

# A Summary and Update of Developing Annuities Markets

## The Experience of Chile

*Roberto Rocha*  
*Heinz P. Rudolph*

The World Bank  
Financial and Private Sector Development  
Non Bank Financial Institutions Group  
June 2010



## Abstract

The rapid growth of the market for retirement products in Chile has its origins in the pension reform that was implemented in 1981. But the successful development of an active annuity market also reflects many other factors. This paper summarizes and updates an earlier longer study on the development of the Chilean annuity market. The update focuses on the numerous changes that were introduced in 2008.

The most striking aspect of the Chilean experience is the very high rate of annuitization. This has been linked

to the restrictions that have been applied to lump-sum withdrawals, the offer of inflation-protected annuities, and the robust prudential regulation of providers. But the level of annuitization has also been supported by the annuitization incentives provided to early retirees and the influence of brokers and sales agents. The recent regulatory changes have weakened the impact of the last two factors, while strengthening the demand for annuities at normal retirement.

---

This paper—a product of the Non Bank Financial Institutions Group, Global Capital Markets Development Department, Financial and Private Sector Development—is part of a larger effort in the department to study pension systems and the development of markets for retirement products.. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at [rocha@worldbank.org](mailto:rocha@worldbank.org) and [hrudolph@worldbank.org](mailto:hrudolph@worldbank.org).

*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.*

**Non Bank Financial Institutions Group  
Global Capital Markets Development Department  
Financial and Private Sector Development  
The World Bank**

**A Summary and Update of  
Developing Annuities Markets:  
The Experience of Chile<sup>1</sup>**

**By**

**Roberto Rocha  
Heinz P. Rudolph**

---

<sup>1</sup> The authors are grateful to Dimitri Vittas for useful comments and advise. The authors also thank Loic Chiquer, Gonzalo Reyes and Tony Randle for comments and suggestions, and to Craig Thorburn for his contributions to the earlier related work. Sevara Atamuratova provided valuable research assistance.

## Preface

This paper is part of a broader project on life annuities and retirement products, coordinated by Roberto Rocha, program manager in the Financial Markets Policy Unit of the Financial and Private Sector Development Vice-Presidency of the World Bank.<sup>2</sup> The project was initiated in 2004 to fill an apparent gap in the pension literature, especially in the literature addressing the payout phase of defined-contribution pension systems.

Many countries that have implemented systemic pension reforms and introduced private pension systems are now facing the challenge of organizing the payout phase for retiring workers. This entails introducing a well-regulated market for retirement products, covering the effective regulation and supervision of retirement products, marketing activities, providers and intermediaries. However, the literature on the payout phase is generally focused on a few countries and topics and does not address in sufficient detail the institutional and regulatory issues faced by policymakers in reforming countries.

The World Bank project fills this gap by reviewing in detail a number of representative country cases, including Australia, Chile, Denmark, Sweden, and Switzerland. These countries have large mandatory or quasi-mandatory private pension systems operating primarily on a defined-contribution basis and have already entered the payout phase. Moreover, their institutional and regulatory arrangements for the payout phase are different in many aspects, including decentralized and centralized arrangements for the provision of life and term annuities, different menus of retirement products, different approaches to price regulation and risk sharing, different marketing rules, and different capital rules for providers. Therefore these countries provide a rich variety of experiences and policy lessons for other reforming countries.

The current paper provides a summary and update of a longer study on the Chilean market for retirement products that was published a few years ago (Rocha and Thorburn, 2007). The paper highlights the numerous changes in the Chilean pension systems that were introduced in 2008, assesses their potential impact, and updates most of the statistical material.

---

<sup>2</sup> Roberto Rocha is currently Senior Advisor at the Middle East and North Africa Region of the World Bank

## Table of Contents

1. Introduction .....	1
2. Overall Structure of the Pension and Retirement System .....	2
2.1 The AFP System.....	2
2.2 The Insurance Sector .....	3
2.3 The Structure of the Market for Retirement Products.....	6
2.5 The Conditions for Retirement.....	11
3. The Menu and Performance of Retirement Products .....	12
3.1 The Menu of Retirement Products .....	12
3.2 The Demand for Retirement Products and Level of Annuitization .....	15
3.3 The Performance of Phased Withdrawals .....	18
3.4 The Performance of Annuities and Money's Worth Ratios .....	19
3.5 Replacement Rates .....	23
3.6 Risk-Sharing Arrangements .....	24
3.7 Marketing Regulation.....	25
4. Regulation and Supervision.....	27
4.1 The Sustainability of Money's Worth Ratios .....	27
4.2 Prudential Regulation.....	31
4.3 Risk Management.....	34
5. Concluding Remarks .....	35
References.....	39

## Tables

Table 1: Coverage in the Chilean Pension System, 1990-2008.....	2
Table 2: Number of Pensioners in the Old and New Pension Systems, 1990-2008.....	3
Table 3: Insurance Premiums in Chile, LAS, and OECD, 2007-2008 .....	5
Table 4: Assets of Insurance Companies: Chile, LAC, and OECD (2006).....	6
Table 5: Benefits Included in the 2008 Amendments to the Pension Law .....	9
Table 6: Breakdown of the Stock of Pensioners, by Type of Retirement, 1990-2007 .....	12
Table 7: Average Retirement Age by the Type of Retirement, 1988-2007 .....	12
Table 8: Average Monthly Pensions by Type (in UF), 1990-2007, Period Averages.....	12
Table 9: Breakdown of Number of Pensions, by Type of Instrument, 1985-2007.....	15
Table 10: Average Pensions by Instrument (in UFs), 1990-2007, Period Averages .....	16
Table 11: Types of Annuities Issued in March 1999, 2002, 2003, 2004 and 2005 .....	16
Table 12: Average MWRs for Annuities Issued in March 1999, 2002, 2003, 2004, and 2005 ...	20
Table 13: Average Money's Worth Ratios In Selected Countries.....	22
Table 14: Portfolio of Life Insurance Companies, 1991-2008 <sup>1</sup> .....	28

## Figures

Figure 1: Chile Insurance Premium: 1990-2008.....	4
Figure 2: Pension and Insurance Assets 1990-2009 .....	4
Figure 3: Number of Life Insurance Companies, Annuity Providers and AFPs, 1990-2008.....	7
Figure 4: Market Concentration Ratios in Pensions and Annuities .....	8
Figure 5: Chile's Solidarity Pillar (in USD of December 2009) .....	10
Figure 6: Phased Withdrawals under the New Pension Law .....	13
Figure 7: Shares of PW and Annuities.....	17
Figure 8: Average Annuity Rate and Risk Free Rate .....	23
Figure 9: Annuity Rate, Adjusted Annuity Rate, Central Bank Bonds and .....	29
Figure 10: Commission Rates 1991-2008.....	29
Figure 11: Administrative Cost of Life Insurance Companies, 1991-2008.....	30
Figure 12: Returns on Equity of AFPs and Life Insurance Companies, 1997-2008 .....	31

## 1. Introduction

Chile's market for retirement products has its origins in the pension reform that was implemented in 1981 and involved the gradual replacement of the old public pay-as-you-go (PAYG) system with a new private and fully-funded (FF) system operating on a defined contribution (DC) basis. In the new system, workers can choose freely among different pension funds managed by dedicated pension fund administrators (Administradoras de Fondos de Pensiones – AFPs). Workers contribute 10 percent of their wages to an individual account up to a specified ceiling.<sup>3</sup> They also pay an additional amount of about 2.2 percent of their wages to AFPs, part of which is used to pay for disability and survivorship insurance and the remainder which covers the operating costs and profits of fund administrators.

At the time of retirement, workers use their accumulated balances either for phased withdrawals (PW) from a pension fund or to purchase an annuity from an insurance company. Lump sum withdrawals are allowed only under strict conditions. Disabled workers are entitled to a disability pension and the dependants of deceased workers and pensioners are entitled to a survivor's pension. Both disabled and survivorship pensioners can also choose between annuities and phased withdrawals.

Because of the restrictions on payout options and the absence of either a universal or an earnings-related public pension, there has been a strong demand for life annuities, especially by middle and high-income workers.<sup>4</sup> The demand for life annuities has been stimulated by the conditions that have been applied on early retirement and by the provision of generous recognition bonds for past contributions. The growth of the new pension system and the development of the market for retirement products have been supported by a robust regulatory framework and by the provision of several important government guarantees that cover both the accumulation and payout phases.

The objective of this paper is to provide an overview of the development and performance of the market for retirement products in Chile. The paper offers a summary of the main findings of the book published by Rocha and Thorburn (2007) on "Developing Annuities Markets: The Experience of Chile". It also provides a timely update of Chilean developments in view of the major reform of the Chilean pension system in 2008.

The next section offers a brief summary of the overall structure of the market, reviews the types of government guarantees and sets out the conditions for retirement. Section 3 focuses on the menu of retirement products and reviews the demand for different products. This section also looks at the performance of different retirement products, targeted replacement rates, the level of annuitization, the use of risk-sharing arrangements, and the regulation of marketing. Section 4 discusses the prudential regulation of life insurance companies and pension fund administrators

---

<sup>3</sup> Since the creation of the AFP system the ceiling has been set at 60 *unidades de fomento* (UFs). The UF is a unit of account that is indexed to prices and is widely used in the valuation of contracts and tax parameters (UF 1 was approximately USD 42 in December 2009). When it was initially set the ceiling amounted to six times the average wage but it has since declined to about three times the average wage.

<sup>4</sup> In 2008, the Government introduced a non contributory solidarity pillar to alleviate problems of poverty in old age.

and the evolution of risk management in these institutions. The last section offers some concluding remarks.

## 2. Overall Structure of the Pension and Retirement System

### 2.1 The AFP System

The AFP system was made mandatory for new entrants into the labor force starting in 1981 and voluntary for existing workers, but most workers opted to switch to the new system, as they received generous recognition of their accrued rights (in the form of recognition bonds issued by the government) and enjoyed a reduction in contribution rates. By 2008, the number of active contributors was 4.5 million workers or the equivalent of about 63 percent of the labor force, as shown in Table 1. This coverage ratio is much higher than the Latin American average of 28 percent, although still low by comparison with the OECD average of about 90 percent. In 2008, the government implemented reforms aiming at increasing coverage of the mandatory funded pillar and strengthening the solidarity of the Chilean pension system. These reforms are expected to reduce the coverage gap compared with other OECD countries.<sup>5</sup>

**Table 1: Coverage in the Chilean Pension System, 1990-2008**

Year	AFP Contributors	Employment	Labor Force	Contributors/ Labor Force	Contributors/ Employment
1990	2,642,757	4,539,040	4,896,680	54%	58%
1995	2,961,928	5,206,650	5,596,630	53%	57%
2000	3,196,991	5,366,570	5,993,550	55%	60%
2004	3,477,500	5,946,430	6,607,650	55%	61%
2005	3,784,141	6,170,340	6,798,410	56%	61%
2006	3,956,992	6,271,850	6,802,750	58%	63%
2007	4,329,412	6,448,860	6,944,390	62%	67%
2008	4,572,327	6,641,570	7,203,230	63%	69%

Sources: SP, INP

The number of pensioners under the new system has increased significantly, reaching 694,000 in 2008, the equivalent of 15 percent of the number of contributors and 47 percent of the number of total pensioners, as shown in Table 2.

<sup>5</sup> In February 2010 Chile was accepted as a new member of the OECD.



**Table 2: Number of Pensioners in the Old and New Pension Systems, 1990-2008**

Year	Pensioners in Old System	Pensioners in New System	New Pensioners/ AFP Contributors	New Pensioners/ Total Pensioners
1990	894,359	57,119	2.2%	6.0%
1995	872,946	190,400	6.4%	17.9%
2000	878,297	343,965	10.8%	28.6%
2005	882,175	574,011	15.2%	39.4%
2008	795,305	693,929	15.2%	46.6%

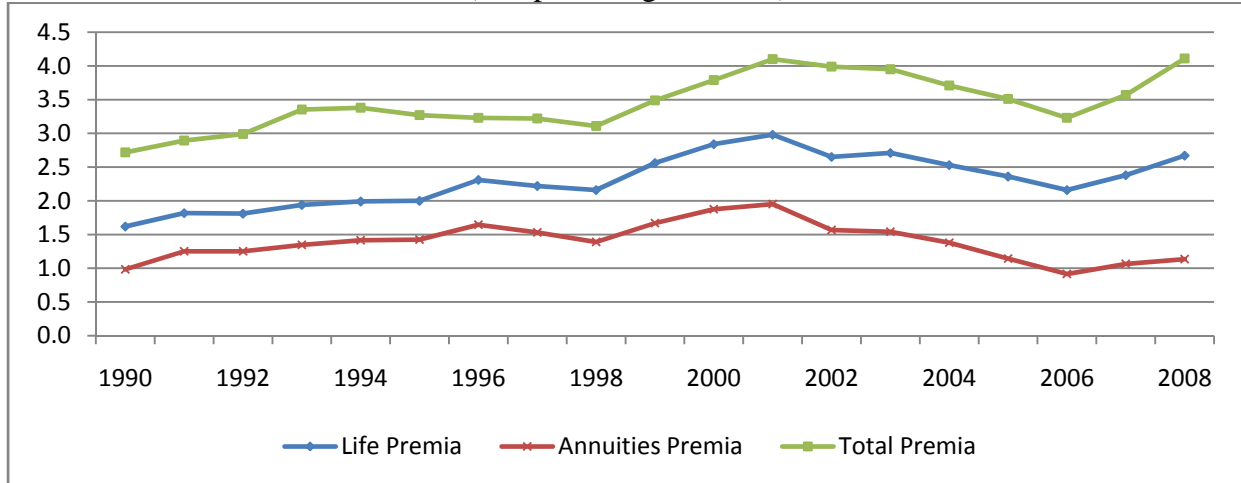
Sources: SP, INP

Contributions and total assets in the AFP system have grown rapidly. Annual contributions have amounted to nearly 4 percent of GDP, reflecting the labor income that is covered by the pension system. Total assets reached 26 percent of GDP in 1990 and 65 and 53 percent in 2007 and 2008 respectively. AFPs have achieved on average high investment returns but have also suffered from relatively high operating fees.

## 2.2 The Insurance Sector

The increase in the number of pensioners from the AFP system has led to a strong demand for both annuities and PWs and fast growth of the Chilean insurance sector in the past decade. As shown in Figure 1, total insurance premiums increased from 2.7 percent of GDP in 1990 to about 4 percent of GDP in 2001-2003. This was followed by a decrease to levels of about 3.2 percent in 2006 and a subsequent recovery to levels of 4.0 percent. The evolution of insurance premiums has been driven primarily by the life sector and fluctuations in life business have been driven in turn by the expansion of the annuity business. The tightening of the early retirement conditions in 2004 explains the reductions in premiums written by life insurance companies between 2004 and 2006. As the old age annuity market matures, the total premium is expected to recover in the future.

