

Securing Lifelong Retirement Income: Global Annuity Markets and Policy

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Chapter 7

Pension Payouts in Chile: Past, Present, and Future Prospects

Jose Ruiz and Olivia S. Mitchell

Chile's funded individual-account defined contribution (DC) pension system, launched in 1981, remains vibrant after almost thirty years. Over the Chilean system's first two decades, analysts and policymakers devoted most of their attention to questions pertaining to coverage, contributions, and investment portfolios. Now, however, as the system moves toward maturity and retirees are increasingly claiming pensions under the program, policymakers are beginning to pay attention to how retirement benefits will be paid.

The goal of this chapter is to review recent developments in the payout market for Chilean pensions, focusing particularly on the role of annuities, and to illustrate what makes the payout market in Chile so different from those in other nations. In what follows, we first offer a brief summary of the Chilean DC pension system as it evolved since 1981. Next, we focus on how participants may elect to take their pension benefits, alternatives that include both a phased withdrawal option and a life annuity. Last, we offer some thoughts on the nature of the Chilean annuity market and discuss prospects for the future.

An overview of the Chilean defined contribution pension system

Chile first instituted a government-run old-age system in the 1920s;¹ in the mid-1950s, this had evolved into three main pension funds organized on occupational lines: one covered most salaried workers, another covered the police, and a third applied to members of the armed forces. Thereafter, additional occupational systems were added, so by the end of the 1970s, the retirement system was a patchwork of more than 150 individual and quite fragmented defined benefit (DB) regimes. This structure produced incomplete coverage (generally attributed to evasion of contributions), as well as low and uneven benefits; ultimately the structure was plagued by massive

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financing problems. By the end of the 1970s, government subsidies worth 2 percent of GDP were needed to finance the system, and prospects for additional problems loomed.

When Pinochet's military government determined to overhaul the system in the early 1980s, it first raised retirement ages, boosted contribution rates, and eliminated some special schemes. Thereafter, it created the new pension system in 1980, after closing the old systems to new workers who then were required to contribute to a funded DC individual account program.² The new mandatory structure was very much in keeping with World Bank recommendations for a multi-pillar arrangement (World Bank 1994). The first-pillar program included a noncontributory, publicly financed, means-tested, pay-as-you-go (PAYGO) welfare-based pension (*pension asistencial*, or PASIS) for the indigent. There was also a state-guaranteed minimum pension guarantee for workers who contributed twenty years into the new DC program but nevertheless ended up with benefits below the government-decreed minimum. The second pillar of the Chilean pension system, by far the better-known feature, consists of a national contributory DC program known as the AFP program, mandatory for wage and salary workers; affiliation remains optional for the self-employed.³ All covered workers must elect one of the privately managed pension funds, and contribute 10 percent of their monthly earnings to that retirement fund, along with an additional contribution (2–3 percent of monthly wages) to cover administrative costs as well as disability and survivor insurance.⁴ Workers can switch between AFPs with advance notice but must hold all of their balance with a single AFP at any given time. At the outset, only government bonds were available for the investment portfolios, and more recently the AFPs have been permitted to offer five funds in the target maturity date spirit. This approach automatically moves workers' assets into more conservative investments as they grow older. There is also a small third pillar in the Chilean system, also an individual funded DC component. In essence, any worker electing to contribute more than the mandated 10 percent amount to his AFP may do so, thus obtaining some additional tax benefits. Relatively few people add additional voluntary contributions in practice.

Figures 7.1 and 7.2 show the time trend in the size of assets under management in the Chilean AFP system, along with the number of contributors and retirees. Figure 7.3 shows the number of people by age claiming different types of pension benefits. We observe that the asset base has been increasing at a rate of over 9 percent per year, such that the pension system now amounts to more than 60 percent of the Chilean GDP. The number of pensioners in the system is around 640,000, of which 37 percent are early retirees, 28 percent are normal retirees, and 35 percent are disability retirees (the latter number is relatively high inasmuch as any

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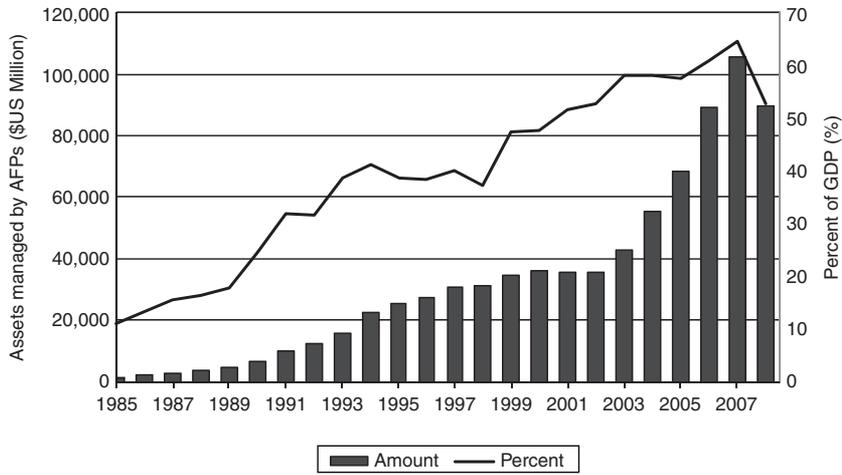


Figure 7.1 Growth of the Chilean AFP pension system. *Source:* Superintendencia de Valores (2010a).

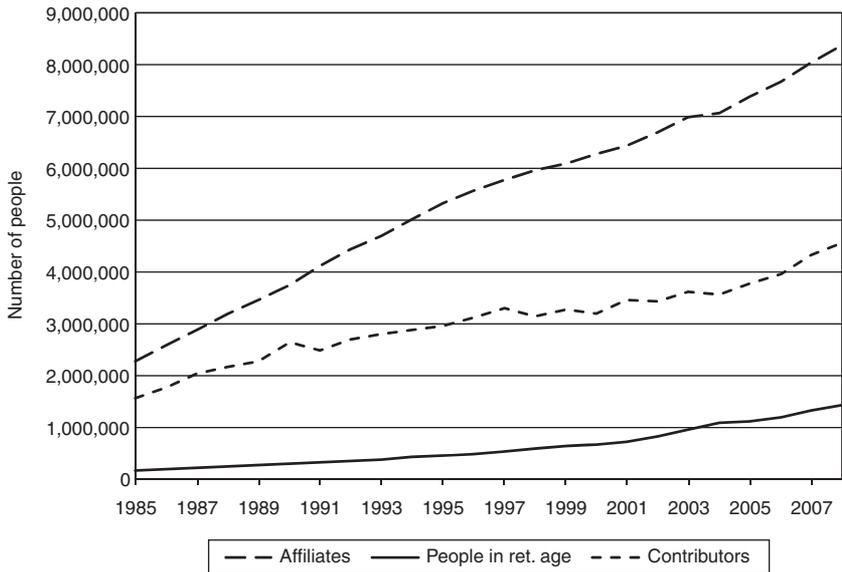


Figure 7.2 Time pattern of affiliates and retirees in the Chilean AFP system. *Source:* Superintendencia de Pensiones (2010c).

