0201. Washington, D.C.
- World Bank (2002) “Towards a Sustainable and Fair Pension System.” Latin America and Caribbean Poverty and Economic Management Department. Mimeo. Washington, D.C.
- _____ (2004). *Public Pension Fund Management: Governance, Accountability, and Investment Policies*. Proceedings of the Second Public Pension Fund Management Conference, May 2003. Washington, D.C.
- _____ (2005). “Technical Note: Pension – Competition and Performance in the Hungarian Second Pillar.” Mimeo. Washington, D.C.

- _____ (2007) *Regional Study on Informality in Latin America*. Latin America and Caribbean Regional Economist Office. Mimeo. Washington, D.C.
- _____ (forthcoming) "Note on Pensions Indicators." Human Development Network, Social Protection Team. Washington, D.C.
- UBS (2007) *Financial Report 2006*. Mimeo. Available at <http://www.ubs.com>.
- Yermo, J. (2005) "The Contribution of Pension Funds to Capital Market Development in Chile." Oxford University and OECD, September. Mimeo.
- Zettelmeyer, J. (2006) "Growth and Reform in Latin America: A Survey of Facts and Arguments." IMF Working Paper No. 06/210. Washington, D.C.: International Monetary Fund.
- Zepeda, JC. and O. Roldán. 2005. "Las Afores: Empresas de Escala Reducida." Coordinación General de Estudios Económicos. Documento de Trabajo 2005-1. CONSAR. Mexico, D.F.
- Zviniene, A. and T. Packard (2002). "A Simulation of Social Security Reforms in Latin America: What has been gained?" Background Paper for the Regional Study on Social Security Reforms, LAC Region. The World Bank, Washington, D.C.

Appendix 1. Tables

Table A1: Total accumulated explicit pension debt since 2001 (percent)

Instrument	2010	2020	2030	2040	2050
Argentina					
Reform	25	58	96	140	189
No reform	10	35	72	119	172
Bolivia					
Reform	16	32	44	50	53
No reform	29	84	164	269	392
Chile					
Reform	22	47	61	68	74
No reform	19	51	92	134	177
Colombia					
Reform	13	44	91	152	224
No reform	30	82	151	235	330
El Salvador					
Reform	11	28	53	74	87
No reform	21	52	94	144	202
Mexico					
Reform	9	19	27	35	42
No reform	8	23	43	68	96
Peru					
Reform	6	14	24	33	43
No reform	6	19	40	69	104
Uruguay					
Reform	18	42	69	98	128
No reform	34	83	142	213	290

Source: Zvinienne and Packard (2002).

Table A2: Number of sales agents across PFAs in selected LAC countries, 2000-2005

Country	2000	2001	2002	2003	2004	2005
Argentina	11,683	11,381	9,118	9,227	9,120	8,161
Bolivia	0	0	0	70	66	67
Chile	4,382	3,868	3,944	3,812	2,281	2,348
Colombia	4,933	3,853	3,341	2,941	2,554	2,622
Costa Rica	n.a.	1,463	n.a.	n.a.	n.d	n.d
El Salvador	856	573	413	399	376	n.d
Mexico	13,482	10,781	12,116	17,870	22,121	36,734
Peru	1,042	880	861	894	1,115	3,168
Uruguay	342	197	193	123	129	123
Total	36,720	32,996	29,986	35,336	37,762	53,223

Note: n.a. means not available.

Source: FIAP.

Table A3: Number of transfers across PFAs, 2000-2006

Country	2000	2001	2002	2003	2004	2005	2006
Argentina	401,009	412,683	330,542	364,384	710,590	243,326	431,543
Bolivia	0	0		2,930	3,447	4,013	4,174
Chile	255,626	235,245	228,856	274,751	211,472	234,593	234,536
Colombia	n.a.	n.a.	169,551	122,949	79,617	72,724	66,488
Costa Rica	--	5,978		74,842	73,661	97,270	98,846
El Salvador	134,957	77,798	40,636	53,361	36,700	67,652	10,118
Mexico	99,300	116,600	133,345	430,617	1,204,776	2,437,961	3,849,333
Peru	7,329	4,667	8,768	9,037	9,845	129,398	642,966
Dominican Rep.	--	--	--	--	1,348	733	861
Uruguay	n.a.	330	1,251	529	322	560	562
Total	898,221	853,301	912,949	1,333,400	2,331,778	3,288,230	5,339,427

Note: n.a. means not available.