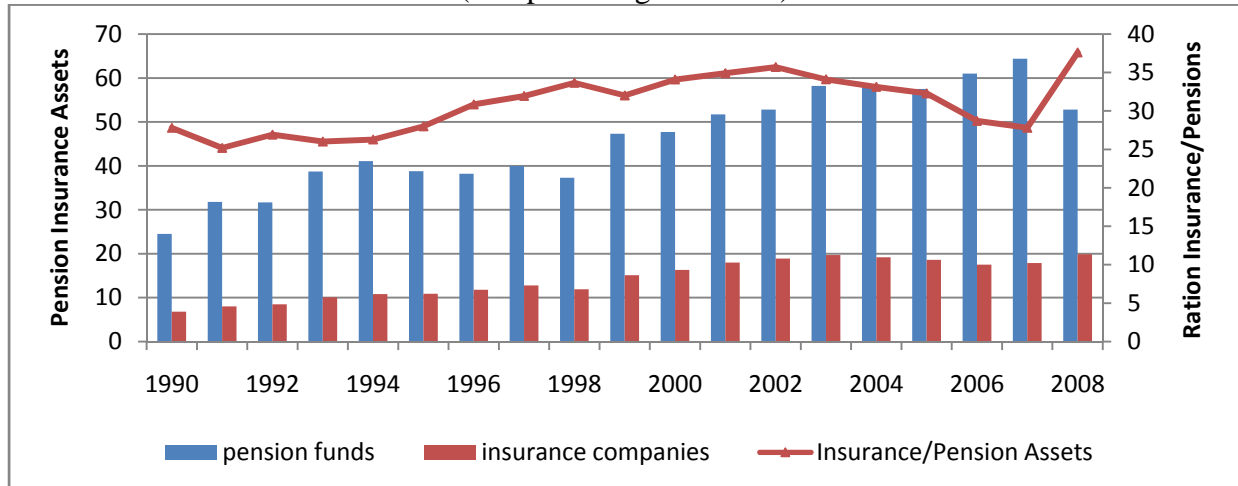
**Figure 1: Chile Insurance Premium: 1990-2008**  
(as a percentage of GDP)



Source: SVS

The expansion of the insurance sector is also reflected in its total assets, which grew from about 5 percent of GDP in the mid-1980s to about 20 percent of GDP in 2003. With the exception of 2008, where figures are volatile due to the effect of the financial crisis, the ratio of total assets of insurance companies to GDP has remained relatively stable since 2003. As shown in Figure 2, the assets of the insurance sector are still smaller than the assets of the pension sector. The increase in the ratio of insurance assets to pension assets between 1990 and 2003 was followed by decreases in this ratio to a level similar to that prevailing in 2009. This declining trend is partially explained by regulatory changes that tightened the requirements for early retirement.<sup>6</sup>

**Figure 2: Pension and Insurance Assets 1990-2009**  
(as a percentage of GDP)



Sources: SVS, SAFF

<sup>6</sup>The true ratio is higher than 28 percent, because insurance assets are measured by a combination of market and book values, while pension fund assets are measured at market values. Due to decreases in the value of pension fund assets and a steady increase in the value of insurance assets, the ratio in 2008 increased to 38 percent.

Chile has the highest level of life insurance premiums relative to GDP in Latin America and compares well with high-income OECD countries. As shown in Table 3, life insurance premiums are three times the Latin American average and about two-thirds the OECD average. This was essentially due to the large size of annuity and PW premiums, which amounted to about 2.4 percent of GDP and almost 70 percent of life premiums.<sup>7</sup> The lack of accurate information on annuity and PW premiums in OECD countries does not allow a direct comparison, but the size of annuities and PW markets in the OECD is known to be much smaller than in Chile. For example, in Australia (a country with a mandatory, private and DC pension system like Chile) premiums on PWs and annuities are equivalent to only 0.8 percent of GDP and 16 percent of life premiums. In the US, the share of single immediate life annuities is only 7 percent of life business, excluding variable annuities in the accumulation stage.<sup>8</sup>

**Table 3: Insurance Premiums in Chile, LAS, and OECD, 2007-2008**  
(as a percentage of GDP)

	Chile		Latin America		High Income OECD	
	2007	2008	2007	2008	2007	2008
Insurance Premiums	4.1	4.5	2.6	2.6	7.7	7.5
Life	2.7	2.9	1.0	1.0	4.7	4.5
o/w PW in AFPs <sup>1</sup>	0.5	0.5				
Non-Life	1.4	1.6	1.6	1.7	3.1	3.0

<sup>1</sup> Estimated

Source: Swiss Re, SP

Comparing total insurance assets in Chile with the relevant benchmarks yields similar conclusions. As shown in Table 4, the ratio of insurance assets to GDP in Chile is about four times larger than the Latin American average and the difference is primarily due to the large volume of annuity assets in Chile. The ratio of insurance assets to GDP is still smaller than the OECD average, but the share of annuity related assets is probably larger than most OECD countries (a straight comparison of annuity assets is not possible due to the lack of information). Moreover, combining pension and insurance assets places Chile at the same level as many OECD countries and indicates that insurance assets in Chile should continue growing strongly in coming years, as these amounts include pension accounts that will need to be converted into annuities and PWs at retirement.<sup>9</sup> All in all, the numbers indicate that the Chilean market for retirement products is already large by international standards and should continue to expand in the coming decades as the second pillar pension system matures.

<sup>7</sup>In Chile, PWs are provided by pension funds, and the PW premiums (the initial balance) are not reported. The PW premium was estimated and included in Table 3 to allow for international comparisons. The PW premium was estimated assuming a ratio of the average payout to the average premium similar to that observed for annuities.

<sup>8</sup>Premiums on variable annuities are large, but these products are mostly in the accumulation stage and may not be converted into actual life annuities at retirement. See, e.g., Brown et al (2001).

<sup>9</sup> However, the total assets of pension and life insurance institutions are smaller relative to GDP than in several OECD countries (e.g. Australia, Canada, Denmark, Netherlands, Sweden, Switzerland, the UK and the US), mainly because labor market coverage of the pension system is so much smaller in Chile compared with all these countries.

**Table 4: Assets of Insurance Companies: Chile, LAC, and OECD (2006)**  
(as a percentage of GDP)

	Chile	Latin America	High Income OECD <sup>1</sup>
Total Insurance Companies	18.6	4.8	55.4 <sup>2</sup>
Life	17.6		47.4 <sup>3</sup>
Non-Life	1.0		10.4 <sup>4</sup>
Pension Funds	61.0	15.1	39.0
Insurance + Pension Funds	79.6	19.9 <sup>5</sup>	94.4

<sup>1</sup>. High Income OECD excludes Chile, Hungary, Mexico, Poland, Slovak Rep. and Turkey

<sup>2</sup>. It excludes New Zealand

<sup>3</sup>. It excludes Belgium, Czech Republic, Iceland, Netherlands, New Zealand, Portugal, Spain, and Sweden

<sup>4</sup>. It excludes Belgium, Czech Republic, Iceland, Netherlands, Portugal, Spain, and Sweden

Source: AXCO, OECD, AIOS, SVS, SP

### 2.3 The Structure of the Market for Retirement Products

Chile has adopted a competitive decentralized institutional structure for its retirement market. Only institutions specializing in pension fund administration and life insurance are authorized to offer retirement products. These institutions are established as profit-seeking commercial undertakings. There are no not-for-profit mutual groups and there is only a very small presence of central agencies offering common services to all competing institutions.<sup>10</sup>

There is strong competition among a small number of AFPs in the accumulation market and among a larger number of insurance companies in the annuity market.<sup>11</sup> This has resulted in large marketing costs, mostly taking the form of high commissions paid to agents and brokers. However, a growing consolidation of the two markets, which is much more pronounced among pension administrators, the threat of regulation and the adoption of informal agreements among competing institutions in the two main segments of the market have recently resulted in a major containment of marketing costs.

The potential role that central agencies can play in collecting contributions, paying benefits and maintaining accounts, all activities that are characterized by large economies of scale, has been considered but not adopted in Chile, but more intensive use of electronic payment systems is expected in the future.<sup>12</sup> A competitive decentralized asset management structure would stimulate innovation and efficiency, which are essential for attaining high investment returns. On the other hand, centralized administration lowers operating costs because of scale economies and avoidance of high marketing costs, while the centralized offer of life annuities could benefit from using a larger customer base and thus more efficient risk pooling.

The structure of the pension and life insurance sectors evolved very differently in the past 20 years. As shown in Figure 3, the pension sector became very concentrated during the 1990s, with the number of AFPs declining from 20 to 8 between 1990 and 2000 and to only 6 more

<sup>10</sup> An example is the creation of SCOMP, which plays the role of information clearing housing collecting and communicating electronic quotations in the market for annuities.

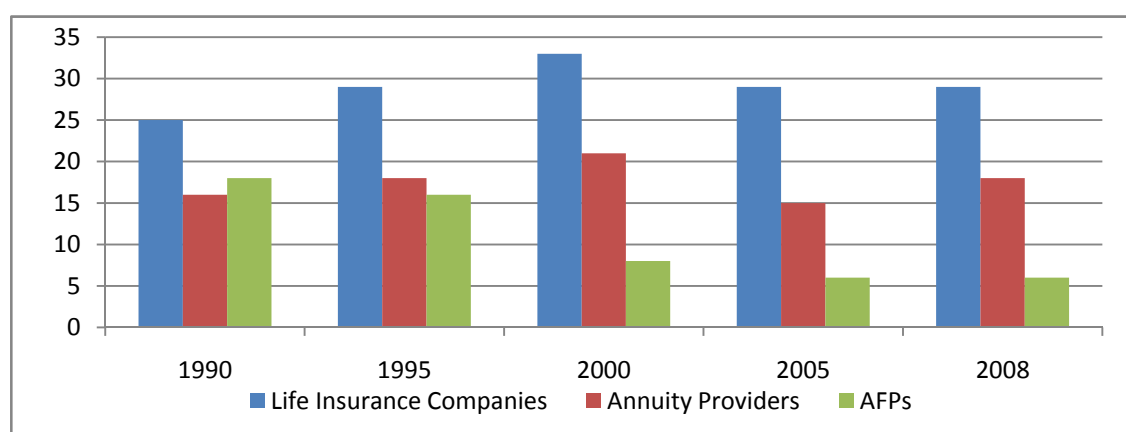
<sup>11</sup> The PW market is handled in a passive way by AFPs.

<sup>12</sup> Hysteresis in the institutional framework has inhibited action in this area,

recently. This reduction in the number of participants was reflected in a sharp increase in concentration ratios. As shown in Figure 4, the 3 largest AFPs increased their combined market share significantly and now account for more than 70 percent of total assets. The increase in the Herfindahl index was even more pronounced.<sup>13</sup>

By contrast, the fast increase in the number of annuity contracts in the 1990s attracted new entrants to the life insurance market, increasing the total number of life insurance companies to 33 by 2000, 21 of which were providing annuities. At that time foreign participation was substantial, accounting for two-thirds of total capital. The annuity market was very concentrated in its early stages – by the end of the 1980s, the share of the 3 largest firms in the annuity business amounted to 87 percent. The increase in the number of participants in the 1990s led to a continuous decrease in concentration ratios, and one decade later the share of the 3 largest firms had declined to less than 30 percent (about 10 percent each).

**Figure 3: Number of Life Insurance Companies, Annuity Providers and AFPs, 1990-2008**

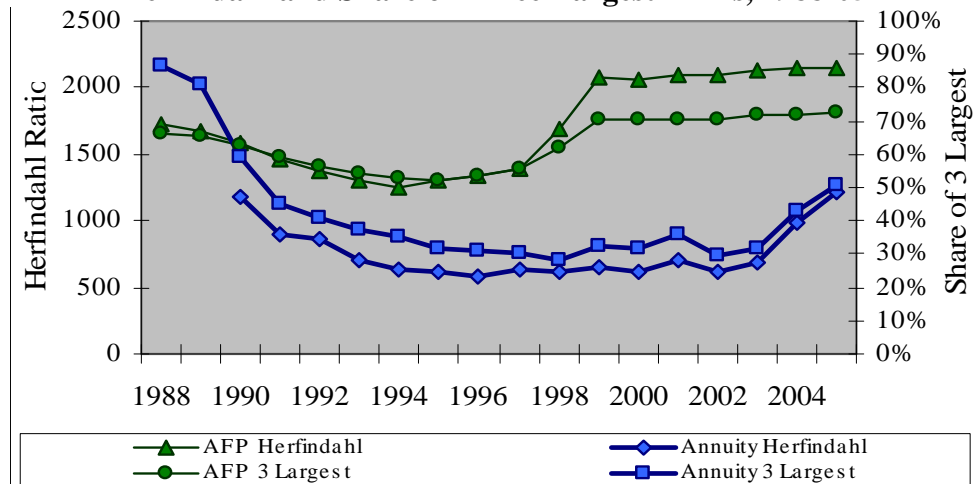


Source: SVS

The past decade has been characterized by the active entry and exit of companies from the annuity segment. The annuity market is highly competitive, offers thin intermediation spreads and relatively low returns on equity. The electronic quotation system for annuities introduced in 2004 has contributed to greater transparency and price competition, opening room for some firms to gain market share and encouraging others to leave the market. These factors have resulted in an increase in concentration ratios, whether measured by the 3 firm concentration ratio or the Herfindahl index. However, the annuity sector in Chile today still remains more competitive than the AFP sector, whether measured by the number of participants or concentration ratios. It is also important to note that life insurance companies that decide to exit the annuity market can enter the market again if the conditions prove attractive, that is, the annuity market not only remains less concentrated than the AFP market, but also looks more contestable. In 2008, there were 29 life insurance companies, 18 of which were offering annuities. Some life insurance companies with small market share in the segment of mandatory savings for retirement have found more profitable business in the less competitive market of voluntary savings.

<sup>13</sup> It should, however, be noted that, attracted by high profit margins, the number of AFPs had increased during the second half of the 1980s from 12 to 20, before the recent trend of consolidation. The latter has been stimulated by the importance of scale economies and the failure of most new entrants to attain critical mass.

**Figure 4: Market Concentration Ratios in Pensions and Annuities  
Herfindahl and Share of Three Largest Firms, 1988-05**



Source : SVS, SAFP

## 2.4 Government Guarantees

As participation in the pension system is mandatory for all new workers, the state has provided four types of guarantees. The first two apply to the accumulation phase and include a minimum relative return guarantee and a guarantee of coverage against disability and death risks. The minimum relative return guarantee involves the obligation of AFPs to ensure a minimum return relative to the industry's average. If the AFP cannot honor this obligation with its capital and "encaje"<sup>14</sup>, it is subjected to supervisory intervention and the government provides the required resources to raise the return to the minimum level. The second guarantee ensures that workers remain properly covered against disability and death risks, in case the insurer defaults in its obligations.<sup>15</sup>

The third and fourth guarantees apply to the retirement phase and include a recently introduced solidarity pension pillar, which includes a Basic Solidarity Pension (PBS) and a Pension Solidarity Supplement (APS) and a guarantee against the bankruptcy of annuity providers.