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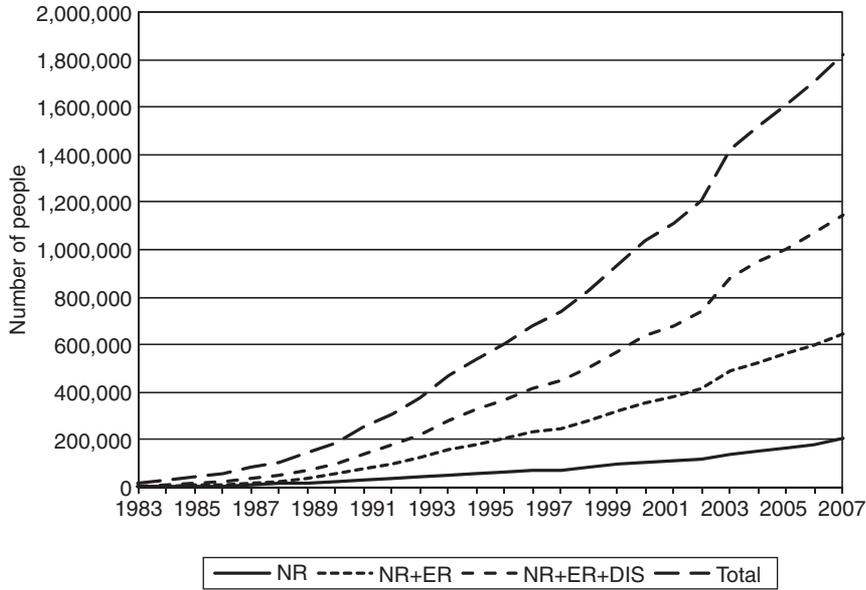


Figure 7.3 Chilean retirees by type, over time. *Source:* Superintendencia de Pensiones (2010a).

young system will tend to have a high proportion of disabled participants relative to regular retirees during the early years).

Retirement benefits payable in the Chilean pension system

At retirement, retirees may use their accumulated funds to determine their retirement payout streams. Women may begin their ‘normal’ payout at age 60, while men must wait until age 65; under certain circumstances (to be explained later), a worker may elect to begin his payments as young as age 55 if he is entitled to receive ‘early’ payments. Unlike in some countries, receiving the pension does not require one to completely withdraw from the labor force, so some workers remain employed while collecting a pension.

Phased withdrawal payments

The main options for retirement payouts from the AFP system are either (a) a ‘phased withdrawal’ (PW) benefit, or (b) a life annuity payout.⁵

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In the case of the PW approach, the retiree retains his assets invested at his AFP, whereupon the fund administrator sets the payout according to a government formula that converts the balance into a monthly payout that takes into account the retiree's age, sex, and marital status. Specifically, the PW benefit paid to retiree i in year t is given by:

$$PW_{i,t} = \frac{\text{Balance}_{i,t}}{12 \times \text{NCU}_{i,t}} \quad (1)$$

where $PW_{i,t}$ is the monthly benefit under the PW system which depends on $\text{Balance}_{i,t}$ or the amount he accumulated in the fund as of his retirement date, and $\text{NCU}_{i,t}$ refers to the government's estimate of the 'necessary capital' required to finance one unit of pension payout, given the retiree's sex, age, and family composition (Pino 2005). The NCU term therefore is an annuity factor converting the worker's accumulated pension balance into a periodic payment.

Survivorship pensions are required by law. If the pensioner is male, his widow will receive 60 percent of his pension if he lacks children eligible for survivorship benefits. In the case that a decedent leaves dependent children, his widow would receive 50 percent of her deceased husband's pension while each child receives an additional 15 percent of the benefit. If the pensioner is female, a survivorship pension was paid only to her dependent children and to her surviving husband only if he is disabled.⁶

When the AFP payouts first started, the government lacked good information about workers' survival patterns in retirement. As a result, US annuitant actuarial tables (with some setbacks) were initially used to project PW amounts. Yet, people with very low balances do not purchase annuities, so using annuitant tables to compute payouts for those taking PWs likely overestimated their life expectancies. Over time, new mortality tables for Chile (RV-2004) were devised, based on actual annuitant mortality patterns over the period 1995–2003. Each retiree's PW amount is also recomputed each year using updated mortality patterns and life years remaining, producing a decreasing pattern of real payouts over time.⁷

As with all PW programs, the retiree who elects the PW option retains ownership of his AFP balance as long as it is positive, but he faces both investment risk and longevity risk in that the balance might decline to zero. At the point of converting to the PW mode, the retiree is also charged a flat fee as a percentage of the payout amount (this is current practice; prior to 1987 commissions on assets under management were charged). The AFPs could charge commissions based on a worker's retirement accumulations, but the regulator subsequently prohibited balance fees. As of 2010, the average PW monthly payment for a retiree

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claiming at the normal retirement age was US\$232 and US\$556 for the early retiree (Banco Central de Chile 2010; Superintendencia de Pensiones 2010a).

Lifetime annuities

Alternatively, a retiree may use the balance in his account to purchase a lifetime payout annuity from a life insurance company. The advantage of annuitizing one's retirement wealth is that the retiree is protected against both mortality risk and capital market risk. Yet, there is a downside: he loses liquidity as he must relinquish the entire capital accumulation to the insurer. In principle, retirees could opt for *both* a PW and annuity payment, but in fact most retirees take either the immediate annuity or the PW, perhaps combined with a deferred annuity.

In all cases, the retiree purchases his annuity benefit from a life insurance company where he relinquishes his pension fund and pays a commission (2 percent of the balance or less) in exchange for a lifelong annuity expressed in UFs (Unidad de Fomento), a standard numeraire for inflation-indexed payments widely used in Chile.⁸ The annuity benefit continues until the retiree's death, and if there are dependents, for as long as the latter are eligible. There is, of course, some risk that buyers may suffer from insolvency of the life insurer which sold the life annuity. In such an eventuality, the Chilean Superintendencia de Valores is authorized to conduct a public auction to seek to recapitalize the failed company; all participating life insurers estimate the number of periods during which they will continue paying 100 percent of the promised pension annuity amounts. The life insurer offering the longest contract period wins, and after this, the government guarantees continued benefits up to a cap from general revenue.⁹ As of 2010, the average monthly annuity payment benefit for a retiree claiming at the normal retirement age was 11.4 UF (US\$458) and for the early retiree, 10.6 UF (US\$426).¹⁰

Table 7.1 provides a descriptive overview of the key features that distinguish the PW form of benefit and the annuity modality. Clearly, the PW approach affords more liquidity but more longevity and capital market risk; the Immediate or Deferred Annuity approach protects against outliving one's assets, but it offers little to no bequest potential.