Source: AIOS.

Table A4: Mexico: Investment Limits per Instrument (August 2007)

		Limits by kind of SIEFORE (fund) ¹					
		1	2	3	4	5	
Market risk	Value at Risk [VAR _{historical} (1- α =95%, 1 day)]	0.6%	1.0%	1.3%	1.6%	2.0%	
	Equity	0%	15%	20%	25%	30%	
	Foreign Currency (Dollars, Euros, Yens or currencies to acquire equity)	30%	30%	30%	30%	30%	
	Derivatives	Yes	Yes	Yes	Yes	Yes	
Credit risk	mxAAA2 and government securities	100%	100%	100%	100%	100%	
	mxAA-rated securities	35%	35%	35%	35%	35%	
	mxA-rated securities	5%	5%	5%	5%	5%	
Concentration/counterparty risk	Domestic	mxAAA rated securities from one issuer or counterpart	5%	5%	5%	5%	5%
		mxAA rated securities from one issuer or counterpart	3%	3%	3%	3%	3%
		mxA rated securities from one issuer or counterpart	1%	1%	1%	1%	1%
		BBB+ rated security denominated in foreign currency from one issuer	5%	5%	5%	5%	5%
		BBB-rated security denominated in foreign currency from one issuer	3%	3%	3%	3%	3%
	Foreign	A-rated foreign securities from one issuer or counterpart	5%	5%	5%	5%	5%
		Maximum ownership of one issue	20%	20%	20%	20%	20%
Other limits	Foreign securities (if fixed income, minimum rate is A-)	20%	20%	20%	20%	20%	
	Securitizations	10%	15%	20%	30%	40%	
	Structured securities	0%	1%	5%	7.5%	10%	
	REITs ²	0%	5%	5%	10%	10%	
	Inflation-protected securities minimum	51% min.	No	No	No	No	
Conflict of interests	Securities endorsed by related parties	15%	15%	15%	15%	15%	
	Securities endorsed by parties related to the Afore	5%	5%	5%	5%	5%	

Note: ¹As percentage of assets under management. The table shows ceilings except for the inflation protection securities, which are floors. ²Real estate must be in Mexican territory.

Source: CONSAR.

Appendix 2. A Comprehensive Reform of the Chile Pension System⁶⁴

In January 2008, the Chilean Congress approved a reform of the country's pension system, which is based on three pillars: (a) an integrated solidarity pillar, (b) a strengthened contributory pillar, based on improved coverage, competition, and investment returns on contributions, and (c) an expanded voluntary contributory pillar.

The reform establishes a new solidarity pillar with old-age, disability, and survivorship benefits integrated to the benefits provided by the contributory pillar, financed with fiscal resources from the Solidarity Fund. This would gradually replace the current programs of minimum pension guarantee and state pension with a universal basic pension for workers who do not receive pensions from the contributory system. The years of contribution requirement would be eliminated for purposes of determining benefits and replaced with the value of the pension self-funded by the worker's savings. The pension amount would be progressively decreased with respect to the pension provided by the contributory pillar, until completely disappearing – when the self-funded pension reaches 255,000 Pesos per month. (Lower ceilings will apply prior to 2012.) In addition, access to benefits provided under this pillar would be granted to workers of both genders who comply with the residency and economic requirements. Overall, this pillar would benefit workers that have lapses in contributions, including the seasonal workforce and the self-employed. Workers that belong to the richest 40 percent of households would be excluded from this pillar.