In 2008, the government introduced amendments to the pension system aimed at strengthening the solidarity pillar. Prior to these amendments, the poverty protection system included two programs: a means tested benefit (PASIS) given to poor elderly people who were not receiving any sort of pension; and the minimum pension, offered to pensioners of the private pension funds who fulfilled minimum requirements of eligibility, including a minimum of 20 years of contributions. The government assessed that the then existing structure of PASIS and minimum pension system did not provide incentives for low-income individuals to contribute and the coverage was limited.

<sup>14</sup> See section 4.2 for a discussion about *encaje*.

<sup>15</sup> Since 2009, the insurance of disability and survivorship is provided by a syndicate of insurance companies. All pension fund members are charged the same fee.

The new solidarity pillar serves as an alternative to improve the coverage of the pension system and improve the retirement benefits of low-income individuals with limited capacity to contribute to the pension system. Since the support of the solidarity pillar is linked to the amount of contributions to the pension system, low-income individuals always have incentives to contribute to the funded pillar. The old PASIS was replaced by a noncontributory Basic Solidarity Pension (PBS) of approximately USD 150 (CLP 75,000) per month in 2009. It will be paid to all aged people with no pension of their own. The benefit initially covered 40 percent of the poorest individuals and it will be gradually extended to 60 percent of the poorest population by 2011 (Table 5). A pension solidarity supplement (APS) was also introduced. This is paid to all aged persons who are in the lowest 3 quintiles (60 percent) of the income distribution and have a pension from the private system. The APS will be equal to the PBS but subject to a clawback provision of eventually 29.4 percent of the private pension (not the total income) of eligible pensioners. The APS will be exhausted when the private pension equals 3.4 times the PBS in steady state. This level is known as the maximum pension with solidarity support (PMAS). Between 2010 and 2011, the PMAS will increase gradually from approximately USD 300 to approximately USD 500 per month (Figure 5).<sup>16</sup> After 2012, these benefits will be indexed to price inflation.

**Table 5: Benefits Included in the 2008 Amendments to the Pension Law**

Date	PBS (CLP)	PMAS (CLP)	Coverage Target
Jul-09	75,000	120,000	45%
Sep-09	75,000	150,000	50%
Jul-10	75,000	200,000	55%
Jul-11 <sup>1</sup>	75,000	255,000	60%

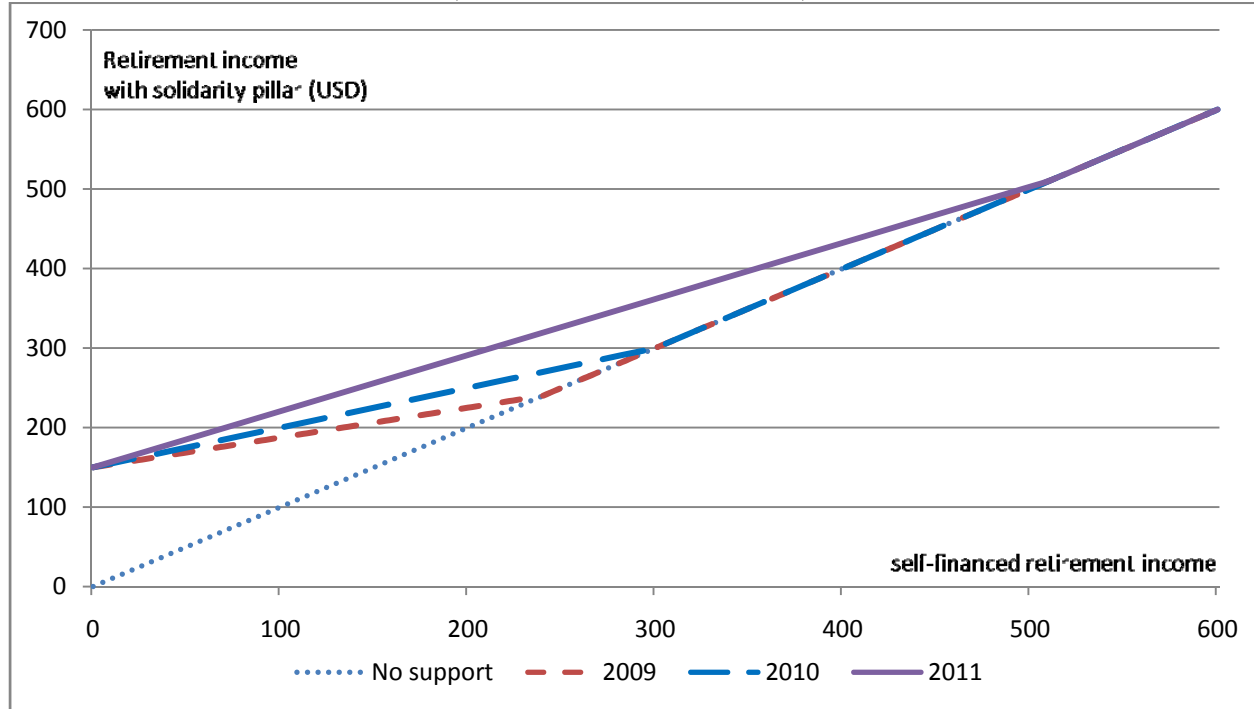
PBS: Basic Solidarity Pension; PMAS: Maximum Pension with Solidarity Support

<sup>1</sup> Initially these changes were expected to take place in 2012, but were modified by law in 2009.

Source: SP

<sup>16</sup> Conversion into US dollars uses an exchange rate of CLP 500 per dollar

**Figure 5: Chile's Solidarity Pillar**  
(in USD of December 2009)



Source: SP

The 2008 amendment to the pension law addresses one of the major concerns of the Chilean pension system, which was the problem of coverage for self-employed workers. The new law gradually extends mandatory coverage to self-employed workers. In the first stage, self-employed individuals are encouraged to contribute to the pension system by establishing the payment of contributions into their default option in the annual declaration of taxable income. Suggested rates are set at 4, 7, and 10 percent of the taxable income for 2012, 2013 and 2014 respectively. During the transition period that lasts until 2014, self-employed individuals have the option of not contributing to their pension fund, but they need to request it actively. Starting in 2015, self-employed individuals will be required to contribute to the pension system at a rate of 10 percent of their taxable income (same rate as dependent workers). According to Bernstein et. al. (2009) this measure is expected to increase the coverage by more than one million workers.<sup>17</sup>

The fourth is a guarantee in the case of insurance company failure – if a worker's annuity provider defaults, the government covers 100 percent of his/her annuity up to the PBS and 75 percent of the amount above this level up to a maximum of 45 UFs per month (approximately USD 1,900).

<sup>17</sup> This measure does not apply to workers who as of January 1, 2002 were older than 50 and 55 years old for women and men respectively.



## 2.5 The Conditions for Retirement

Workers can retire at the normal retirement age of 65 and 60 for men and women, respectively. Early retirement is allowed if a sufficient balance has been accumulated in a worker's account. Prior to 2004, this was defined as the balance needed to generate a pension equal to at least 50 percent of the worker's average real wage over the preceding 10 years as well as at least 110 percent of the minimum pension. The 2004 amendments to the pension law raised these parameters to 70 and 150 percent respectively and also introduced a stricter definition of the average real wage, excluding periods of no contributions. The 2008 amendments to the pension law maintain the 70 percent of the real average wage requirement, but replace the minimum pension requirement with an 80 percent of the PMAS requirement.<sup>18</sup>

The changes in the parameters in 2004 were introduced in reaction to the rapid growth of the number of early retirees and the concomitant decline in the average age of retirement. As shown in Tables 6 and 7, by 2004 roughly 520,000 workers had retired under the new system, the proportion of early retirees had increased to more than 40 percent of the total and the average age of retirement had declined by three years among early retirees. Early retirees outnumbered normal age retirees by 65 percent. Early retirement in Chile does not necessarily imply withdrawal from the labor force and the average pension of early retirees is higher than the average pension of normal old age retirees, because their incomes are higher (Table 8). Nonetheless, there was a concern that the retirement rules were too liberal, that many workers were encouraged to retire early by insurance brokers and that there was a risk of low replacement rates in the future, with possible fiscal consequences through access to the minimum pension (MPG), which was the PBS predecessor.<sup>19</sup>

The stricter retirement conditions introduced in the 2004 amendments to the pension law were successful in reducing the proportion of early retirees from 41 percent to 37 percent of the total retirees from 2004 to 2007 respectively. Early retirees accounted for 18 percent of the increase in the number of all pensioners, underscoring the impact of the tighter restrictions. In addition, as the average retirement income of old age retirees grows at a faster pace than that of early retirees, it becomes relatively less attractive to opt for early retirement (Table 8). The sustained increase in retirement income of old age retirees is one of the clear indicators of the maturity of the pension system.

Disabled workers are entitled to a full or partial disability pension, depending on the severity of their condition and after medical examination. Partially disabled pensioners need to be re-certified after a period of three years, but fully disabled pensioners do not require re-certification.<sup>20</sup> Unlike old age and early retirement pensions, disability pensions are determined according to a defined benefit formula and amount to 70 percent of the average real wage of the member in the 10 years preceding the disability. Survivor pensions are defined as 50 percent of the average wage of the member who dies before retirement, paid to the surviving spouse and 15

---

<sup>18</sup> This 80 percent requirement becomes effective in 2012

<sup>19</sup> The 2008 amendments to the law replaced insurance brokers with pension advisors, who are required to pass a stricter examination administered by the pension and insurance supervisors.

<sup>20</sup> The exemption of re-certification for full disabled retirees was introduced in the 2008 amendments to the pension law.

percent for each surviving child under 21 years of age. In the early phase of the new pension system, most pensioners were disability and survivor pensioners and there were few old age retirees. This was expected because most retiring workers in the early 1980s preferred to stay in the old system. The share of disability and survivor pensioners has recently stabilized at around one-third of the total.<sup>21</sup>

**Table 6: Breakdown of the Stock of Pensioners, by Type of Retirement, 1990-2007**

Year	Total	Normal Old Age		Early Retirement		Disability + Survivors	
		Number	% of Total	Number	% of Total	Number	% of Total
1985	7,609	2,647	34.8%	-	0.0%	4,962	65.2%
1990	57,119	23,876	41.8%	5,790	10.1%	27,453	48.1%
1995	190,400	55,591	29.2%	69,537	36.5%	65,272	34.3%
2000	343,965	93,152	27.1%	132,221	38.4%	118,592	34.5%
2004	540,342	134,207	24.8%	221,201	40.9%	184,916	34.2%
2005	574,011	148,096	25.8%	229,033	39.9%	196,882	34.3%
2006	606,342	163,223	26.9%	233,384	38.5%	209,735	34.6%
2007	642,064	179,146	27.9%	239,790	37.3%	223,128	34.8%

Source: SP

**Table 7: Average Retirement Age by the Type of Retirement, 1988-2007**

	1988-1990	1991-1995	1996-2000	2001-2003	2004-2007
Old Age	65	65	65	64	64
Men	67	67	67	66	66
Women	63	62	62	62	62
Early Retirement	58	57	56	55	54
Men	58	57	56	56	56
Women	56	55	54	53	53

Source: SP

**Table 8: Average Monthly Pensions by Type (in UF), 1990-2007, Period Averages**

	Old Age	Early Retirement	Disability	Survivorship	Total
1990-94	5.6	9.5	7.4	2.7	5.7
1995-99	6.1	9.8	7.7	3.2	6.8
2000-04	6.8	10.2	8.2	3.7	7.4
2005-07	7.7	10.7	9.1	4.7	8.2

Source: SP

### 3. The Menu and Performance of Retirement Products

#### 3.1 The Menu of Retirement Products

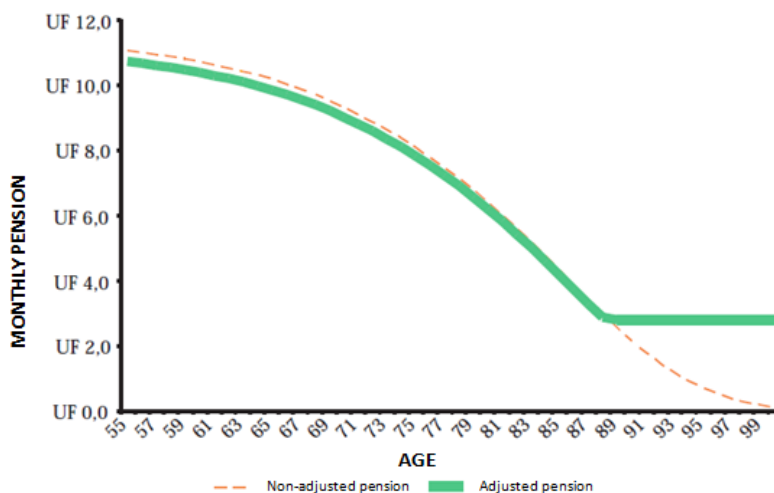
Retiring workers can take a partial lump-sum payment subject to strict conditions and can also choose among 3 basic retirement products: a phased withdrawal (PW), an annuity and a temporary withdrawal (TW) combined with a deferred annuity. This section provides a brief

<sup>21</sup>Although disability and survivor pensions play a critical role in any pension system, they involve specific issues that require a separate examination and which are beyond the scope of this report. The focus of this report is on old age and early retirement.

description of these products. Prior to 2004, workers could take a partial lump-sum if they met strict conditions, namely, the remaining balance had to be sufficient to finance a pension equal to at least 50 percent of the average real wage of the worker in the 10 years preceding retirement and 110 percent of the MPG. In 2004, the first condition was raised to 70 percent and the second to 150 percent of the MPG. In 2008, the second condition was replaced by a requirement to reach 80 percent of the PMAS. Relatively few workers drew partial lump-sums and the amounts were generally considered to be small. After the change in the rules, the incidence of early retirement was substantially reduced.

The basic condition for buying an annuity at the normal retirement age is that it must be higher than the Basic Solidarity Pension (PBS).<sup>22</sup> Workers who do not meet this basic condition must use a PW at the PBS level from their own account until the balance is exhausted. The 2008 amendments to the law introduced an additional accrual factor in the calculation of the PW to account for the risk of longevity. The use of the accrual factor will require pensioners to have enough resources until they reach 105 years old to receive an income at least equal to 30 percent of the first phased withdrawal or 30 percent of the ‘reference annuity’.<sup>23</sup> As shown in Figure 6, the introduction of an accrual factor in the calculation of phased withdrawals will reduce the probability of receiving an income lower than the PBS, and consequently the contingent liability for the government. This amendment was introduced due to the moral hazard incentives for individuals who preferred PWs to take advantage of the fiscal subsidy through the MPG/PBS, when the retiree ran out of resources for earning the minimum pension. Since the attractiveness of PWs will decrease compared to annuities, it is likely that the demand for PWs will come mostly from retirees with low life expectation and interested in leaving bequests.