Figure 7.4 shows the time trend of the fraction of Chilean retirees taking an annuity versus a phased withdrawal. Of particular interest is the time path of annuitization adoption: after only a few years of the system's inception, already one-quarter of pensioners had elected the immediate annuity option, and today close to 60 percent of retirees have taken the immediate life annuity. It is in this sense that the data show quite high levels

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TABLE 7.1 Characteristics of alternative payout modes under the Chilean retirement system

Attribute	Payout structure		
	Phased withdrawal (PW)	Immediate annuity (IA)	Temporary withdrawal (TW) and deferred annuity (DA)
Managed by	AFP	Life insurance company	AFP and life insurer
Can payout be changed	Always	No	DA can happen earlier
Who controls funds	Retiree	Life insurer	Retiree (TW) and life insurer (DA)
Benefit amount	Variable	Constant or variable	Variable and constant
Eligible for MPG	Yes	Yes	Yes
Bequest feasible	Yes	No	Only for TW

Source: Authors' calculations; see text.

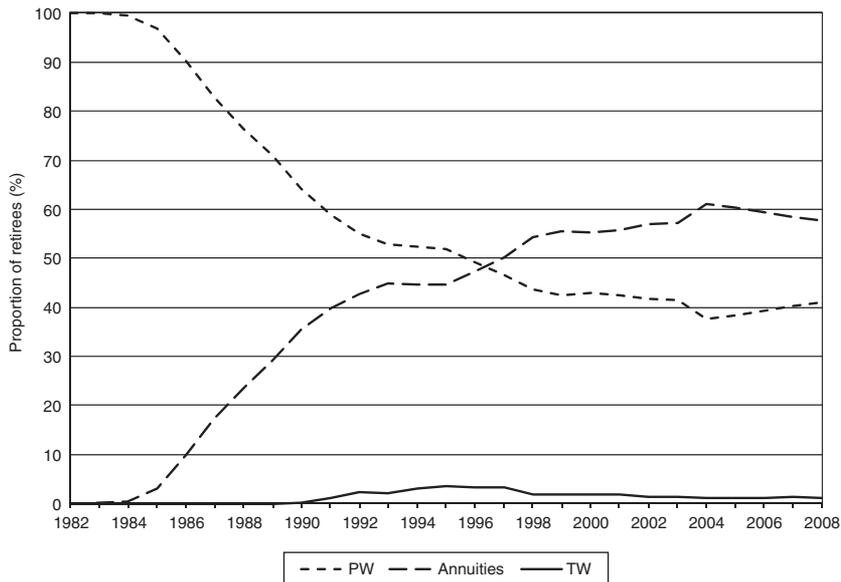


Figure 7.4 Fraction of retirees taking an annuity, phased withdrawal (PW), or temporary withdrawal (TW). Source: Superintendencia de Pensiones (2010a).

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of annuitization in Chile, consistent with others' reports on the time trends (James et al. 2006; Rocha and Thornburn 2006; Thornburn et al. 2007).

Figure 7.5 shows the time path of benefit streams under both the PW and the annuity, respectively, for a single male retiring at age 65 and for a female retiring at age 60 (these figures assume the male retiree has a balance of CP\$20 million or approximately US\$33,230; the female balance is CP\$56 million or approximately US\$90,540). We observe that the projected PW amount is initially higher than the annuity payment, but within a decade after retirement, the PW benefit is projected to fall below the annuity payment.

The role of the minimum pension guarantee

Several aspects of the Chilean retirement system are intended to ensure that the system pays 'adequate' benefits. One benchmark against which benefits are valued is the 'minimum pension guarantee' (MPG), set by the federal government as a target minimum monthly nominal income value. This amount is inflation-updated annually and is higher for older retirees. For instance, the MPG value¹¹ in December 2009 for a retiree younger than age 70 was CP\$104,960 per month (~US\$209); for those aged 70–74 it was CP\$114,776 (US\$229); and for people aged 75+ it was CP\$122,451 (US\$244). A time series of MPGs appears in Figure 7.6, where it can be seen that this is generally higher than the national minimum monthly earnings level, and in fact it is equivalent to about one-fourth of the national average pay of contributors into the pension system.¹²

In terms of the payout choices, the worker retiring at the *normal* age who takes a PW may receive a benefit set by the formula in equation (1), but if this benefit falls below the MPG, he may request a higher payout rate which will naturally reduce his balance more quickly. In the event that he runs out of money, the government will top up his benefit to the MPG amount only if the worker had a minimum of twenty years of contributions into the system and his total old-age income falls below the MPG (SAFP 2010). As Arenas et al. (2008) show, however, this is a relatively stringent criterion. Currently, many retirees who were credited for service under the old PAYGO system may have sufficient years of service, but it has been estimated that no more than half of future retirees will be likely to attain this twenty years of service goal.¹³ If the PW is taken at the *early* retirement age, then the benefit would be at least 50 percent of his average salary in the last ten years he paid into the system or 110 percent of the MPG (rising to 70 and 150 percent, respectively, by 2010).

If the worker annuitizes at the *normal* retirement age, he must allocate at least enough of his balance to a fixed real annuity such that his benefit is at

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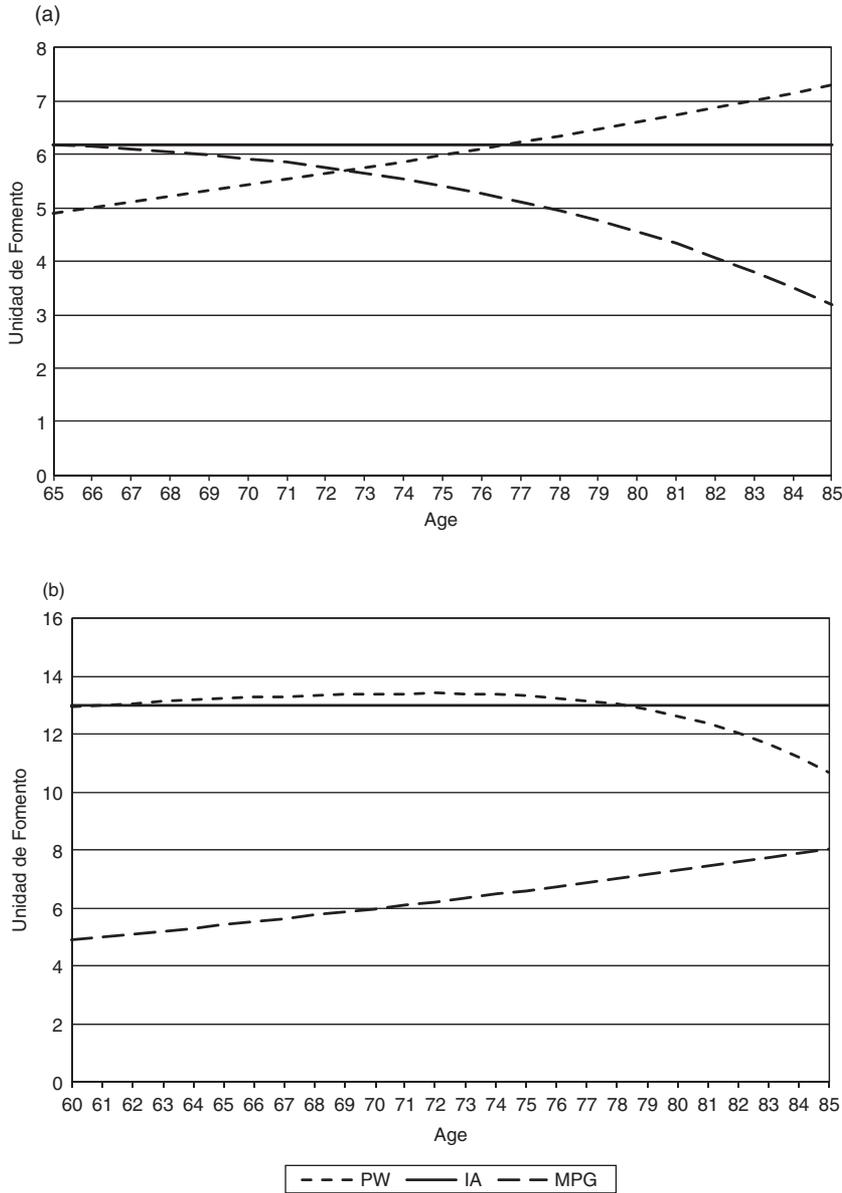