On price and competition in the contributory pillar, the reformed system will organize a bidding mechanism for new affiliates joining the individual capitalization system, assigning them, for a 24-month period, to the Pension Fund Administrator (*Administradora de Fondos de Pensiones*, PFA) charging the lowest commission. To win the auction, the PFA will also have to charge old affiliates during the same 24-month period a price below the lowest price prevailing in the system at the time the bidding was submitted. The fixed fee charged by PFAs would be deducted from workers' wages instead of their individual capitalization accounts and PFAs would be allowed to give discounts on commissions charged based on the effective enrollment period with the same administrator. The reformed system encourages subcontracting of administrative services.

To increase the return and security of investments, the three main modifications are: (a) relaxing the structure of the investment regime, (b) relaxing quantitative investment limits for both domestic and foreign investments, and (c) promoting competition based on the quality of the management of pension funds' assets, with the modification of the methodology used in the calculation of the relative minimum rates of return.

⁶⁴ Based on *Consejo Asesor Presidencial para la Reforma Previsional* (2006).

Appendix 3. Mexico: Fostering Greater Competition⁶⁵

Since 2001, a series of legal and regulatory changes have been adopted to foster competition and lower fees in the Mexican pension industry. They have induced a dramatic fall in fees and costs as well as significantly narrowed fee dispersion. The main changes implemented are:

(a) Automatic assignation of affiliates' accounts without an administrator: Until 2001, the accounts of affiliates who did not choose a pension fund administrator (*Afore*) were managed by the Central Bank. Between 2001 and 2002, about 7 million accounts were automatically assigned by the Mexican Commission for the Retirement System (*Comisión Nacional del Sistema de Ahorro para el Retiro*, Consar). In 2001, four criteria were used: equivalent fee for a 25-year projection; historical yields on returns; identification number; and financial sustainability of the *Afore*. In early 2002, the criteria were modified to give greater weight to the equivalent fee estimated on a 5-year basis, and, in March 2002, it was decided that the equivalent fee commission calculated on a 25-year basis would be the criterion for automatically assigning affiliates without an *Afore*. In 2005, the equivalent fee estimated on a 1-year projection basis became the new criterion used by Consar to automatically assign close to 80 percent of new system's affiliates to an *Afore*.

(b) Transfers: Initial regulations limited transfers across *Afores* to once a year, obliged the affiliate to provide extensive documentation, and required administrator holding the account to initiate the process. In 2004, an amendment to the law allowed affiliates to switch more than once a year if they transferred to an *Afore* with lower fees.

(c) Information disclosure: Having realized the complexity of the fee structure, Consar has made significant efforts to improve information to affiliates *inter alia* upgraded regulations concerning marketing, and developed standard indicators for comparing performance across *Afores*. Consar also provides extensive information through its website and call center.

(d) Procesar: In 2004, legal changes were adopted to reduce and modify the charging structure of *Procesar*, the central operator of the pension system's database, which is in charge of reconciling information on contributions with actual financial flows and to redistribute them to *Afores*. In 2005, Consar adopted various measures to reduce the system's costs and enhance its operational efficiency. To enhance *Procesar's* governance structure, the number of independent board members increased from 1 to 4 and the board's chairman was required to be an independent member. *Procesar* costs about 5 percent of system's operational costs while record keeping in each administrator is estimated at 30 percent of each *Afore's* costs. There is scope for exploiting further economies of scale.

In the first half of 2007, the Congress modified the pension law. The most important amendments were: (a) simplification of the fee structure to an asset-based

⁶⁵ Based on Zepeda et al. (2005), Consar (2006), and Schwartz (2007).

structure, (b) limiting the number of transfers across *Afores* to one per affiliate per annum, (c) allowing the transfer of affiliates before the 12-month period when they switch to an *Afore* with a higher net profitability indicator, in which they must remain for 12 months, and (d) automatically assigning affiliates who do not choose an *Afore* to the administrator with the highest net returns. The new fee structure will facilitate comparisons across *Afores* to the average affiliate, while the definition of critical parameters to determine net rate of returns (e.g., period of measurement) and the criteria for *Afores* to pay salesmen will be set by Consar's regulations. In addition, in order to promote portfolio diversification and higher rates of return, the investment regime was changed. Each *Afore* will have the option to offer three additional funds (*Siefores*) with investment strategies varying according to contributors' age and risk preferences. These *Siefores* should invest a larger share of their funds in variable-income instruments.