**Figure 6: Phased Withdrawals under the New Pension Law**



Source: SP

<sup>22</sup> Before 2008, this requirement was the minimum return guarantee. Since MPG was substantially higher than the PBS, it is still to be seen whether insurance companies are interested in selling annuities to pensioners with low pension assets, or whether the insurance companies will charge a premium for serving low income retirees.

<sup>23</sup> The reference annuity is the value of an annuity an individual would receive on the earlier of his or her retirement and the official retirement age.

Annuities are provided by life insurance companies and are freely priced according to age, gender and market conditions, particularly the level of interest rates. Workers can choose any of the licensed companies upon retirement. Until recently, all annuities were fixed and indexed to prices (fixed real annuities) and denominated in UFs. The new pension law introduced other options, including combinations of PWs and fixed real annuities as well as combinations of variable and fixed real annuities, in the case of higher income people. Married couples have to buy joint life annuities. The reversion rate for joint life annuities is 60 percent for the surviving dependent beneficiary. Annuities with a guaranteed period of payment are optional. They entitle the surviving spouse to receive the same level of annuity as the main beneficiary during the guaranteed period.

In the PW option, the individual balance remains in the AFP and is drawn according to a formula that takes into consideration life expectancy and the possibility of triggering the PBS. In the past, PW holders had no choice of fund – their balances were invested in the same diversified portfolio of assets as active workers. Before 2008, PW holders were allowed to choose from 3 different funds, which were differentiated according to the maximum share of equities that they could hold – 40, 20 and 0 percent, respectively (active workers had access to 2 additional funds which could hold more equities). From 2008, PW holders are allowed to choose from the five different funds offered by AFPs, under the conditions that the contributor needs to have enough resources to finance a pension equivalent to the value of the PMAS, and that the calculated pension needs to be at least 70 percent of the real wage over the past 10 years. At the end of each year, PW payments are re-calculated based on the residual balance and the drawdown formula. PW holders can decide to draw less than the formula, provided it is at least equal to the PBS, but not more. PW holders can also switch to an annuity at any time during retirement provided that the annuity exceeds the PBS. Upon death of the main beneficiary, the spouse continues receiving the PW payments and upon his/her death, the residual balance goes to the heirs as a bequest.

TWs involve a fixed drawdown for a pre-defined number of years (most commonly 1 year) followed by a deferred annuity. The market for deferred annuities for periods longer than two years has not developed. The size of the two types of payouts is defined jointly at the time of retirement and the balance is split accordingly between the AFP and the selected insurance company. The TW payout cannot be lower than either the PBS or the eventual annuity and cannot be higher than twice the level of the eventual annuity. TWs differ from PWs in that they involve a deferred annuity and can be considered as an annuity for all practical purposes.

These three retirement products have different strong and weak features and appeal to workers with different needs and risk profiles. Fixed real annuities provide protection against inflation, investment and longevity risks, but do not allow bequests, unless they are guaranteed. The holder is subject to the risk of bankruptcy of the annuity provider, although this risk is reduced by the annuity guarantee. PWs allow their holders to share the gains in the capital market. If returns are high, PW payments may even increase in the initial years. They also allow bequests. However, PWs expose holders to investment and longevity risks. PW payments decline over time and eventually reach the PBS level. The introduction of the accrual factor in the calculation of the pension reduces the probability of reaching the PBS level. TWs offer the possibility of

larger initial payouts in the early years, combined with longevity insurance when the deferred annuity is received.

### 3.2 The Demand for Retirement Products and Level of Annuitization

The number of retirees choosing annuities has increased considerably in the past 20 years. As shown in Table 9, only 3 percent of the number of pensioners chose annuities in 1985, while in 2007 this percentage increased to 58 percent, including the small number of TW holders. Excluding disability and survivor pensioners, the share of retirees who selected annuitization reached 71 percent. No data are published on the size of accumulated balances that are used for PWs and thus there are no published data on the share of accumulated balances that is annuitized. However, this proportion is also likely to be close to 70 percent.

These numbers imply one of the highest levels of annuitization in the world. The average annuity payment is significantly higher than the average PW payment, as shown in Table 10, showing that the average income of the annuitant population is higher. The average TW payment is much higher, reflecting a segment of higher income annuity holders.

Unlike other countries, such as Denmark and Sweden, Chile has very detailed and comprehensive data on the use of annuities (Table 11). Most annuities are joint life, reflecting the regulation that forces married males to take this type of annuity.<sup>24</sup> The share of deferred annuities in the flows of annuities increased slightly from 20 to 30 percent, but the period of deferment has remained short, roughly around one year. The short period of deferment helps explain the low share of TWs in the total stock of retirement products.

The share of guaranteed annuities is large and most of these annuities are guaranteed for periods of 10-15 years and even longer. The strong demand for guaranteed period annuities reveals a voluntary insurance/income smoothing arrangement within the family unit as well as a preference for bequests. The main beneficiary accepts a lower payment in exchange for the maintenance of the same payment to the surviving spouse during the guaranteed period (when the guarantee expires the payment is reduced to 60 percent of the main annuity). If both die, the heirs keep receiving the payments during the guaranteed period. In the case of single annuities, payments go directly to the heirs during the guaranteed period.

**Table 9: Breakdown of Number of Pensions, by Type of Instrument, 1985-2007**

Year	Total	PWs		TWs		Annuities	
		Number	% of Total	Number	% of Total	Number	% of Total
1985	7,609	7,373	96.8%	-	0.0%	236	3.2%
1990	57,119	36,696	64.2%	148	0.3%	20,275	35.5%
1995	190,400	98,699	51.8%	6,803	3.6%	84,898	44.6%
2000	343,965	147,532	42.9%	6,632	1.9%	189,801	55.2%
2005	557,712	214,239	38.4%	6,917	1.2%	336,556	60.4%
2007	626,405	252,095	40.2%	8,578	1.4%	365,732	58.4%

Source: SP

<sup>24</sup> Since 2008 this requirement is imposed on married females as well.

**Table 10: Average Pensions by Instrument (in UFs), 1990-2007, Period Averages**

Period	PWs	Annuities	TWs	Average
1990-04	3.8	7.5	25.0	5.7
1995-09	4.8	7.5	23.4	6.6
2000-04	5.0	7.9	26.7	7.0
2005-07	5.4	9.5	26.7	8.1

Source: SP

**Table 11: Types of Annuities Issued in March 1999, 2002, 2003, 2004 and 2005**

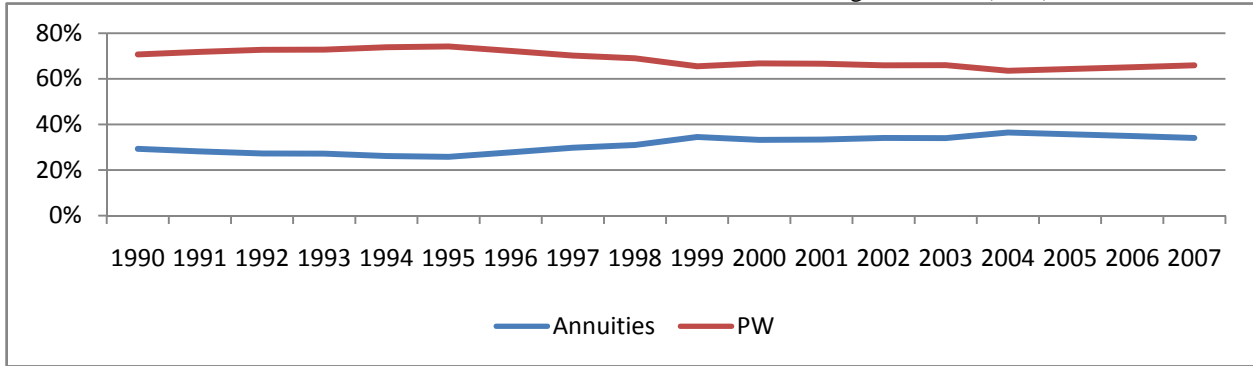
	March 1999	March 2002	March 2003	March 2004	March 2005
Number of annuities issued	937	1,517	1,193	1,490	1,391
Number of joint annuities	670	1,069	823	973	763
Number of deferred annuities (% of total)	199 (21.2%)	331 (21.8%)	307 (25.7%)	409 (27.5%)	419 (30.1%)
Number deferred for 12 months	164	275	238	322	315
Number of guaranteed annuities (% of total)	708 (85.6%)	1,191 (78.5%)	948 (79.5%)	1,153 (77.4%)	1,093 (78.6%)
Number guaranteed for 10 and 15 years	666	1,088	846	1,016	912

Source: SVS

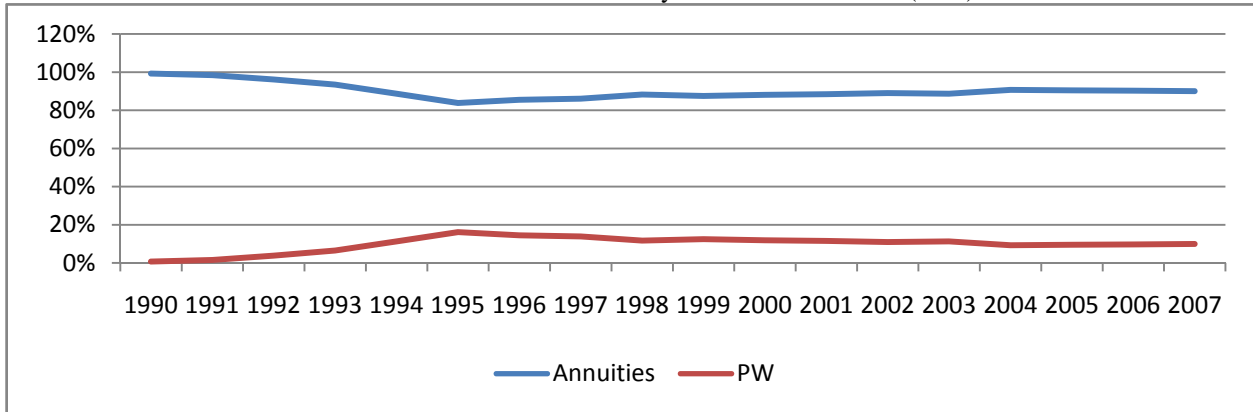
There is a very strong association between annuitization and early retirement. As shown in Figure 7, approximately two-thirds of normal age retirees use PWs and only one-third purchase annuities. By contrast, 90 percent of early retirees buy annuities and only 10 percent use PWs. Examining the distribution from the point of view of the retirement product (the bottom of Figure 7), 60 percent of all annuitants are early retirees and only 15 percent are normal age retirees (the remainder are disabled retirees and survivors). If disability and survivors are excluded, the share of early retirees in the number of annuities increases to 80 percent.

### Figure 7: Shares of PW and Annuities

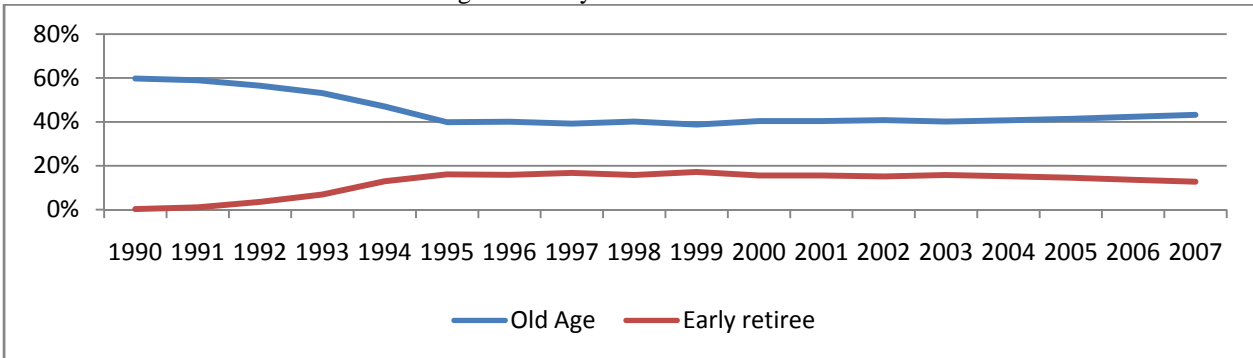
Shares of PW and Annuities in the number of Normal Old Age Pensions (in %)



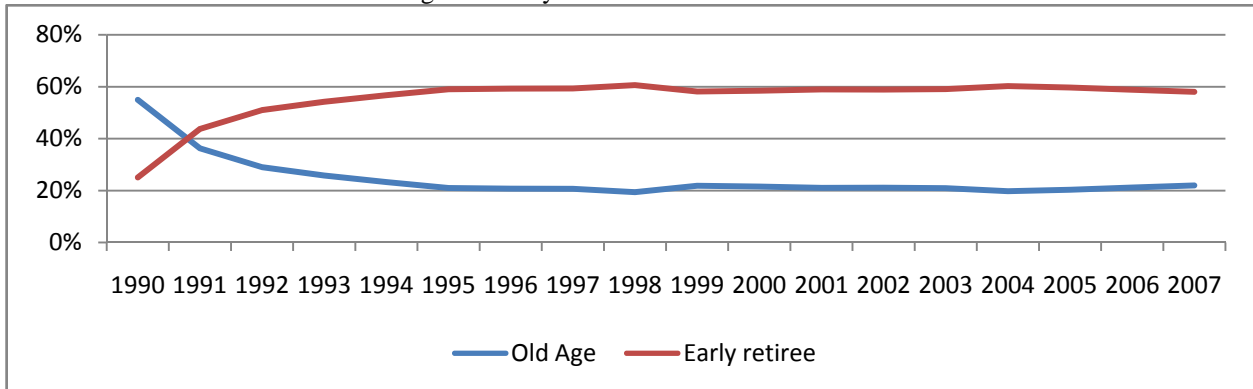
Shares of PW and Annuities in Early Retirement Pensions (in %)



Shares of Old Age and Early Retirees in the Total Stock of PWs



Shares of Old Age and Early Retirees in the Total number of Annuities



Source: SP

The high rate of annuitization and its relation to early retirement is the result of several factors. Firstly, restrictions on lump-sum payments increase the demand for all retirement products, including annuities. Secondly, the absence of a front-ended public pillar benefit previous to 2008 implies that middle and higher income retirees who use PWs were substantially exposed to investment and longevity risks. These retirees have no other stable source of retirement income and can experience a large erosion of the real value of their pensions if they take a PW. Therefore, they may find the protection provided by annuities attractive. Although the introduction of the solidarity pillar has multiple benefits for low and middle-income individuals, it is unlikely to change this behavior, since the value of the PBS is only 46 percent of the value of the old MPG.<sup>25</sup> Moreover, these retirees tend to be early retirees precisely because only higher income retirees can meet the conditions for early retirement.