Figure 7.5 Phased withdrawal and annuity payments in Unidad de Fomento (UF) units: simulation over the life cycle. Panel (A): single male who retires at age 65 (no dependents); Panel (B): single female who retires at age 60 (no dependents). *Note:* Pension balance of UF962 (~US\$33,230 in 2008) for men and UF2632 (~US \$109,925 in 2009) for women. *Source:* Superintendencia de Pensiones (2010a) and actual SCOMP quotes for life annuity.

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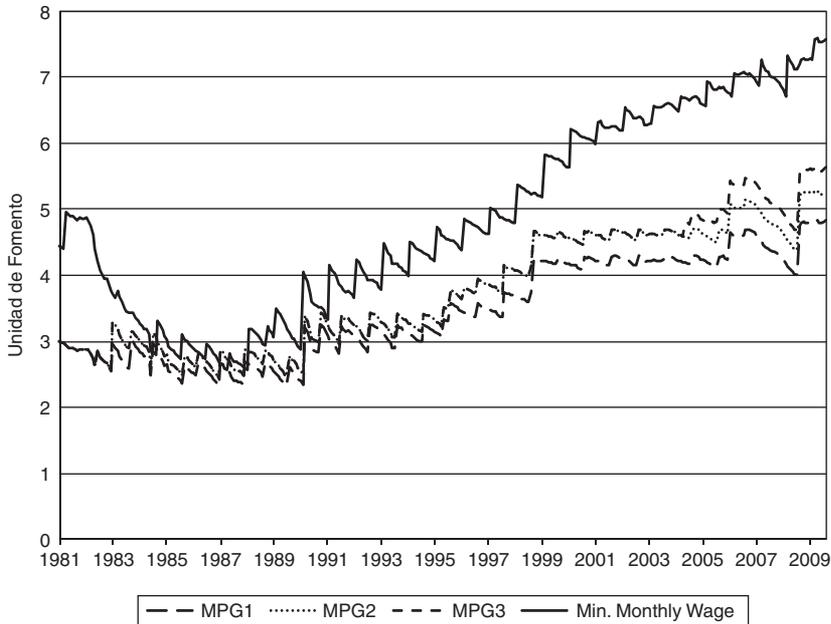


Figure 7.6 Time path of Chilean minimum pension guarantee (MPG) levels and minimum monthly earned income (in Unidad de Fomento). *Notes:* See Figure 7.5. MPG1 applies to those less than age 70; MPG2 to those aged 70–75; MPG3 to those aged 75 and older. The minimum monthly earned income is set by the government as the lowest salary a formal sector worker may earn. *Source:* Authors’ calculations based on Superintendencia de Pensiones (2010a).

least equal to the MPG. If he retires *early*, he must purchase an annuity that exceeds 50 percent of his average salary in the last ten years he paid into the system or 110 percent of the MPG (rising to 70 and 150 percent, respectively, by 2010). Annuity benefits may be either fixed or variable; in practice, most pay a real fixed payment (expressed in UF) though the variable benefits have some portion devoted to a fixed real benefit with another portion linked to some index (such as a money market or stock index); in the latter case, the fixed part must amount to at least a fraction of the worker’s preretirement pay.

It is also worth noting that the government guarantee covers all of the MPG plus 75 percent of the excess of the annuity value over the MPG, with a maximum payment of 45 UF. The latter means people receiving a pension higher than MPG face some insolvency risk from the life insurance company. The higher the pension amount, the higher is the eventual

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benefit reduction in case of insolvency. For this reason, at retirement, people are provided not only annuity bids but also company ratings information.

Since the system's inception, there has been only one life insurer bankruptcy; at that time, the regulator undertook provisional intervention until the beneficiaries were assigned to another life insurance company. The regulator then ran an initial auction in March 2006 but it was redone as only one offer was received; the second auction in October 2006 received two bids. In the tender, Euroamerica S.A. offered to continue to pay the full pensions to retirees for 124 months,¹⁴ for US\$77 million in equity. After that period, participants would receive the guarantee from the government.

Benefit take-up patterns

It is of interest to explore the time path of retirement benefit take-up patterns. Figure 7.7 shows the time path of people purchasing annuities versus taking the PW: in the 1990s, the number of people who elected the annuity began to rise, and it exceeded the number selecting PW benefits. Figure 7.8 shows average payments that people received according to the payment method they elected. These trends show no important difference between the average payment for people who purchased an annuity at either the normal retirement (NR) or early retirement (ER) age. There is,

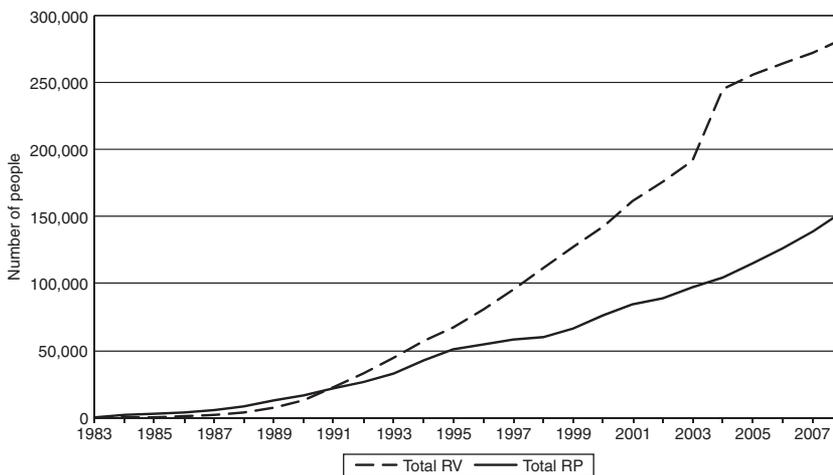


Figure 7.7 Time path of annuities purchased (RV) and phased withdrawal benefits (RP) elected in the Chilean pension system. *Source:* Authors' calculations based on Superintendencia de Pensiones (2010a).