Appendix 4. Lessons from the Swedish New Financial Defined Contribution Scheme⁶⁶

In the 1990s, Sweden transformed its DB PAYG scheme into a combination of a notional defined contribution (NDC) PAYG and a financial defined contribution (FDC) scheme with a DB guarantee benefit level. The contribution rate for the NDC and FDC schemes is 16 percent and 2.5 percent, respectively. In the NDC, accounts are notional and the rate of return is based on the average covered wage.^a In the FDC, affiliates have individual accounts and choose up to 5 funds to invest their contributions from a large number of funds. While contributions to the FDC have been made since 1995, individual fund choices became available in 2000.

Given the small size of the FDC pillar, authorities paid careful attention to its design and developed a structure in which funds could be efficiently managed at a low cost. They separated administrative and investment management functions, where the former is centralized and publicly managed and the latter is open to private competition. The Premium Pension Authority (PPM) was set up to administer the FDC pillar, including the maintenance of individual accounts, collection and information on participating funds, transfers, and the provision of information services to workers. It relies on the Swedish tax administration authority to collect contributions, allowing for additional administrative savings. The sole responsibility of fund managers is to invest the funds during the accumulation phase, and they have no direct interaction with workers. Also, the PPM will become the monopoly annuity provider during the decumulation phase.

The authorities tried to reduce entry barriers and to create a competitive fund management market. All fund managers registered with the Swedish Financial Supervisory Authority are allowed to participate in the system. By December 2005, over 700 funds were registered in the system and around 50 percent of assets were invested in equity funds and 30 percent in the default option. Excluding the default option, there is limited concentration among private pension funds and, as of 2004, the 20 largest private funds held about 33 percent of the assets.

⁶⁶ Based on Palmer (2004) and Rocha and Hinz (2007).

Total charges were moderate in the initial years of operation and are expected to decline as the asset base expands – the total charge (the PPM administration fee and the manager’s fees) was 60 basis points of in 2005 and is projected to decline to less than 30 basis points in 2025.^b The PPM projects that its charge will fall to 10 and 4 basis points by 2015 and 2020, respectively. Initial costs were higher due to the small asset base and the fixed costs related to the development of information technology systems. The average fee for all funds (net of rebates) was 41 basis points in 2003 and it is projected to fall to about 24 basis points percent by 2020. The PPM designed a fee schedule for participating funds that is inversely related to the amount of assets held by fund managers, who can charge the fees they normally charge on similar products but pay a rebate, credited to the affiliates’ accounts, to the PPM if the fees exceed the PPM benchmarks. Marketing expenditures by fund managers are modest.

The system, however, still faces challenges and criticisms. The FDC scheme was designed with free entry for fund managers with a price ceiling and, as a result, the number of funds is large. There are no restrictions on fund choices and affiliates could place all their mandatory old-age savings in high-risk and poorly diversified portfolios. Critics thus have called for limitations regarding fund choices and lowering the permissible risk exposure. The large number of alternatives has created a passive attitude among affiliates instead of promoting choice because individuals have difficulty comparing investments to risk tolerance. This has resulted in: (a) the lack of diversification of investments (there is a risk for home bias in the country one lives in or sector one works in), and (b) a risk that investment strategies do not change over time, therefore not adapting to individuals changing risk preference during their lifecycles.

Appendix 5. The Importance of Financial Literacy for Retirement⁶⁷

In the conventional life-cycle microeconomic model, workers will rely on accurate knowledge regarding their likely retirement benefits and consumption needs in order to arrive at the optimal saving decisions (Skog 2006). If they lack key financial information, this can cause individuals to prepare inadequately for retirement (Lusardi and Mitchell 2006). Little is known about individuals’ reasons for acquiring financial knowledge. Older people may know more simply because they are closer to retirement, healthier people may know more because they expect to live longer in retirement, and wealthier or more educated individuals may know that they will need to rely more on their pensions in retirement than the poor.