Thirdly, low-income workers whose benefits were close to the old MPG found PWs more attractive, because they could enjoy any high returns in the early stages of retirement while not being exposed to downside risk – if returns proved weak they will receive the old MPG anyway. The introduction of the accrual factor in the calculation of PWs in the 2008 amendments to the law and the reduction in the level of the minimum pension are likely to reduce this preference for PWs. In general, PW holders tend to be lower income workers retiring at the normal age, precisely because they cannot meet the conditions for early retirement. The PW population also includes low-income workers who are forced to take PWs because of their very small balances.

Finally, the marketing of retirement products is one-sided. AFPs focus on the accumulation phase of the pension business and do not market PWs actively. By way of contrast, life insurance companies depend on the annuity business and have marketed their products aggressively. Insurance brokers obtain their income from commissions on annuity premiums. They target their marketing efforts primarily to higher income workers, frequently encouraging these workers to retire early and annuitize. Brokers do not receive any commission from a client or provider in the case of the client taking a PW.<sup>26</sup>

### **3.3 The Performance of Phased Withdrawals**

The pension market has been extensively examined in the literature, with most researchers concluding that AFPs have generated high real returns on managed funds, but have charged, and still levy, high operating fees to contributors. As of May 2008, at the bottom of the financial crisis, gross and net real returns have averaged 9.2 and 6.2 percent per year since the creation of the system in 1981, well above the average annual rate of growth of real wages of 2 percent over the same period. At the same time, the difference of 3 percentage points between gross and net investment returns reflects the high fees that have been charged. This difference reflects the high costs and very high profit margins during this period. In the past 15 years, with the sole exception of 2008, AFPs have always earned real returns on equity (ROE) above 20 percent, and in some years the average ROE reached 50 percent.

---

<sup>25</sup> As of July 1, 2009 the value of the MPG was CLP 163,000 and the value of the PBS was CLP 75,000.

<sup>26</sup> James, Martinez and Iglesias (2006) provide an insightful analysis of the demand for PWs and annuities in Chile. As noted before, the 2008 amendments to the law replaced the brokers with pension advisors.



AFP operating costs and fees have declined significantly in the past 20 years, but still remain high. In 2007-2008, total fees amounted to 1.0-1.3 percent of assets, including fees of about 64 basis points paid to foreign asset managers.<sup>27</sup> Fees paid by pension funds to international mutual funds have decreased from about 100 basis points in 2003 to about 64 basis points in 2009. By comparison, the average costs of US occupational pension funds of similar size are about 0.5 percent of assets. The average fees of US mutual funds of similar size are about 1 percent of assets, but these include equity funds with high turnover. Bond funds and equity funds with low turnover have much lower fees.<sup>28</sup> These figures indicate that there is still scope for reducing operating fees, costs and profit margins in the AFP sector.

The 2008 amendments to the law required that new entrants should be allocated to the pension fund that levies the lowest fees. In January 2010, through an open bidding process, the Pension Supervisory Agency selected the AFP that offered to charge the lowest fee to its contributors. This was approximately 24% lower than the weighted average of the fees charged by the AFP industry.

The AFP market has generally performed better for PW holders than for active contributors, because pensioners earn the same rates of return as active workers in the 3 portfolios where they are allowed to invest, but are charged much lower fees. Although the multi-funds regime, created in 2002, allowed active workers and PW holders to choose among 5 and 3 different portfolios, the 2008 amendments to the law allow retirees with higher expected retirement income to choose among the 5 pension funds as well. At the same time, PW holders are charged much lower fees for the management of their accounts. AFPs do not maintain a sales force for the promotion of PWs and charge a fee of only 1 percent on PW benefits paid, an amount that is designed to cover just marginal administration costs. AFPs have been able to generate high returns on equity, but these returns are derived from the accumulation phase, not the payout phase.<sup>29</sup>

### **3.4 The Performance of Annuities and Money's Worth Ratios**

Assessing market performance in the annuity market involves the use of more elaborate indicators, given the different nature of annuity contracts and their very long duration. One indicator that is commonly used is the money's worth ratio (MWR), defined as the ratio of the expected present value of benefit payments to the annuity premium. This indicator measures how much the annuitant receives back for the premium paid. A ratio equal to one is usually interpreted as an actuarially fair annuity. Table 12 provides information on MWRs for all annuities issued in March 1999, 2002, 2003, 2004 and 2005.

---

<sup>27</sup> As a consequence of excessive charges paid by pension funds on international mutual funds in the past, the regulation requires these fees to be reported regularly.

<sup>28</sup> Collins (2003) and the Investment Company Institute (2004) provide a detailed analysis of costs and fees of pension and mutual funds in the US.

<sup>29</sup> The 2008 amendments to the law allow pension advisors to charge a commission for advising the retirees to take PWs.

**Table 12: Average MWRs for Annuities Issued in March 1999, 2002, 2003, 2004, and 2005**

	March 1999	March 2002	March 2003	March 2004	March 2005
All cases	0.978	1.080	1.036	1.064	1.062
- maximum	1.148	1.222	1.181	1.276	1.223
- minimum	0.755	0.872	0.872	0.876	0.706
Male, Age 55	0.981	1.081	1.056	1.036	1.042
Male, Age 65	0.996	1.098	1.066	1.042	1.067
Female, Age 55	0.994	1.105	1.056	1.060	1.064
Female, Age 60	1.021	1.120	1.066	1.074	1.083
Joint Life (Male 65, Female 60)	0.998	1.089	1.058	1.062	1.069
Premium up to UF1,000	0.980	1.078	1.045	1.068	1.067
Premium above UF3,000	0.997	1.099	1.047	1.075	1.071
Non-Guaranteed	0.990	1.092	1.045	1.071	1.073
Guaranteed	0.974	1.076	1.033	1.062	1.059
Without deferment	0.979	1.079	1.035	1.063	1.061
With deferment	0.974	1.080	1.036	1.067	1.064

Source: Rocha and Thorburn (2007), Annex 1

As shown in Table 12, the average MWR was slightly lower than 1 in 1999 and has been above 1 since then, indicating that Chilean annuitants have generally received good value for their premiums. However, the dispersion between the maximum and minimum ratios has been wide, amounting to 40 percent in some years and suggesting that some annuitants may have obtained less favorable terms. Average MWRs are lower for younger retirees, consistent with the greater investment and longevity risks involved in annuities with longer durations. MWRs are lower for joint annuities by comparison with single annuities consistent with their longer duration as well.

MWRs are higher for larger premiums, indicating that insurance companies are willing to pay higher annuity rates for larger balances, just like banks pay higher interest rates for larger deposits, because unit costs are lower and profit margins are higher in these cases. MWRs of single female annuities are higher than those of single male annuities, despite their longer expected duration. This result may be partly due to the higher average premium in the case of single females. MWRs of guaranteed annuities are lower than those of non-guaranteed annuities, because long guarantee periods change the time path of payments and increase duration. Finally, the MWRs of deferred annuities are higher than those of non-deferred annuities, but the difference is marginal.

The availability of a large dataset on individual annuities in Chile has allowed the formal testing of these relationships.<sup>30</sup> Annex 1 of Rocha and Thorburn (2007) contains a detailed analysis of MWRs. This shows that MWRs have been positively and significantly related to the age of the annuitant and the size of the premium- and negatively and significantly related to the length of the guarantee period. It also shows that annuities with longer expected durations have lower MWRs than annuities with shorter expected durations and that larger premiums get better value on average than smaller ones. This is consistent with the view that insurers are concerned with

<sup>30</sup>Other researchers have computed MWRs for other countries based on a smaller number of annuity quotes rather than actual annuities issued.

the higher reinvestment and longevity risks presented by long durations and, in the case of size, the effect of fixed expense loadings is more significant in the Chilean market than attempts to differentiate mortality between annuitants of different income levels.

At the same time, the analysis also shows that nearly 40 percent of the variation in individual MWRs is not explained by these individual characteristics. The wide dispersion between the highest and lowest annuity is intriguing and is especially wide for lower premiums, indicating that market search may be more inefficient among lower income retirees. Further examination of the dataset reveals that annuitants with the same characteristics such as age, premium and gender frequently receive materially different annuities.

Comparing average MWRs in Chile with those estimated for other countries suggests that Chilean annuitants have generally received a better deal than annuitants in other countries, especially considering that Chilean annuities are indexed to inflation. As shown in Tables 12 and 13, average MWRs in Chile are higher than the average nominal MWRs estimated for other countries, which range from 0.9 to 1. The differences are striking in the case of indexed annuities – buyers of indexed annuities in the UK receive a much lower annuity value of 86 percent of the premium, and pay a charge of about 5 percent of the premium to obtain inflation protection. The cost of inflation protection in the US is even higher, amounting to more than 20 percent of the premium. This result is explained, at least in part, by the larger supply of inflation-indexed instruments in Chile, including not only indexed government bonds, but also other higher-yield fixed-interest instruments that allow providers to hedge inflation risk while obtaining more attractive returns.<sup>31</sup>

While the differences between MWRs of indexed annuities in Chile and other countries can be reasonably explained, other differences cannot be easily interpreted. For example, the relationship between MWRs and age is negative in the UK and US cases, quite the inverse of the Chilean case. As mentioned before, the positive relationship in the Chilean case can be explained by the higher reinvestment and mortality risks associated with annuities with longer expected durations. The same factor also explains the lower MWRs of joint annuities in Chile; and it is noteworthy that joint annuities have similar or lower MWRs than single annuities in other countries as well. Therefore, the inverse relationship between MWRs and age in the UK and US cases probably reflects factors specific to those countries.<sup>32</sup>

---

<sup>31</sup> Chilean providers probably succeed in extracting an increase in returns adjusted for risk due, *inter alia*, to the existence of a liquidity premium in higher yield bonds.

<sup>32</sup> Brown et al (2001) report the negative relationship between MWR and age for the UK and the US but do not provide a clear explanation for this outcome.

**Table 13: Average Money's Worth Ratios In Selected Countries**

	Australia (James al)	Canada (James al)	Switzerl. (James al)	UK <sup>1</sup> (Can/Ton)	UK (James al)	UK (Brown al)	US <sup>2</sup> (Brown al)
<b>Nominal Annuities</b>							
Male, Age 55	-	-	-		-	0.921	0.934
Male, Age 65	1.013	0.981	1.046		0.977	0.908	0.927
Female, Age 55	-	-	-		-	0.928	0.937
Female, Age 65	1.002	0.976	1.037		0.979	0.907	0.927
Joint	0.988	0.980	0.985	0.981	0.987	-	0.929
<b>Indexed Annuities</b>							
Male, Age 55	-	-	-		-	0.867	-
Male, Age 65	-	-	-		0.887	0.854	0.822
Female, Age 55	-	-	-		-	0.876	-
Female, Age 65	-	-	-		0.877	0.857	0.782
Joint	-	-	-		0.880	-	-

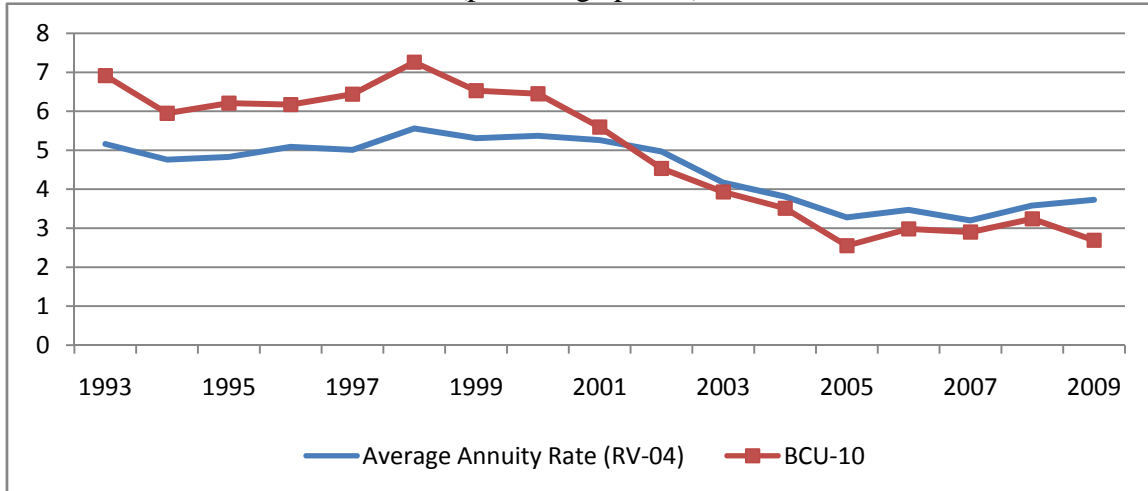
Notes and Sources: Rocha and Thorburn (2007), Annex 1

Market performance can also be measured by the relationship between the annuity rate (defined as the internal rate of return on the annuity) and the risk free rate. As shown in Figure 8, the average annuity rate measured by the RV-04 mortality table tracked the interest rate on 10 year Central Bank bonds reasonably well during the 1990s, with the difference between the two rates averaging 0.7 percent p.a. in this period.<sup>33</sup> It would be tempting to conclude that retired workers could have obtained a better deal by investing directly in risk-free bonds, but this conclusion would need to be modified considering the costs and the risks to retirees, especially their exposure to longevity risk.

In 2001, the difference between the two rates inverted and the annuity rate has exceeded the risk-free rate since then. This negative difference between the risk-free rate and the annuity rate is unusual. For example, Brown et al (2001) calculate the internal rates of return on US annuities and obtain rates ranging from 5.9 to 6.5 percent p.a., lower than the yields of 10 and 30-year Treasury bonds—which were 7.1 and 7.3 percent p.a. in the same period. James, Song and Vittas (2001) performed the same exercise for several countries and obtained similar results.

<sup>33</sup> Until 2005, insurance companies had to report their average annuity rates using an outdated mortality table, the RV-85. During 2005, annuity rates were calculated and reported with both the RV-85 and the recently built RV-04. Past annuity rates were recalculated with the RV-04 on the basis of the relationship between the two rates in 2005. This resulted in an average increase of 60 basis points in the annuity rate. The interest rate is the PRC-20 for the period 1993-2005 and BCU-10 for 2003-2009. Both instruments have the same duration.

**Figure 8: Average Annuity Rate and Risk Free Rate**  
(percentage points)



Sources: SVS, Central Bank.