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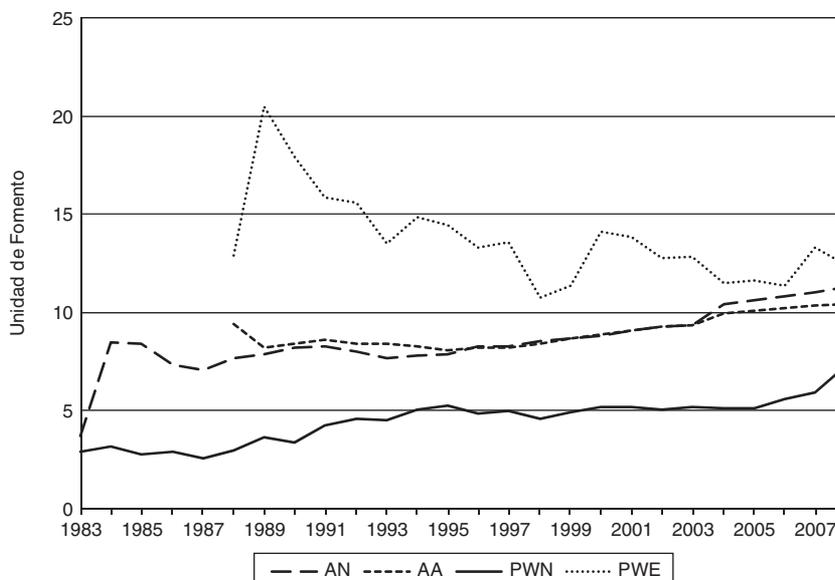


Figure 7.8 Time path of Chilean pension values according to payout method elected. *Notes:* AN corresponds to the value of the annuity purchased at the normal retirement age; AE corresponds to value of the early retirement annuity; PWN refers to the value of a phased withdrawal benefit taken at the normal retirement age; PWE refers to the value of the phased withdrawal taken prior to the normal age. *Source:* Authors' calculations based on Superintendencia de Pensiones (2010a).

however, a significant difference between those who elect the PW at the normal age (PWNR) and people who select the PW at the early retirement age (PWER). That is, the average early PW amount actually paid may exceed the normal PW value, inasmuch as those who retire early to start receiving pension benefits must satisfy higher balance requirements. As a result, low-income people who have not accumulated much in their pension funds have little opportunity to take early retirement payments, as a rule. It is for this reason that the normal retirement age PW amount will be expected to be the lowest payout, on average, and likely very close to the MPG.

Understanding the Chilean annuity market

During the early days of the Chilean pension system and throughout the 1990s, a substantial amount of peoples' retirement accounts was charged by

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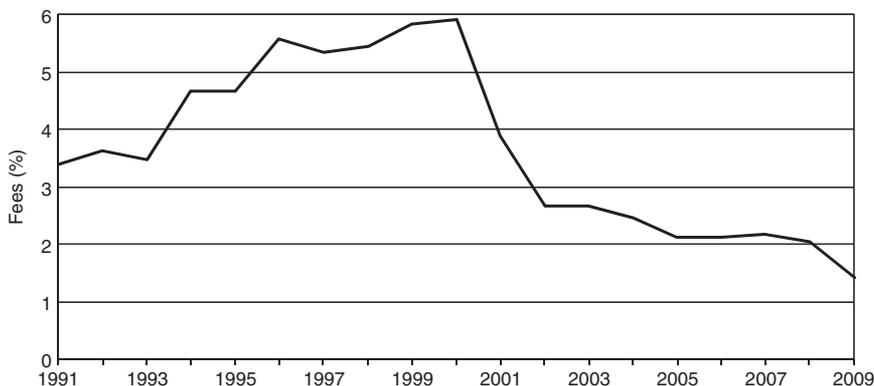


Figure 7.9 Time path of commissions for annuity sales in Chile. *Source:* Authors' calculations based on Superintendencia de Valores (2010*b*).

intermediaries in the form of commissions. Figure 7.9 depicts the time path of front-loaded commissions charged by life insurers over time, which rose to around 6 percent of retiree balances in 2000. In response to the perceived high rate of charges, policymakers began to draft a law that they hoped would hold down commissions. The policy debate took a decade to bear fruit with a draft law emerging in 2001 and the final law passed by the Congress in 2004. Initially, a maximum commission of 2.5 percent of the individual's balance could be charged; this was then lowered to 2 percent in 2008. This regulation is believed to have had an important impact in bringing down commissions, as is clear from Figure 7.9.

In addition to the cap imposed on annuity commissions, this reform also established a system for retirees to obtain anonymous bids via an online offer and quotation system (known as SCOMP, its Spanish acronym). This system was introduced as an electronic competitive market for all those workers who could obtain pension quotes. Specifically, the AFPs and the life insurers receive the same information about each person requesting a quote, including the retiree's age, sex, balance, and any beneficiaries. The main goal of the system was to increase competition and enhance transparency for consumers (Valdes Prieto 2005).

Those who request a price quote via this system and purchase an annuity can elect to do so directly, or they may engage a life insurer, broker, or financial adviser in which case they can pay up to 2.5 percent of their pension balance to such an intermediary. The operation of the SCOMP system may be summarized as follows:

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- A member initiates the retirement process by informing his AFP of his intention to claim benefits (this can be either via an agent or over the internet). The AFP issues a certificate reporting the member’s balance, and the member then requests premium quotes from his AFP, a life insurer, or any broker licensed to work with SCOMP.
- The affiliate may request up to three quotes for each certificate issued by the AFP.
- After processing and certifying the validity of the request, the system sends information to the pension benefit providers who in turn submit their offers to the system. These are then fed to the member and they are valid for fifteen days.

Worth emphasizing is that the SCOMP system is only informative; that is, each retiree decides his own course of action. He may select any of the offers provided, request additional quotes, negotiate with a provider separately from the SCOMP offers (with the requirement that this external offer cannot be lower than the benefit amount offered by this provider via the SCOMP), or request that SCOMP carry out an auction on his behalf in which case he must take the lowest price offer. To date, the services of the SCOMP platform have been used for approximately 142,000 retirees with an average of 1.3 requests per member since inception in August 2004 (see Tables 7.2 and 7.3). This implies that 81 percent of requests were accepted by the affiliate or pension beneficiary. In practice, it appears that the most popular way to access SCOMP is via the AFPs, who advise 39 percent of the purchasers. Brokers, who represent 32 percent of the market, can also obtain a price quote on the retiree’s behalf, and life insurers account for 29 percent of the requests.

TABLE 7.2 Time path of requests for annuity quotes under the Chilean SCOMP system

Year	Number requesting	Average number of requests	Accepted requests	Channel (% of total)		
				Broker	Life insurer	AFP
2004	14,426	1.20	9,849	40.75	27.91	31.35
2005	33,714	1.29	28,294	36.58	25.19	38.23
2006	29,154	1.28	23,146	38.95	26.66	34.40
2007	37,606	1.36	32,524	40.20	27.79	32.01
2008	44,173	1.30	27,260	33.81	26.95	39.24
2009	33,356	1.20	20,955	7.01	41.16	51.83
Total	192,429	1.29	142,028	32.20	29.30	38.50

Source: Authors' calculations of data from Superintendencia de Valores (2010c); see text.