Analyses using US data found that the financial misinformation or lack of information is the norm (Gustman and Steinmeier 2001b). However, it was found some variability across the population: men tend to know more about their retirement benefits than women; the older the individual the more financially literate he or she is; and wealthier, healthier, and better educated individuals tend to be more informed about their retirement prospects (Mitchell 1988, Gustman and Steinmeier 2001a, and Chan and Stevens 2004). Individuals that are the most likely to rely on social security are the least informed, while those who are mostly expected to rely on their pensions are the most

⁶⁷ Adapted from Skog (2006).

well-informed (Luchak and Gunderson 2000). As a means of improving financial literacy in the US, several education programs were promoted. Caskey (2006) however argues that personal financial management education cannot be considered an effective mechanism for helping lower-income households accumulate financial assets and improve credit histories – in spite of the best existing studies of its effectiveness suggesting that it might help lower-income households build savings and improve credit records, their results are only suggestive.

Some surveys on financial literacy were implemented in a few OECD countries. Although they differed in target audience, approach to measuring financial literacy, and methodology, one common result was the low level of financial understanding among respondents. The surveys that included questions about respondents' social characteristics found that financial understanding is correlated with education and income levels. In Australia, the lowest levels of financial literacy are associated with low levels of education (year 10 or less), unemployment or low skilled work, low incomes, low levels of savings, being single, and being at either end of the age profile (18 to 24 year olds and those aged 70 years or older). In the UK, individuals in the lower social grades and the lowest income band, as well as young people aged 18 to 24, are likely to be the least receptive consumers. By contrast, the higher social grades, those with higher income, young couples and older respondents with no family are more likely to be sophisticated financial consumers, knowing how to get the information they need and understanding the advice they receive. In Korea, scores broken down by demographic characteristics indicated that students from families with less educated parents and/or students who have low income and professional expectations score the lowest (OECD 2005).

Relatively few analysts have examined the question of pension knowledge outside of the US. Arenas de Mesa et al. (2006) used Chilean data from the 2004-Social Protection Survey (or *Encuesta de Previsión Social*, EPS) to examine trends of financial literacy variables across social groups. In addition, Skog (2006) used the same dataset to develop a multivariate analysis on the determinants of individuals' financial literacy regarding several structural questions about their pension system. He aggregated these questions into clusters, representing aspects of the pension lifecycle, and literacy along these vectors of knowledge is assessed using an integer scoring system. Results showed that the older, healthier, more educated, married male workers know more about the system. Union members, those with higher incomes, and employees of larger companies are also more financially informed. Finally, he found that knowledge varies by subject area; accordingly, it is important to ascertain what literacy shortfalls must be targeted before determining what education efforts might be useful.

Appendix 6. Insights on the “Prudent Person Rule”⁶⁸

The “prudent person rule” is commonly applied by Anglo-Saxon countries and has its roots in the trust law. It is generally stated in terms of the following broad principle. “A fiduciary must discharge his or her duties with the care, skill, prudence, and diligence that a prudent person acting in a like capacity would use in the conduct of an

⁶⁸ Based on Galer (2002).

enterprise of like character and aims.” It not only applies to investment management of pension assets, but also to the management of a trust, a pension plan, or a fund. Overall, this regulatory framework for the investment of pension funds is regarded as a complex and substantive rule of law that is composed of several basic duties and principles, which include:

(a) A duty to act prudently and with due diligence: it focuses on how diligently a trustee or fiduciary performs his or her obligations with respect to the pension plan, including how investment decisions are made. Therefore, “The focus of the inquiry is how the fiduciary acted in his [or her] selection of the investment, and not whether his [or her] investments succeeded or failed.

(b) A duty of loyalty to the pension fund and its members: the trustee must manage the trust, pension plan, or fund solely on the (best) interest of its members.

(c) A duty to monitor: fiduciaries remain responsible for monitoring the activities they delegate, taking into account investment policies and review processes to assure that they have been prudently carried out.