The average MWRs estimated for March 1999, 2002, 2003, 2004 and 2005 are consistent with the movements in the two rates. The MWR is slightly lower than 1 in 1999, consistent with a slightly higher risk-free rate and higher than 1 in the following years, consistent with a higher annuity rate. In general MWRs are higher in the period after 2002, when the annuity rate has exceeded the risk-free.. The MWRs for 2004 and 2005 are similar, consistent with a stable relationship between the two rates. We have not estimated MWRs for previous years, but the relationship between the two rates suggests that MWRs were lower in the 1990s and increased significantly after 2000. All in all, these results suggest that annuitants in Chile in the mid 2000s were receiving better value for their premiums and are also receiving a better deal, on average, than annuitants in other countries.

### 3.5 Replacement Rates

Despite the collection of massive amounts of data, Chilean statistics do not contain information on the replacement rates achieved by retiring workers. Projections of replacement rates are based on assumptions regarding the length of active work and retirement lives, the average rate of wage growth and the average rate of net investment returns. Assuming an active life of 40 years, a retirement life of 20 years, an average growth rate of 2 percent and a net investment return of 5 percent would produce a replacement rate of 60 percent of the final wage for a 10 percent contribution rate. If the net investment return is 3.5 percent, the replacement rate would amount to 38 percent.

Chile closed down its old social security system and until recently did not operate a public pillar. The introduction of a solidarity pillar in 2009 is an implicit zero/first pillar that tops up pensions if they fall below the PMAS. The amounts of PBS and PMAS are set in the law and are expected to reach about USD 150 in 2009 and USD 500 in 2011 respectively. Both pensions will be indexed according to inflation.<sup>34</sup> The solidarity pillar was designed to provide income support

<sup>34</sup> Laws 20.255 and 20.366

not only to low-income individuals, but also an important proportion of middle-income households.

Replacement rates benefited from the high investment returns that were achieved in the first 29 years of operation of the new system and by the generous terms of recognition bonds provided to members of the old system who switched to the AFP system. In the early years of the new system, most persons receiving pensions were recipients of disability and survivorship pensions. These were defined benefits that were financed from compulsory group disability and term life insurance. Early retirement and old age pensions accelerated in the mid-1990s. Early retirement pensions, which accounted for about 40 percent of all pensions between 1995 and 2004, obtained replacement rates of around 50 percent because this was a regulatory requirement. The AFP system was successful in making possible early retirement at high replacement rates for short active life and long retirement life. Since early retirement age was on average 9 years lower than normal retirement age, early retirees would have an average active life of 31 years and an average retirement life of 29 years. With a growth rate of 2 percent and a 10 percent contribution rate, a net investment return of 6.5 percent would be needed to generate a replacement rate of 50 percent of the final wage. Such a net investment rate was close to the average net return achieved over this period. The replacement rates of normal old age retirees were probably much lower than those of early retirees but significantly higher than the old MPG level.

### **3.6 Risk-Sharing Arrangements**

The Chilean retirement market does not make use of risk-sharing arrangements. Retirement risks are assumed either by providers or by pensioners, depending on the type of product. Holders of PWs assume the investment, inflation and longevity risks as well as the credit and bankruptcy risks. However, some of these risks are mitigated by the strong conduct and prudential regulation of AFPs and the provision of government guarantees in case of institutional failure. The MPG/PBS covers some of the longevity risk of PW holders since the government assumes the responsibility to pay the MPG, now the PBS, for life once the account balance of a PW holder has been exhausted.

Fixed real annuities transfer the investment and longevity risks to annuity providers, while the inflation risk is covered by the extensive use of inflation-indexed financial instruments. An important shortcoming of fixed real annuities is that their holders are prevented from participating in the higher returns that can be obtained from equities and real estate. Thus, the protection against investment and inflation risks comes at a potentially high cost. In Chile, the level of real interest rates has been high for most of the past 29 years, reflecting the impact of anti-inflationary policies in the early 1980s and the slow reduction of risk premiums that has affected all countries in the Latin American region. Risk premiums have occasionally increased in response to regional financial crises. Hence, the annual real rates of return on inflation-indexed annuities have not been low. During the period 1990-2002, they fluctuated between 4.88 and 5.73 percent. However, real rates experienced a drastic decline in 2003 and 2004 when they fell to 3.33 percent.

The decline in real interest rates in the mid 2000s underscored the exposure of retiring workers to the annuity rate risk. In fact, available data show that the annuity conversion factor has declined

steadily over the years. It fell for old age annuities from 8.46 percent in 1998 to 7.31 percent in 2003. The corresponding levels for early retirement annuities were 7.35 and 6.28 percent.<sup>35</sup>

Profit participating annuities with guaranteed benefits and annual bonuses are not found in Chile. In these policies, which are widely used in some OECD countries (e.g. Denmark and Sweden), annuity providers assume the investment and longevity risks for the guaranteed benefits, but these two risks are shared among participants for the annual bonuses. Variable (unit-linked) annuities were authorized in 2004 to be used in combination with fixed real annuities, but these products have not been developed. In unit-linked annuities, the investment risk is borne by the individual pensioner but longevity risk is shared among all annuitants. Profit-participating and unit-linked annuities avoid the timing of annuitization risk and also permit participation in higher long-term returns from equities and other real assets. However, regular payments are exposed to the risk of significant fluctuations.

### **3.7 Marketing Regulation**

The marketing of the two main payout options, PWs and life annuities, is highly asymmetrical. AFPs focus on the very profitable accumulation phase of the pension business and adopt a passive marketing stance on PWs. PWs are mainly used by workers with low balances who cannot purchase an annuity above the MPG/PBS level. They were also chosen by workers with balances that are slightly higher than the old MPG level but with a potential financial advantage in choosing a PW. The introduction of the actuarial factor in the calculation of PWs is expected to reduce the demand for PWs from this group. The actuarial factor makes the PWs relatively less attractive compared with annuities. People in this group will be able to obtain a higher level of income by using annuities rather than PWs.. Due to tax reasons, very few high-income and large-balance workers use PWs.

The commission income that AFPs can raise from offering PWs is very limited. A modest fee of around 1 percent of benefit payments is charged on all PW holders just to cover operating costs, whereas the fees during the accumulation phase, excluding premiums for term life and disability insurance, still amount to close to 15 percent of contribution amounts. The profits from the accumulation phase have been very large because while operating costs have declined with the growing maturity of the pension system, the reduction of operating fees has lagged behind considerably.

In contrast, life insurance companies engage in very active marketing of annuities, using employees and company agents as well as independent brokers. They have strong incentives to market annuities, which represent the core of their business. Independent brokers account for 40 percent of sales and agents and employees for the remaining 60 percent. Brokers and agents play a part not only in the choice of the annuity option but also in the decision to retire early. Brokers have influenced the early retirement decision by emphasizing the potential access to two incomes (since 'early retirement' does not imply exit from the labor force) and immediate access to any excess funds. They have also offered assistance with the handling of recognition bonds and the considerable amount of paperwork involved.

---

<sup>35</sup> Annuity conversion factors are smaller for people who retire at a younger age since annuity payments will need to cover a longer period of retirement life.

During the 1990s when commissions paid to brokers reached very high levels of 5 to 6 percent of the value of the annuity contract, brokers reportedly offered kickbacks to their clients, effectively increasing the amount of funds that early retirees could withdraw as lump sums. Commission rates have fallen since then to 2.5 percent or less and this practice is no longer used. Commission rates are built into the annuity price and are not charged directly to consumers or even disclosed to them. The decline in commission rates is attributed to the threat of regulation and was brought about by an informal agreement among life insurance companies. A similar informal agreement among pension companies has lowered commissions paid to agents for attracting new customers to AFPs during the accumulation phase. Account switching among AFPs was a major policy issue at that time.

Regulators were concerned during the 1990s with the bias in favor of early retirement, the dispersion of annuity prices, the high level of commissions and the spread of illegal marketing practices, such as the cash rebates. New rules were adopted in the 2004 revision of the pension system: the conditions for early retirement were tightened; a cap of 2.5 percent was imposed on annuity commissions; banks were allowed to participate in the distribution of annuities; the menu of retirement products was expanded by allowing use of phased withdrawals or variable annuities in combination with MPG (or higher) fixed real annuities; and a new electronic quotation system was introduced. In 2008, a new cap of 2.0 percent was imposed on annuity commissions.

The new quotation system, known as *Sistema de Consultas y Ofertas de Montos de Pension* (SCOMP), has attracted particular interest because it represents an attempt to reduce the influence of brokers in the selection of annuities. The aim is to enhance the quality of information available to consumers as well as to enable direct access to a full range of annuity quotations. Quotations are solicited through SCOMP participants, while SCOMP validates the personal data of the workers concerned. SCOMP receives quotations from insurers and also calculates the PW and sends this information to the applicants. Workers can select one of the offers made within 15 days or seek another offer outside SCOMP but only from an insurer who made an offer under SCOMP. The offer made outside SCOMP must be better than the first offer. In addition to the quotation system itself, a list of all potential retirees, including those reaching normal retirement age and those eligible for early retirement, is prepared and circulated to all SCOMP participants (brokers/advisors, insurance companies and AFPs). This reduces further the influence of individual brokers. However, workers who object to the circulation of their personal data can have their names removed from this list.

The new quotation system became effective in August 2004. Early experience showed an increase in the average number of quotations, an increase in price competition as the final selection of provider has been closely associated with the ranking of quotes and a reduction in commissions to 2.2 percent. However, early experience has also shown an increasing concentration in the annuity market.

The regulation of marketing activity in the annuity market is extensive. Independent brokers have to pass a certification test administered by the supervisory agency as well as a basic "fit and proper" test. Most applicants take a course on annuities that comprises a total of 120 hours.



Licensed brokers are legally obligated to represent their clients and generate their income from commissions on the sale of annuities. They are not permitted to accept volume-related remuneration from insurers. However, they are not required to disclose the level of commissions they receive from different insurers.

Brokers have strong incentives to influence their clients toward both an early retirement decision and a selection of an annuity in favor of a PW. Prior to 2004, retiring workers were required to obtain at least 6 annuity quotes from the market before making their selection. These quotes had to be presented to their pension companies, which were not allowed to release the funds and transfer them to an insurance company unless these quotes were presented. The requirement of a minimum number of quotes was motivated by a concern for disclosure and transparency. It was aimed at preventing pension companies from directing retiring workers to affiliated insurance companies. However, while sensible, the regulation was not effective in preventing the emergence of high dispersion in annuity prices and broker manipulation of the process. Brokers often directed customers to the insurance companies that offered the highest commissions.

The 2008 amendments to the pension law replace brokers with pension advisors, who are subject to stricter eligibility requirements. Although licensing requirements have been challenging for most of the applicants, these pension advisors are expected to be self-regulated. Currently pension advisors have not created an association that may act as a self-regulatory organization that may impose a code of ethics on its associates. It is still to be seen whether this upgrade will create a change in the behavior of the market.

## **4. Regulation and Supervision**

### **4.1 The Sustainability of Money's Worth Ratios**

An important question that arises in Chile is whether the high MWRs that have been observed in recent years can be sustained into the future. Annuity providers could in principle pay high annuity rates and still achieve positive spreads by investing in higher yielding assets. Table 14 indicates that the industry has shifted toward higher-yielding mortgage-backed securities and corporate bonds since 1995. As interest rates decreased during most of this decade, individuals prepaid their balances and insurance companies lost an important part of their mortgage bond portfolios. Banks developed alternative instruments for housing finance and life insurance companies increased their share of bonds issued by banks and alternative instruments such as mutual funds, investment funds and foreign investments. The move towards corporate bonds since 2000 is particularly noteworthy, with the share of these instruments increasing from 10 percent to one-third of the portfolio. These instruments are also indexed and pay a higher yield than government and central bank bonds, allowing providers to match their liabilities while extracting a higher return.

Annuity providers may have been able to extract a higher return adjusted for credit risk, as these instruments are much less liquid than government or central bank bonds and probably pay a liquidity premium. Providers may be able to extract this premium due to their much longer

investment horizon. Moreover, providers have only held bonds issued by banks and corporations with very good credit standings – usually rated AA and higher and sometimes with specific credit enhancement features, thus maintaining credit risk at relatively low levels.

This pursuit of higher yields has been observed in other countries as well. For example, the TIAA-CREF pension fund, which is the largest annuity provider in the US, holds privately-issued fixed-income instruments offering higher yields in order to match its fixed annuities, including a large share of less liquid instruments bought through private placements. The Chilean situation is different not because of the shift towards fixed income instruments issued by the private sector, but because these instruments are also inflation-indexed, allowing providers to match their indexed liabilities while extracting higher yields.

**Table 14: Portfolio of Life Insurance Companies, 1991-2008 <sup>1</sup>**  
(as a percentage of the Total Assets)

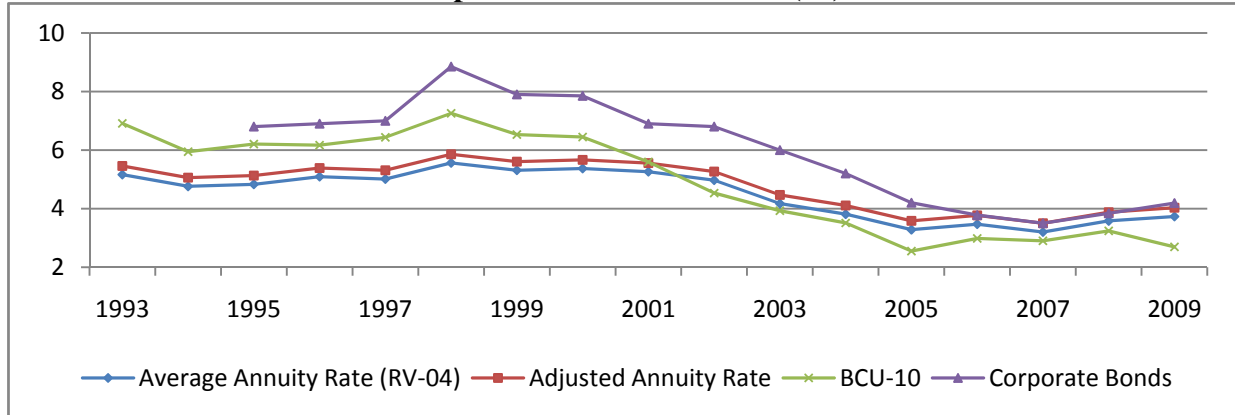
	1991	1995	2000	2003	2005	2008
Government Sector	38.3	40.3	28.7	17.6	15.0	9.0
Financial Sector	23	28.4	45.1	37.6	32.4	33.8
Mortgage Bonds	13.9	18.6	24.2	18.8	11.9	7.9
Mortgage-Backed Securities	3	6	10.1	10.1	9.6	11.9
Other Financial Instruments	6.1	3.8	10.8	8.7	10.9	14.1
Company Sector	29	22.1	15.3	33.4	38.4	35.5
Shares	8.9	10.2	3.4	2.9	3.5	2.0
Bonds	20.1	10.7	10.7	29.3	34.8	33.4
Real Estate	7.8	7.7	7.4	7.3	7.9	10.7
Other Assets	2	1.5	3.6	4.1	6.4	11.1
Total Assets	100	100	100	100	100	100

Note: 1 December values in 1991-2003 and June values in 1995.