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TABLE 7.3 Annuity quotes accepted in Chile based on ranking of benefit offered

Ranking	Year						Total
	2004	2005	2006	2007	2008	2009	
Best quote (%)	66.40	63.42	61.96	63.32	57.56	45.81	62.49
Second-best quote (%)	15.50	15.42	14.15	13.53	14.54	14.10	14.44
Third-best quote (%)	7.52	7.31	7.37	7.36	7.70	9.52	7.34
Other (%)	10.59	13.85	16.53	15.80	20.20	30.56	15.74
Total number	6,640	18,351	16,193	19,711	20,450	17,916	77,300

Source: Authors' calculations of data from Superintendencia de Valores (2010*a*); see text.

The evidence also indicates that 60 percent of people selected the highest benefit, or best monetary offer, provided by the bidders, and the ratio rises to 80 percent if we consider the highest three monetary offers generated. Though this could be interpreted as savvy purchasing behavior, it must be acknowledged that high benefit levels are not the only consideration. Insurers differ according to their risk classifications, so it is difficult to compare a high benefit payment monetary offer from a lower ranked firm with a lower benefit and a more highly regarded firm.

Further analysis of monetary quotes indicates that take-up rates vary according to the channel used to access the system (Figure 7.10). Specifically, people who referred their decision to brokers elected the highest payout 75 percent of the time; the ratio was 43 percent when the retiree used his AFP for advice, and only 3 percent when the life insurer was consulted. This could indicate that brokers are actually helpful in assisting people's decision-making. A possible explanation for the AFP's poor performance as a channel is related to its lack of incentives during the retirement phase. That is, an AFP participates actively during the worker's accumulation phase, registering contributions, investing, and managing the account; on the other hand, they receive no commission for giving advice about payout products. The fact that so few people obtain the highest payout product when consulting a life insurer may be due to the fact that agents have an incentive to capture customers once they are contacted.

Many have deemed the SCOMP system a success, but buying an annuity is still not a simple task. That is, the SCOMP-generated reports can be ten pages long with multiple numbers and calculations about payments under different payout structures (e.g., simple annuity, annuity with a guaranteed period, etc.). This information seems to be quite daunting for those seeking to shop annuity products at retirement. Furthermore, recent surveys show that people are not well informed about the pension system and may lack the financial literacy to make sensible financial choices

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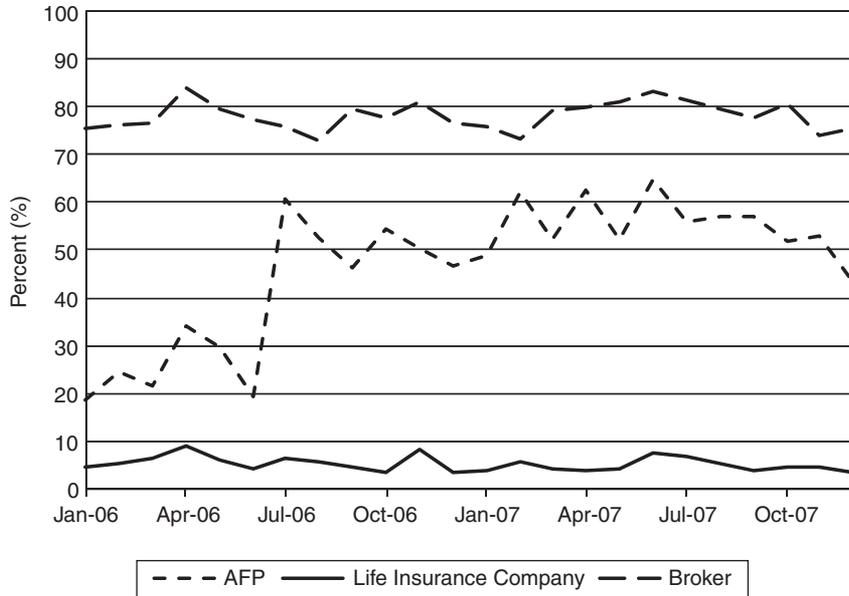


Figure 7.10 Proportion of Chilean AFP member retirees electing the lowest cost annuity quote by access channel utilized. *Source:* Authors’ calculations based on Superintendencia de Pensiones (2010a).

(Arenas et al. 2008; Mitchell et al. 2009). As a result, retirees are likely to continue requesting the services of intermediaries, which in turn reduces their pension levels due to the commissions charged.

A further consideration is that it is virtually impossible for people to ‘learn by doing’ as most people undertake this once in a lifetime. The decision requires the purchaser to sign a contract in which he transfers his pension balance to a life insurer in exchange for a cash flow until the purchaser’s death. For this reason, the Chilean pension supervisory authority has focused on enhancing information flow and strengthening the platform for annuity bids. Suppliers also benefit from SCOMP. While one-third of retirees do request online quotes directly, thus avoiding paying fees to intermediaries, only 12 percent finalize the process without paying any commissions (Reyes and Stewart 2008). This reinforces the notion that consumers lack financial knowledge for making such a momentous and irreversible decision. For this reason, people seek out and pay advisers, and also for this reason, the regulator continues to seek ways to reduce commissions paid to intermediaries.

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Are Chilean annuities attractive?

Earlier studies research has noted that adverse selection is likely when retirees have the option to annuitize (Mitchell et al. 1999; Finkelstein and Poterba 2004), due to an asymmetry of information between the life insurer and the individual seeking to buy the annuity. Specifically, retirees may have better information about their health conditions and thus about life expectancy compared to the information available to the insurer. For instance, people who believe their mortality probability is lower than average will value offered annuities more than people who believe their mortality is higher. Life insurers in Chile are not allowed to discriminate between buyers using health tests, medical records, or familiar history – in fact, they only permit age and sex to be used to classify purchasers. Of course, in fact, mortality patterns do differ across segments of the population for various reasons (McCarthy and Mitchell 2010), and mortality patterns can also change over time as a result of improvements that affect life expectancies of one group more than another (new drugs, new vaccines, etc.). For this reason, it is of interest to ask whether there is adverse selection in the Chilean annuity market, and if so, how important this phenomenon might be.

One way to analyze adverse selection is to simply plot population and annuity mortality patterns, which we do in Figure 7.11.¹⁵ The evidence strongly suggests that, in Chile, the male population does die earlier than those persons who purchase annuities, supporting the notion that people who expect to live longer purchase annuities that allow them to smooth consumption and avoid the longevity risk, and the effect is even stronger for women. Thus, there is some degree of adverse selection in the Chilean annuity market since people who are expected to live longer are more likely to purchase annuities.