(d) A principle of diversification: given that fiduciaries should prudently manage assets and avoid undue risk, this principle requires the investment portfolio of pension funds to be suitably diversified and unwarranted risk to be avoided.

Appendix 7. Herding Behavior in the Chilean Pension Fund Industry

Herding behavior is commonly defined as the decisive intention of managers to copy investment decisions made by their competitors regardless of their own information (Devenon and Welch 1996, and Hirshleifer and Teoh 2003). The mechanism for PFAs to achieve similar profitability rates is to mimic their asset allocations, which intensifies the herding behavior in the industry. Table I shows the mean and the standard deviation of portfolio weightings for different assets in Chile in 2000-2006.

There is a prevalent view that the herding behavior of Chilean PFAs is due to the concentrated market structure and the existence of a minimum return guarantee, relative to the system’s average (IMF and World Bank 2004). The lack of an absolute benchmark thus encourages funds to copy each other’s strategy for asset allocation. The herding behavior of Chilean pension fund administrators was analyzed by Olivares (2005), who used monthly data on asset allocation by fund and administrator for the period June 1997 to December 2001. He found that managers herd on asset allocation and stock trading. For asset allocation, a 99 percent correlation between the variability of returns of individual managers and the industry average (benchmark) was found. For stocks, results showed a high positive correlation among funds in stock trading and that herding intensifies when managers trade large market capitalization stocks. Results of the Granger causality test showed that pension fund administrators that merged with or were acquired by other funds pursued the same strategies as the three industry leaders (Cuprum, Habitat and Provida) or the industry benchmark with a one-lag period. The

increase in the time horizon to calculate minimum rates of return in 1999 from 12 to 36 months is considered a regulatory improvement, but Olivares did not find changes in the asset allocation behavior of managers when the two different settings were compared.

The creation of multi-funds in Chile in 2002 was expected to open more room for portfolio differentiation and lessen herding in the system. This would result from the fact that more choices were given to managers and that an administrator would be able to offset a lower rate of return in one fund by a higher return in another fund, decreasing switching by members even if the first fund under-performed. Herding across administrators diminished in the early stages of the multi-fund scheme, but shortly reasserted itself (IMF and World Bank 2004).

Table I: Chile: Mean and standard deviation of portfolio weightings by asset class as shares of total assets, 2000-2006 (percent)

(a) Mean							
Asset	2000	2001	2002	2003	2004	2005	2006
Government Bonds	33.3	30.4	25.2	19.8	12.4	11.0	9.3
Mortgage credit bills	16.6	13.7	11.7	9.4	7.1	5.2	4.6
Deposit certificates	16.0	16.4	19.2	13.7	19.0	20.4	17.2
Domestic corporate shares	10.7	9.8	9.1	13.4	14.8	13.8	16.1
Domestic corporate bonds	3.8	6.5	7.9	8.1	7.0	6.8	7.8
Foreign mutual funds	8.9	8.6	11.9	18.1	24.7	20.8	24.3

(b) Standard Deviation							
Asset	2000	2001	2002	2003	2004	2005	2006
Government Bonds	5.6	2.8	4.3	2.5	2.0	1.2	1.7
Mortgage credit bills	3.4	2.1	1.4	1.4	1.7	1.8	1.2
Deposit certificates	6.1	4.0	6.3	3.3	2.5	3.1	4.8
Domestic corporate shares	1.3	0.4	0.7	0.6	0.8	0.7	1.6
Domestic corporate bonds	1.6	1.5	1.9	1.5	1.5	0.9	0.6
Foreign mutual funds	0.6	0.6	1.1	3.0	1.6	1.1	2.9

Source: Based on data from SAFP.

Appendix 8. Two Crisis and their Impacts on Investments of Pension Funds⁶⁹

(a) The Mexican crisis of 1994-1995: The “Tequila crisis” is linked to the Mexican *Peso* devaluation of December 1994, followed by a banking collapse that saw more than half of the nation’s loans written off. After the crisis, Mexican authorities followed conservative economic policies to bring inflation and the public sector deficit under control. Its aftermath produced some economic reforms, which included the social security reform through the introduction of a private pension fund system in 1997 designed to promote private savings. Pension funds have experienced a rapid growth in their asset base and the majority of their investments have been in government securities. This is mostly due to the investment regime in the country – an extreme cautious setting that allowed for investments in equities only in 2005. As a result, pension funds have been key elements in boosting the demand for government debt, underpinning the recovery of the public debt market after the crisis.