Source: SVS

Although this portfolio strategy has apparently succeeded in preserving positive financial spreads, the spreads have narrowed dangerously in the second half of the present decade. As shown in Figure 9, the marginal return on the fixed income portfolio, measured by the corporate bond rate, exceeded the annuity rate every year until 2005 (with the difference amounting to about 100 basis points after 2001), these margins have become extremely narrow in the past few years. This spread is thin considering the need to cover all costs and risks and still generate a positive return on equity.

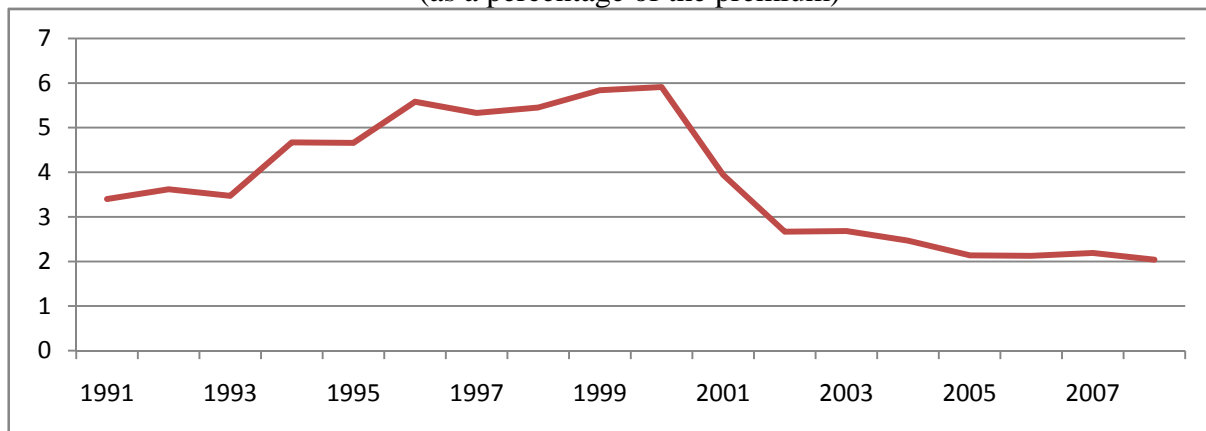
**Figure 9: Annuity Rate, Adjusted Annuity Rate, Central Bank Bonds and Corporate Bonds 1993-2009 (%)**



Source: Central Bank of Chile, SVS, SAFP and authors' estimates

Providers' costs include the commissions paid to annuity brokers and all operating costs. As shown in Figure 10, commissions averaged 3 percent of the premium in the early 1990s, increased continuously to almost 6 percent at the end of the decade and then decreased sharply to levels of around 2 percent. The increase in the 1990s reflected the practice of charging higher commissions and providing an informal (and illegal) cash rebate to retirees. This cash rebate amounted *de facto* to a partial lump sum and proved a popular marketing device, but it was also inconsistent with the intention of the law and prompted a reaction from policy-makers, which at the end of 2000 submitted a draft new pension law to Congress, that, among other things, capped broker's commissions and proposed the new electronic quotation system. Although the law that imposed a 2.5 percent cap on fees was only passed in 2004, the threat of the law and political pressures induced a change in behavior, as indicated by the sharp decline in fees in 2001.<sup>36</sup>

**Figure 10: Commission Rates 1991-2008**  
(as a percentage of the premium)



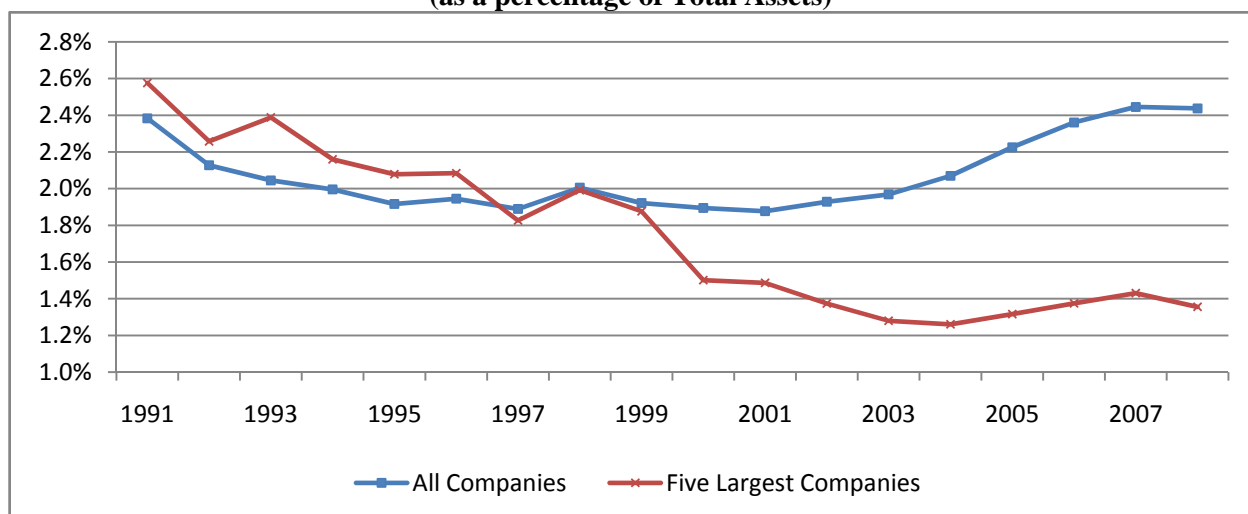
Source: SVS

<sup>36</sup>Walker (2005) examines the relationship between the annuity rate and the risk-free rate and concludes that the threat of the new pension law did produce a change in behavior.

The commission cost has added about 30 basis points to the annuity rate, as shown by the adjusted annuity rate line in Figure 9, reducing the intermediation spread commensurately.<sup>37</sup> In addition, providers also need to cover their operating costs, which in 2008 amounted to about 2.2 percent of assets, implying a negative spread overall. As shown in Figure 11, while the largest life insurance companies have reduced their operating costs and may continue reducing them further, the overall market has increased them. However, if cost ratios decline to 0.6 percent, which is the lowest cost ratio among OECD countries, prospective profit margins would appear to remain unattractive even for the five largest life insurance companies.

The analysis of money's worth ratios and intermediation spreads suggests that at least some annuity providers may have experienced losses from the annuities issued between 2002 and 2005. These losses have not resulted in immediate financial problems for the companies because of the strong capital and reserve buffer accumulated from previous years which was due to strict capital regulations implemented in the early 1990s. However, the analysis also suggests that the high MWRs offered in 2002-2005 probably cannot be sustained, as they would imply further erosion of capital, at least for some companies.

**Figure 11: Administrative Cost of Life Insurance Companies, 1991-2008**  
(as a percentage of Total Assets)



Source: SVS

The question arises as to why profit-maximizing companies have issued annuities with such thin financial margins. It is unlikely that insurance companies have underpriced their annuities due to outdated mortality tables, because most companies seem to have sufficient technical capacity, including well-trained actuaries. It is more likely that companies have priced their annuities counting on a future increase in interest rates from the low recent levels. The intermediation spreads shown in Figure 8 do not capture the spread earned over the entire life of the annuity contract because assets have a shorter duration than liabilities. If interest rates increase (above the levels implicit in the current yield curve) margins earned on currently issued contracts would increase as well.

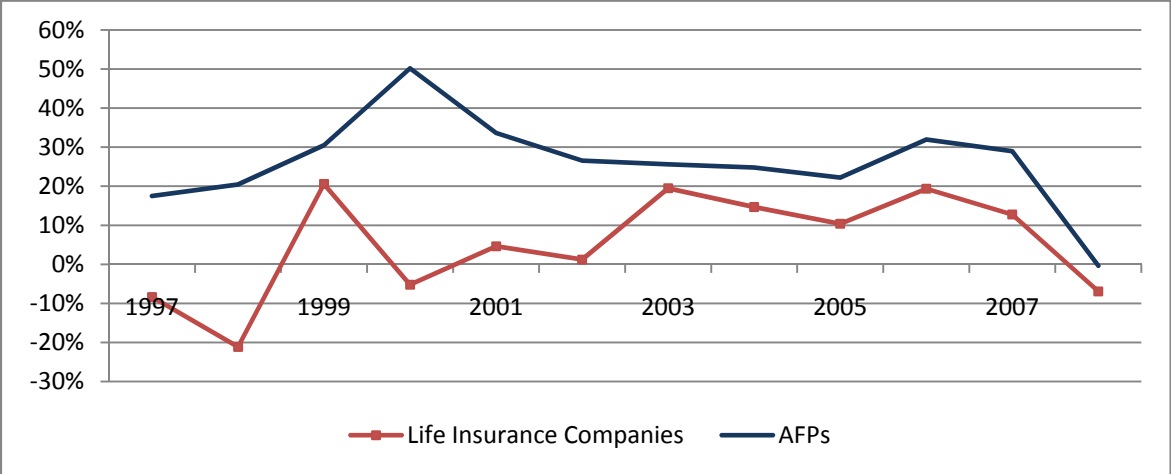
<sup>37</sup>The commission rate is transformed into an interest rate (i.e. capitalized) by calculating the difference between the internal rates of return of an annuity with the gross and the net premiums.

There is also the possibility that some companies are deliberately adopting aggressive pricing strategies in order to drive competitors out of the market to gain market share. All the industry participants acknowledge that intermediation margins have been thin and returns on equity low and that is probably the reason why some life insurance companies have decided to exit the annuity market in recent years. Although the industry has become more concentrated and the possibility that the annuity market will undergo a process of consolidation similar to that observed in the pension sector in the 1990s cannot be entirely discarded, some life insurance companies have found a profitable business in the provision of voluntary savings for retirement. Since it is more heterogeneous, less transparent and therefore less competitive, smaller life insurance companies can compete in the voluntary savings market.

The differences between the degrees of competitiveness of the pension fund and insurance sectors are also reflected in the reported returns on equity (ROE) of AFPs and life insurance companies. As shown in Figure 12, while AFPs have generated ROEs above 20 percent and in some years even above 50 percent, the life insurance companies have earned much lower ROEs, despite bearing much higher levels of risk.

The ROEs of the two sectors are not directly comparable year by year, because the returns of pension funds and the ROEs of AFPs reflect a mark-to-market valuation, whereas the portfolios of insurance companies are valued by a combination of book and market values, largely book values. Moreover, the accounting ROEs of annuity providers are affected by a strict capital rule that imposes large provisions when the company sells an annuity and leads to accounting losses at the point of sale. However, the two indicators are more comparable over longer periods of time and the numbers indicate clearly a more competitive annuities industry.

**Figure 12: Returns on Equity of AFPs and Life Insurance Companies, 1997-2008**



Sources: SVS, SAFF

**4.2 Prudential Regulation**

Chile is the first country in the world that has mandated the use of retirement products with regular income streams over the expected life of beneficiaries (either in the form of life annuities or life expectancy phased withdrawals). As a result, it has introduced a rigorous regulatory

regime on providers of retirement products to minimize the bankruptcy risk faced by pensioners. It has also introduced state guarantees to protect pensioners against provider insolvency as well as aberrant behavior.

The capital regulation of pension companies includes a stipulated minimum capital that rises with the number of beneficiaries but is generally low and does not act as a barrier to entry. For an APF with 10,000 members or more, the minimum capital amounts to 20,000 UF or about 850,000 USD. A more stringent capital requirement is the obligatory reserve (*encaje*) of 1 percent of the value of assets under management.<sup>38</sup>

The *encaje* is required to be invested in units of the fund in order to ensure an alignment of interests between the pension companies and their members. The *encaje* is designed to support the minimum relative rate of return guarantee that Chilean AFPs are required to observe. The guarantee initially specified that the average real rate of return of any company could not be lower than 50 percent of the average of all AFPs or the average return minus 2 percent over the preceding 12 months. In 2002, the period of calculation was extended to 36 months and was applied to each of the five funds that AFPs were then required to offer, while the spread below the average was differentiated by type of fund, being higher for the more volatile A and B funds (4 percent) and lower for more conservative funds (2 percent). The *encaje* and the minimum relative return guarantee are intended to protect workers from aberrant managers. They have been effective in forcing AFPs to stay close to the average of the industry. The guarantee has never been called.

AFPs do not suffer from any mismatching between their assets and liabilities because the value of liabilities is by definition equal to the value of assets. The only other capital regulation concerns the valuation of assets which are required to be marked-to-market. As most assets have to be invested in instruments that are traded on public markets, asset valuation is relatively straightforward, but challenges are arising with the valuation of instruments such as derivatives and private equity funds.

The capital regulation of life insurance companies is far more complex. Since long-term annuity business dominates the balance sheets of life insurers, the valuation of assets and liabilities and the regulation of any mismatches between them play a critical part in determining the capital adequacy of life insurers. Chile introduced the so-called CALCE reserve rule to regulate the asset/liability mismatches.

The first step in CALCE is to calculate the asset and liability cash flows for ten different maturity brackets. The asset flows depend on the characteristics of particular instruments but the liability flows need to be expressed in actuarial terms, allowing for the survival probabilities of the main and contingent beneficiaries. The life tables used for calculating the survival probabilities are specified by the regulators. They used to be based on data from the early 1980s (RV-85) but were replaced with the more up-to-date tables RV-04 in 2005. Insurance companies are free to use their own life tables for pricing annuities but have to use the standardized tables for the CALCE rule.

---

<sup>38</sup> The *encaje* was initially set equal to 5 percent of assets but this was found to be excessive and was quickly lowered to the current level

Asset and liability cash flows for each maturity bracket are then compared. A matching factor of 1 is used if asset flows are equal to or exceed the liability flows; a value of less than 1 is assigned to any bracket where the liabilities exceed the assets implying an increased capital requirement. Data for 2004 show that the matching factor, known as CP in Chile, was close to one for brackets 1 to 7, ranging up to maturities of 16 years, but fell drastically for higher brackets, reaching a low of 0.203 for the highest bracket, which covers maturities of 29 years or longer.

The third step is to calculate the basic financial reserve, which is given by the discounted value of matched and unmatched liability flows. Matched liability flows are discounted at the market rate of interest that prevailed at the time each contract was issued, while unmatched flows are discounted at a technical rate of 3 percent which is prescribed by the regulators. The market rate is the same for all companies but varies by contract depending on its time of issue.

The fourth step is to calculate the basic technical reserve, which involves the discounting of liability flows by the rate of interest used in determining the annuity pricing of each contract. The technical rate of discount is not just different for each company but it is different for each contract in each company. However, the basic technical reserve for each contract cannot be lower than the corresponding basic financial reserve.