We quantify these differences by computing the A/E ratio comparing population and annuitant mortality patterns. Specifically, we compare the number of deaths in the Chilean male population with a given age structure using one table, versus the number of deaths in the annuitant group using the annuity mortality table. The formula for the A/E method is:

$$\frac{A}{E} = \frac{\sum_x w_x q_x^*}{\sum_x w_x q_x} \times 100 \quad (2)$$

where q_x^* is the probability associated with the table in question that an individual of age x dies, and q_x is the corresponding probability for the base table; w_x are the weights which are set with value $w_{65} = 100,000$ and $w_x = w_{x-1} (1 - q_{x-1})$. In the Chilean case, we see that for males the ratio is 84.8 and for females, 66.1. By way of comparison, McCarthy and Mitchell (2010) find a

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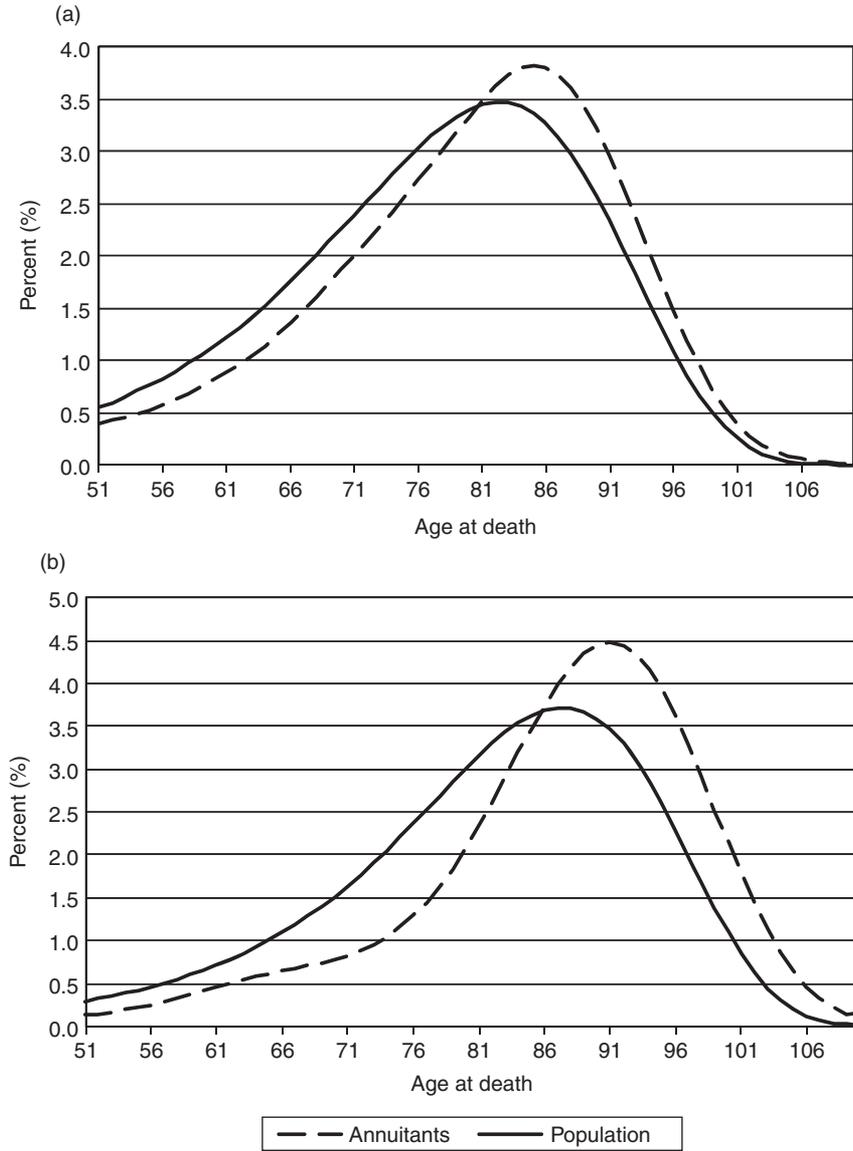


Figure 7.11 Distribution of age at death of Chilean population and annuity purchasers conditional on attaining age 25. Panel (A): males; Panel (B): females. *Source:* Authors' calculations based on INE (2004).

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smaller number for US men, 65.3 but a relatively larger ratio for women, 73.6. Thus, we interpret this result as showing that male and female annuitants in Chile live longer than the population, but the women live relatively much longer than in the United States. As a result, it would be reasonable to conjecture that women would find life annuities relatively more appealing than men.

Another way to judge whether Chilean annuity markets are appealing is to compute the so-called money's worth ratio (MWR), or the discounted expected present value of the lifetime payment stream relative to the premium, conditional on survival. This calculation requires that one employs not just a period but a cohortized mortality table and term structure for interest rates (see Mitchell et al. 1999). Also, the formula must take into account whether the person purchased a single annuity or joint annuity (compulsory for married males). In addition, in Chile, life insurers also promise a funeral benefit of 15 UF in case of the purchaser's death. Accordingly, the MWR for a single life annuitant may be defined as:

$$MWR_i = \frac{\left(A_i \sum_{t=d+1}^{12(w-x)} \frac{{}_tP_x}{(1+i_t)^t} \right) + F}{P} \quad (3)$$

where A is the monthly annuity payment in UF, w is the ultimate age in the mortality table, ${}_tP_x$ is the probability that a life aged x is still alive at time t , d is the number of deferment months chosen in the annuity, i_t is the interest rate used for discounting future payments, F is the funeral benefits, and P is the premium paid to the life insurance company. Similarly, the MWR for a joint annuity may be defined as:

$$MWR_i = \frac{\left(A_i \sum_{t=d+1}^{12(w-x)} \frac{{}_tP_x + 0.6(1-{}_tP_x){}_tP_y}{(1+i_t)^t} \right) + F}{P} \quad (4)$$

where almost all the variables are the same as before, but now we need to add the death probability of the beneficiary (${}_tP_y$).¹⁶ In case of guarantee periods, the term ${}_tP_x$ takes the value 1 in the periods covered by the guarantee.

Table 7.4 replicates some of the MW computations carried out by prior analysts, at the end of the 1990s and early in the 2000s, and Table 7.5 reports our own updated estimates for the years 2005–8. Overall, and somewhat different from other countries,¹⁷ we find that MWR tends to exceed 1 in Chile and the advantage appears to be rising slightly over time. This suggests that annuity buyers are receiving a relatively generous flow of payments given their premium payments, which explains some of the

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TABLE 7.4 Money’s worth ratios for Chilean payout annuities derived in prior studies

	James et al. (2006) ^a		Rocha and Thorburn (2006)	
	1999	2003	1999	2003
Male aged 55	0.98	0.98	0.98	1.05
Male aged 65	—	1.01	1.00	1.07
Female aged 55	0.96	0.93	0.99	1.05
Female aged 60	—	0.96	1.02	1.08
Joint life	1.00	1.01	1.00	1.05
Mortality table used	RV-98	RV-98	RV-04	RV-04

^a Computed for a balance of UF1000.

Source: Authors’ calculations from cited sources; all computations use the risk-free rate.