⁶⁹ Based on Mander (2005) and Fernandez et al. (2007).

(b) The Argentinean crisis of 2001-2002: At the end of 2000, Argentina presented serious financial problems. In spite of attempts to rescue sovereign debt, the crisis could not be avoided and the “mega-exchange” was implemented in mid-2001 in an effort to reduce the financial needs of the government, capitalizing interests and extending the maturity of debt. Pension funds were key in the process of managing the crisis and, in 2002, the share of government bonds in the total portfolio of pension funds reached around 80 percent. This was a consequence of a series of events. In November 2001, PFAs entered the exchange that converted government bonds into guaranteed loans in an attempt to help to avoid sovereign default. After that, the government compulsorily made pension funds invest in a short-term bond, which represented 10 percent of their portfolios at the end of 2004. At the beginning of 2002, default of sovereign debt was followed by currency devaluation, the *pesification* of dollar deposits, and the *pesification* of sovereign debt under domestic legislation. Despite the increase in nominal valuation, almost the whole portfolio of government bonds was in default. Only one of the pension fund managers formally accepted the *pesification* of its portfolio of government bonds, while the others reverted to the original bonds and participated in the global restructuring process, despite the warning from the government that this would result in worse terms than those initially offered for guaranteed loans. In the process of sovereign debt renegotiation, a special bond was designed for pension funds (the quasi-par bond), which matures in 2045 and represents around 70 percent of their total holding of government bonds. These bonds were valued at face value and there was no secondary market where they could be negotiated. The portfolios of pension funds were normalized in 2005 since all PFAs participated in the debt exchange.

Appendix 9. Risk-Based Supervision of DC Pension Systems: The Experience of Australia⁷⁰

The first pillar of the Australian pension system presents a wide coverage, offering benefits equal to 25 percent of the average wage financed with revenues from the central government. The mandatory second pillar was introduced in 1993, requiring 9 percent of workers’ salaries to be deposited in their individual accounts. The assets under management by the private pension system are equivalent to about 100 percent of GNP and, in total, there are 307 trustee entities managing around 1,000 pension funds.

The system’s regulation is based on fiduciary responsibility of trustees. The formal risk-based supervision model, introduced in October 2002, is implemented by the Australian Prudential Regulation Authority (APRA), which also supervises the banking and the insurance sectors. The main drivers of this regulatory development were: (a) structural organization changes in APRA, (b) the small number of fund failures, and (c) regulatory concerns about both incomplete compliance with conduct rules and poor governance standards. The primary goal of this model is to ensure that pension entities meet the “financial promises” made to their members and beneficiaries and it applies to DC and DB pension funds, covering a broad range of institutions in terms of size and complexity.

⁷⁰ Based on Brunner et al. (2006).

The model provides a structured methodology, covering all types of regulated financial institutions, that addresses the magnitude of potential impacts and the probability of financial failure. The model employs the Probability and Impact Rating System (PAIRS) to select, rate, and weight factors that determine the overall probability of fund failure. The PAIRS framework was adapted for DC pension funds taking into account that solvency was not a problem and the assessment of net risk is, thus, limited to the inherent risk management and control. In the case of DB pension funds, capital support is important, since they involve an assessment of the surplus or deficit position of the fund, while incorporating an assessment of support from the plan sponsor. Between 2004 and 2006, the risk-based supervision framework was revised. The main elements of this revised structure were: (a) the licensing of all trustees and registration of all funds, (b) widening of reporting obligations for fund auditors, and (c) the introduction of five new prudential measures regarding fitness and propriety of trustees, risk management strategies and plans, outsourcing of trustee information, available resources to trustees, and capital adequacy.