The CALCE reserve is then obtained as the difference between the basic technical reserve and the basic financial reserve. Companies are required to show on their balance sheet the basic financial reserve and the CALCE reserve. The basic technical reserve is not shown but is used for determining the size of the CALCE reserve.

This complicated approach was used because insurance regulation was based on projected asset and liability cash flows rather than market values. Insurance companies were not required to use mark-to-market asset valuation, partly because the companies followed a 'buy and hold' approach and held debt instruments to maturity (Rocha and Thorburn 2007:123; 135). The insurance regulators are now taking steps to introduce risk-based supervision that will focus on market valuation of assets and use of market rates of interest for valuing liabilities.

It is not clear how the CALCE rule will be modified or whether it will be discarded completely in favor of the full market valuation and traffic light system that has been introduced in Denmark and other continental European countries as well as several Anglo-American countries. Despite its shortcomings, the CALCE rule played a useful role in forcing insurance companies to maintain an adequate level of reserves that reflected the degree of asset/liability mismatching. Nevertheless, the dearth of long-term assets with maturities over 16 years, while annuity liabilities can run for much longer periods, has exposed insurance companies to significant investment as well as longevity risks.

In addition to the CALCE reserve, insurance companies were required to operate with a leverage of no higher than 15, which implied a required equity ratio of 6.7 percent. The leverage limit was recently raised to 20, lowering the required equity ratio to 5 percent. However, in the absence of a requirement to use market values for assets and market interest rates for valuing liabilities, the measurement of equity is itself subject to a considerable degree of arbitrary valuation. In

addition, an asset sufficiency test was introduced. This requires a detailed calculation of future asset cash flows, including credit and prepayment risks and computation of the reinvestment rate that would be needed to equalize asset and liability flows.

The last element in the annuity regulation of insurance companies concerns the offer of a government guarantee to annuitants in cases of insurer insolvency. The guarantee covers 100 percent of payments up to the PBS level and 75 percent of any annuity payments above the PBS, up to UF 45 per month (USD 1,900 approximately). The cost of the guarantee is not pre-funded but is covered from general tax revenues. However, the authorities have in place a speedy resolution mechanism that allows early interventions in companies that face financial difficulties.

### **4.3 Risk Management**

Risk management has evolved considerably over time in line with the growing maturity of the new pension system. Increasing demand from life insurance companies has stimulated the development of high-yielding long-term corporate and mortgage bonds. Most fixed income instruments are indexed to consumer prices, whether they are issued by the public or the private sector. Fixed income instruments have long maturities, up to 30 years for public sector, mortgage bonds and corporate and infrastructure bonds.

Despite the ample supply of long-term fixed income and indexed debt instruments, annuity providers are still faced with an overall asset and liability mismatching because the average duration of assets is shorter by 3 to 4 years than the average duration of liabilities. Most insurance companies report an average duration of the asset portfolio of 8 years, substantially shorter than the average duration of liabilities, which is 11-12 years, depending on the clientele.

Risk management has been complicated by the absence of derivative instruments, especially the underdevelopment of long-term interest rate swaps. Although prudential regulations force insurance companies to maintain higher capital reserves to cover the mismatching at the longer end of the maturity spectrum, insurance companies face a significant reinvestment risk, which is aggravated by the steady decline in long-term real interest rates. By increasing their holdings of corporate and mortgage bonds, insurance companies have increased their exposure to credit and prepayment risks. Prepayment risk, in particular, has risen in response to the fall in interest rates. Insurance companies have invested in equities and real estate to increase the average duration of their assets and have raised short-term debt to lower the average duration of their liabilities, but these strategies have provided limited benefits in asset liability management.

The management of longevity risk has also been a major challenge. Risk-sharing arrangements, whereby longevity risk is shared with annuitants, have not been used in Chile. The use of international reinsurance to cover the long tail of liabilities has been constrained by regulations that require localization of reinsurance assets, while local reinsurance has not been available at reasonable cost. In addition, there has been no access to risk hedging instruments, such as longevity bonds or longevity derivatives. Thus, insurance companies have fully assumed the longevity risk. Estimating future improvements in longevity has proven one of the most challenging tasks of risk management, especially dealing with data limitations in the tail end of the age distribution. Since 2007, the private sector, with the support of the insurance supervisor



(SVS) and the World Bank, has tried to launch a longevity bond in Chile, but so far this has been unsuccessful.

Insurance companies are required to use life tables prescribed by the regulators for determining their technical and capital reserves and for reporting purposes, but are free to use proprietary life tables reflecting their own clientele for pricing and marketing purposes. While companies are not allowed to ask personal questions on health history, they are allowed to price annuities freely and to differentiate risks by observable characteristics, such as age, sex, level of income and the accumulated account balance of retiring workers (income and financial wealth tend to be well correlated with educational levels, which in turn tend to be highly correlated with life expectancy). Although there is evidence that insurance companies price their annuities according to the risk characteristics of annuitants, there is also evidence of aggressive pricing and marketing campaigns that result in thin financial spreads and increase the exposure of insurance companies to investment and longevity risks.

Pension fund administrators do not bear either investment or longevity risk. These are assumed by holders of PWs. The introduction of multiple (lifestyle) funds has allowed a better alignment of investment risks with the risk preferences of retired workers. Workers near-retirement and PW holders face restrictions for holding the funds with the riskiest portfolios.<sup>39</sup> However, the short duration of fixed income assets in the conservative funds exposes retiring workers to annuity rate risk. There is therefore a need for a fund with a portfolio of long bonds that is better aligned to the pricing of annuities.

## **5. Concluding Remarks**

The rapid growth of the market for retirement products has its origins in the pension reform that was implemented in 1981. However, the pension reform was a necessary but not sufficient condition for the development of this market. Other countries (e.g. Australia) have also introduced a private mandatory pension pillar, but have not experienced such an increase in the number of PW and annuity contracts, especially the latter. The high rate of annuitization is particularly impressive, given the thinness of annuity markets in most countries.

The outcome in Chile has reflected a number of additional factors, including restrictions on lump sums, the absence of a front-ended first pillar benefit, the low level of the back-ended MPG, and the influence of brokers and sales agents. The restrictions on lump sums have increased the demand for all retirement products, including annuities. The absence of a front-ended first pillar benefit and the low level of protection provided by the MPG have led most middle and higher income workers to prefer annuities.<sup>40</sup> PWs are primarily used by lower income workers, because these workers benefit relatively more from the MPG (now PBS), and also because some of these workers have to use PWs due to their small balances. Finally, insurance brokers have focused their selling efforts on middle and higher income workers, as their commissions are related to the size of the premium, and have encouraged these workers to retire early and to annuitize. It is still

---

<sup>39</sup> The 2008 amendments to the Law allows pensioners the use of the riskiest funds, under certain conditions.

<sup>40</sup> The introduction of the solidarity pillar in 2008 is unlikely to affect the behavior of the middle and high income workers.

to be seen what will be the retirement products selected by retirees with retirement income between the PBS and PMAS.

Chilean annuitants have generally received good value for their premiums, as indicated by average MWRs on indexed annuities of around 1.04 to 1.06. These have been high by international comparison. In most other countries, MWRs range from 0.9 to 1 for nominal annuities and from 0.8 to 0.85 for indexed annuities, in the few countries that offer inflation protection, such as the UK. The higher MWRs of indexed annuities in Chile are in part due to the availability of a larger supply of financial assets indexed to prices, including higher yield assets such as mortgage, corporate and infrastructure bonds. They are also due to the presence of a very competitive annuity market. In recent years, providers seem to have engaged in aggressive pricing strategies, as indicated not only by the high MWRs but also by the very thin intermediation spreads. The high MWRs of recent years may not be sustainable in the longer run because they imply very low spreads and profit margins and possibly losses in the annuity business at least for some companies.

The industry could absorb these losses, because of the strong capital buffer accumulated in the 1990s, due to the introduction of a strict capital regulation regime early in that decade. However, the continuation of aggressive pricing strategies could lead to further erosion of capital. Therefore, some market adjustments should be expected, leading to some decline in MWRs. The implementation of a new electronic quotation system in 2004 has enhanced price competition and led to further consolidation of the industry, suggesting that these adjustments may be taking place.

The regulatory framework has been reasonable and has supported the development of the market. Product regulation has prevented an early exhaustion of real incomes at retirement. Annuities have been fixed and indexed and married males have been required to purchase joint annuities. These features imply relatively lower payments in the early stages of retirement but ensure adequate payments for beneficiaries in later stages. The PW formula follows the same approach, by preventing a depletion of the balance in a finite period of time and distributing payments according to life expectancy. The 2004 pension law introduced new products, but these are combinations that always include a minimum fixed indexed annuity, thus ensuring minimum insurance against investment and longevity risks.

Marketing regulation allowed some questionable selling practices during the 1990s, but has been tightened with the amendments to the pension law in 2004. Broker commissions have been capped at 2.5 percent of the premium. More importantly, an innovative electronic quotation system for annuities and PWs has been introduced. The new system has improved market transparency and seems to be producing positive outcomes – retiring workers have selected annuities based on the best quotes and broker commissions have declined further to levels below the cap.

The regulation of providers has supported the sound development of the market. Strict capital rules introduced in the early 1990s penalized mismatches of assets and liabilities and provided a capital buffer that has proved essential for the stability of the industry. The capital buffer weakened over time due to the failure to account for the improvements in mortality rates in the

past 15 years. This affected not only capital regulation but product regulation as well. This regulatory failure was addressed in 2005 through the adoption of an updated mortality table and an asset sufficiency test that should enhance transparency and market discipline.

The government provides guarantees to retirees, but the regulatory framework contains elements that should prevent excessive recourse to these guarantees. The introduction of stricter conditions for early retirement and the actuarial factor in the calculation of the PWs will reduce the potential number of retirees eligible for the PBS. The annuity guarantee has an element of co-insurance that seems reasonable, especially considering that the private pension system is mandatory.

At the same time, there are some important weaknesses that will need to be addressed in the future. The separation of the accumulation and retirement phases implies that neither pension funds nor annuity providers are effectively maximizing an individual's pension wealth over the entire lifecycle. In particular, workers in the pre-retirement phase are subject to some risks, such as annuity rate risk, that have not been properly addressed. Management of longevity risk by annuity providers remains a particular challenge. In addition, although annuity providers have access to a wider range of financial instruments than providers in other emerging countries to manage market or investment risk, they still face a duration mismatch problem that needs to be continuously addressed. Providers also lack access to a wider range of risk management tools such as derivatives and reinsurance.

The Chilean experience has many lessons for other developing countries. The most important lesson concerns the feasibility of developing a market for retirement products from a low initial base. Firstly, the provision of PWs and annuities to disabled workers and survivors enabled an early and rapid start to the market for retirement products, attracting new providers into the market. Secondly, the Chilean approach to product regulation is appropriate for countries that expect the new second pillar to play a major role in retirement provision and social protection. The restrictions on lump-sum payments increase the potential demand for all retirement products, including annuities. A PW formula that is based on life expectancy prevents a very premature exhaustion of funds. The imposition of fixed annuities indexed to inflation and joint annuities for married couples both contribute to preventing an early exhaustion of funds and poverty in old age. The introduction of new products, such as variable and adjustable annuities, should require a minimum fixed annuity component providing investment and longevity insurance.

Countries that have preserved a large first pillar and introduced only a modest second pillar can adopt a more liberal product regulation, as, in these cases, the exposure of retiring workers to investment and longevity risks is more limited. However, very liberal rules for lump-sums can hinder significantly the development of the market for retirement products, especially the market for life annuities. The appropriate policies in this area will vary significantly from country to country. In some cases, it may be appropriate to continue restricting lump-sum payments, but to adopt a more liberal approach to the design of retirement products. For example, the regulation of PWs may be more liberal, allowing designs that enable a faster withdrawal of funds. Likewise, variable and adjustable annuities may be introduced without the obligation of a fixed annuity component.

Access to long-term instruments, including inflation indexed bonds and freedom to price annuities on the basis of proprietary life tables have been essential elements of the success of the annuity market in Chile. In addition, robust marketing regulation to ensure market transparency, free choice and informed decision making by retiring workers has played an important part. The new electronic quotation system has improved transparency in the market for retirement products and has ensured that retirees effectively get the best quotes.

Chilean regulators have addressed reinvestment and longevity risks by imposing strict capital regulations on providers. The capital rules introduced in 1990 were innovative and were based on the extent of asset and liability mismatching. This approach to capital regulation enabled the early build up of a strong capital buffer that has proved very important for the sound development of the industry. The production of appropriate mortality tables to be used for regulatory purposes is also of central importance. Finally, ensuring that bankruptcy rules protect the interests of annuitants in the case of insurance company failure and offering a government annuity guarantee with a reasonable element of coinsurance by annuitants are further essential components of a sound regulatory framework.

## References

- Acuna, Rodrigo and Augusto Iglesias. 2001. 'Chile's Pension Reform After 20 Years', Social Protection Discussion Paper No. 0129. Washington, D.C.: World Bank
- Berstein, Solange, Pablo Castañeda, Eduardo Fajnzylber, and Gonzalo Reyes. 2009. Chile 2008: *Una Reforma Previsional de Segunda Generación*. Superintendencia de Pensiones, Chile.
- Brown, Jeffrey R., Olivia S. Mitchell, and James M. Poterba (2001) "The Role of Real Annuities and Indexed Bonds in an Individual Accounts Retirement Program," in Brown, Jeffrey, Olivia S. Mitchell, James M. Poterba and Mark J. Warshawsky, *The Role of Annuity Markets in Financing Retirement*, MIT Press, Cambridge, Massachusetts.
- Collins, Sean (2003) "The Expenses of Defined Benefit Pension Plans and Mutual Funds" in *Perspectives*, Vol. 9, No. 6 (December). The Investment Company Institute. Washington DC.
- The Investment Company Institute (2004) "The Cost of Buying and Owning Mutual Funds" in *Fundamentals*, Vol. 13, No. 1 (February).
- James, Estelle, Guillermo Martinez and Augusto Iglesias. 2006. 'The Payout Stage in Chile: Who Annuityzes and Why?', *Journal of Pension Economics and Finance* 5(2):121-54.
- James, Estelle, Xue Song and Dimitri Vittas. 2001. 'Annuity Markets Around the World: Money's Worth to Annuityants and How do Insurance Companies Cover It?', CeRP Working Papers 16/01. Torino: CeRP.
- Rocha, Roberto and Craig Thorburn. 2007. *Developing Annuities Markets: The Experience of Chile*. Washington, D.C.: The World Bank.
- Walker, Eduardo. 2005. 'Annuity Markets: Competition, Regulation and Myopia?' Unpublished manuscript. Catholic University of Chile.
- Yazigi, Alejandro Ferreiro et al (2002) *El Sistema Chileno de Pensiones Derivado de la Capitalizacion Individual*, Superintendencia de Administradoras de Fondos de Pensiones, Santiago, Chile.