TABLE 7.5 Updated money’s worth ratios for Chilean payout annuities

Demographic	Average 2005–8
Male aged 55	1.07
Male aged 65	1.07
Female aged 55	1.09
Female aged 65	1.11
Joint life	1.11

Source: Authors’ calculations from Superintendencia de Valores (2010a, 2010b, 2010c); all computations use the risk-free rate.

product’s appeal. In results not reported here (but available on request), we examine an OLS regression model relating individual MWRs to participants’ age, account balance at purchase, sex and marital status, and other factors. We find that MWRs rise with age, pension balance, and for those who buy deferred rather than immediate products. Single men and women have lower MWRs than do married women, indicating that some of the annuity value derives from what appear to be more than actuarially fair benefits to married women.

The relatively high MWRs we find are also consistent with Rocha and Rudolph (2010), and they are grounds for concern in that insurers selling these products are unlikely to make a positive profit over time as in expectation they will pay out more than they earn. Yet another way to look at the results is that our computations use a risk-free discount rate which enhances the expected present value of the income flow (a long-term government bond rate). If, instead, we used a higher corporate bond

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rate, annuity payouts would be reduced as would MWRs (note that the PW payout would also decline). Accordingly, while benefits seem relatively generous under conventional assumptions, it is likely that these are risky in the long run.

Conclusion

One of the most interesting features of the Chilean pension system is that approximately two-thirds of all retirees purchase annuities, a very different result than the evidence reported in other countries. In our view, this phenomenon is attributable to several factors specific to Chile:

1. *Generous annuity payments.* As we have shown, MWRs for the Chilean pension system are high in comparison with international experience and appear to be rising.
2. *Information transparency in the annuity bidding process.* The transparency and ease of the SCOMP online mechanism has evidently made it easier for retirees to find better information on annuity premiums than was feasible in the past. In addition, AFPs are now required to issue a list of people nearing retirement age to all the pension providers, as a means to boost competition.
3. *Access to early retirement.* The Chilean law permits people to retire early if their pension accruals are substantial enough. Since workers need not leave the labor force in order to claim their pensions, those who have sufficient wealth in their AFP accounts will value access to the funds. Most of these retirees with decent balances will not expect to see their benefits decline down to the MPG threshold, so they are very likely to annuitize.
4. *Small incentives for the AFPs to promote PW.* In Chile, the AFP managers are mainly paid based on workers' contributions; they are prohibited from paying commissions to brokers. Furthermore, AFPs may not charge a front-end fee to retirees who leave their money with the AFP and take the PW amounts.¹⁸

The fact that the Chilean life annuity market is continuing to grow bodes well for future retirement security. Nevertheless, some important policy issues remain to be resolved. One is that the system uses sex-specific mortality tables to price retirement benefits, and under the current law, women are able to file as young as age 60. These facts, combined with women's generally lower earnings levels, mean that women's benefits are relatively low compared to men's. By contrast, in many European nations and in the United States, retirement ages are the same for both men and women, and unisex tables apply to the benefit formulas (Bertranou 2001).

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If a common mortality table were used for Chilean calculations, men's benefits would fall and women's would rise. Therefore, male retirees taking the PW would deplete their pension balances later and females earlier. Bernstein and Tokman (2005) suggest that men's annuity values would fall by 5 percent, while women's would rise by the same percentage. The same authors estimate that raising women's retirement age to 65 would boost their annuities by one-third to 47 percent.

Another issue is that, until recently, poverty benefits under the first pillar were rationed. That is, some poor retirees were unable to qualify for poverty-based old-age income support benefits due to lack of funding for the program. As a result, risk-averse consumers would have been likely to demand an annuity to help smooth old-age consumption, as long as the chance of welfare support was not 100 percent. Also, the MPG benefit level was relatively low, and to receive this benefit, people had to meet strict eligibility requirements (e.g., contributing for twenty years into the system). Both factors would have raised the attractiveness of annuitizing instead of relying on PW payouts.

Nevertheless, the Chilean government has recently enacted several pension system reforms seeking to enhance coverage and boost first-pillar benefits (Godoy 2008; Arenas 2010). Specifically, access to the minimum benefit was made easier and the twenty-year contribution requirement has been dropped. Additionally, the minimum old-age benefit level was increased for those with low or no contribution histories. These reforms are likely to reduce the demand for annuitization in the future, since more people will be able to avail themselves of the social safety net in old age. In addition, the insurance sector is paying what appears to be quite high benefits in exchange for the premiums charged, a pattern that may be challenged as the financial turmoil of 2008–9 takes its toll on insurance company investments.

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Notes

- ¹ This section draws on Arenas et al. (2008) which cites numerous historical references to the development and growth of the Chilean pensions system over the last three decades.
- ² The public defined-benefit entity that administered the old PAYGO defined-benefit program was closed to new entrants by the 1980 reform, but it continues to pay those retirees who remained in the old program at the time of the reform; it also pays ‘recognition bonds’ at retirement to those who moved to the new system and received credit for prior contributions.
- ³ It also provides life insurance and disability benefits as part of the mandatory program.
- ⁴ Mandatory system contributions are capped at an earnings ceiling of approximately US\$2,000 a month; fewer than 5 percent of AFP contributors earn over that ceiling.
- ⁵ Strictly speaking, they have other two choices from the combination of these modalities according to recent changes in the regulation, but few people elect these combinations.
- ⁶ The survivorship benefit was made sex-neutral in the most recent 2009 reforms.
- ⁷ This is similar to the $1/E[T]$ rule implemented by the US Internal Revenue Service, when determining how quickly the retiree must spend down his 401(k) plan; see Horneff et al. (2007).
- ⁸ As of 3/10, a UF is equal to CP\$20,998, or about US\$40.33 (Banco Central de Chile 2010).
- ⁹ The formula for the benefit is
$$\text{Guaranteed pension} = \text{Min}\{45\text{UF}, \text{MPG} + 0.75(\text{Annuity} - \text{MPG})\}$$
- ¹⁰ Information taken from Superintendencia de Pensiones (2010a) and monetary units were converted into US dollars using data from Banco Central de Chile (2010).
- ¹¹ For the reader’s convenience, US\$1 = CP\$501 as of December 2009.
- ¹² Superintendencia de Pensiones (2010b).
- ¹³ Since the calculation takes into account one’s final ten years of contributions, this means that benefits are low for people claiming benefits after a long unemployment period or with many zero-contribution periods. To disincentivize early retirement, the regulator has limited to sixteen the number of zero-contribution months that can be counted in the retiree’s final decade of contributions.
- ¹⁴ From February 2008 to May 2018.
- ¹⁵ Information collected from The National Institute of Statistics – Chile (INE) where mortality tables are aggregated over five-year periods and disaggregated using the methodology in Ruiz (2010).
- ¹⁶ Here, we assume that the only potential beneficiary is a spouse; no children are assumed as beneficiaries.

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¹⁷ See for instance Doyle et al. (2004), James et al. (2006), Rocha and Rudolph (2010), and Thorburn et al. (2007).

¹⁸ All AFPs charge a fee of 1.25 percent on the pension balance in order to provide pension payouts.

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