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The Payout Phase of Pension Systems

A Comparison of Five Countries

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Abstract

This paper provides a comparative summary of the payout phase of pension systems in five countries—Australia, Chile, Denmark, Sweden, and Switzerland. All five countries have large pension systems with mandatory or quasi-mandatory retirement savings schemes. But they exhibit important differences in the structure and role of different pillars, regulation of payout options, level of annuitization, market structure, capital regulations, risk management, and use of risk sharing arrangements. The paper summarizes the experience of these countries and highlights the lessons they offer to other countries.

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 rrocha@worldbank.org, dvittas@worldbank.org, and hrudolph@worldbank.org.

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Preface

This paper on 'The Payout Phase of Pension Systems: A Comparison of Five Countries' was part of a broader project on life annuities and retirement products, coordinated by Roberto Rocha, Senior Adviser at the Finance and Private Sector Development in the Middle East North Africa Region, and former Manager at the Financial and Private Sector Development Vice-Presidency of the World Bank. The paper is published by Global Capital Markets Non Bank Institutions of the Financial and Private Sector Development Vice-Presidency of the World Bank. 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 comparative summary of the experience of the five countries covered in this project and the lessons they offer for other countries. A companion paper (Rocha and Vittas 2010) addresses policy issues and constraints in designing the payout phase with particular focus on developing countries that have reformed their pension systems.

1. Introduction

This paper provides a comparative summary of the payout phase in five countries. All five countries (Australia, Chile, Denmark, Sweden, and Switzerland) have large pension systems with mandatory or quasi-mandatory retirement savings schemes that are mostly based on defined contribution (DC) plans. But the five countries also exhibit important differences in the structure and role of different pillars, in the regulation of payout options, in the level of annuitization, in market structure, in capital regulations and in risk management and use of risk sharing arrangements. The different institutional and regulatory arrangements provide a rich set of experiences that may be useful and relevant for other reforming countries.[1]

The paper is structured as follows. The next section provides an overview of the pension systems of the five countries, focusing on the relative role of different pillars and highlighting the target replacement rates in each country. The third section examines the menu of available products and discusses the crucial role that product and marketing regulation plays in shaping the total market. This section also summarizes information on the level of annuitization that prevails in each country. The fourth section focuses on the regulation of providers of retirement products, looking in turn at institutional arrangements, the prevalence of centralized or decentralized management, and the design of investment and capital regulations. This section also contains a brief discussion of risk management issues and the role of risk-sharing arrangements. The paper concludes with a summary of policy lessons for other countries.[2]

2. Overview of Pension Systems

2.1 Overall Structure of Pension Systems

All five countries covered in this paper have well-developed pension systems. As shown in Table 1, they all have a multi-pillar structure combining public and private provision, including a mandatory or quasi-mandatory private pillar. All countries have a zero public pillar providing basic benefits, but the level of provision varies considerably. Only Sweden and Switzerland have contributory and earnings-related public schemes (first pillars). Denmark and Sweden have supplementary public schemes, the ATP in Denmark and the PPM in Sweden, that are mandatory and fully funded and operate alongside the private occupational funds. All counties have voluntary third pillars for additional provision and for self-employed workers.

[1] The paper is part of a broader project on annuities that comprises more in-depth country studies, and draws on these individual studies: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Thorburn (2007); Rocha and Rudolph (2010); and Vittas (2008).
[2] A more detailed discussion of policy issues and constraints is contained in Rocha and Vittas (2010).

Table 1: Structure of National Pension Systems

Country	Pillar Zero	Pillar One	Pillar Two	Pillar Three
Australia	X		X	X
Chile	X		X	X
Denmark	X		X X	X
Sweden	X	X	X X	X
Switzerland	X	X	X	X

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Table 2 describes in greater detail the overall structure of the five pension systems. More details on the benefits and costs of different pillars are offered below.

Table 2: Overall Structure of the National Pension Systems

Country	Public Unfunded (Pillars 0 and 1)	Mandatory or Quasi-Mandatory Funded (Pillar 2)	Voluntary Funded (Pillar 3)
Australia	Universal pension financed from general tax revenues and subject to clawback provisions	Occupational system, operating mostly DC plans. Provision through corporate, industry or retail funds.	Voluntary plans for additional provision and for self-employed workers.
Chile	(1) Means-tested universal pension and declining supplement to low-income pensioners, financed from general tax revenues and a sovereign fund.	Open pension funds operating DC plans and managed by independent pension fund administrators (AFPs).	Voluntary plans for additional provision and for self-employed workers. Offered by Pillar 2 pension funds and other financial institutions.
Denmark	(1) Universal pension financed from general tax revenues. (2) Supplement to low-income pensioners. Both benefits are subject to clawback provisions.	(1) Public schemes (mainly ATP) operating DC plans. (2) Occupational funds and insurance companies operating mostly DC plans, based on collective agreements.	Voluntary plans for workers not covered by labor agreements and for additional provision. Offered by pension funds, insurance companies, and banks.
Sweden	(1) Contributory public scheme operating as notional defined contribution (NDC) plan. (2) Minimum pension guarantee for combined NDC and FDC benefits.	(1) Public scheme (PPM) operating funded DC plan. (2) Occupational funds operating mostly DC plans, based on collective labor agreements.	Voluntary pension plans for workers not covered by labor agreements and for additional provision. Offered by insurance companies and banks.
Switzerland	(1) Contributory DB plan, subject to tight maximum and minimum limits, partly financed from general tax revenues. (2) Means-tested supplement to low-income pensioners.	Occupational funds and insurance companies operating mostly DC plans, but with absolute minimum guaranteed return and minimum annuity conversion factor.	Voluntary pension plans for self-employed workers not covered by the mandatory pillar and for additional provision. Offered by insurance companies and banks.

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

2.2 Structure and Cost of Public Pillars

There are large differences in the structure of the zero pillars among these five countries (Table 3). Australia and Denmark offer universal pensions financed from general tax revenues. These are subject to clawback provisions. Denmark also pays a supplement to low income pensioners. The level of the universal benefit is 25 percent of the average wage in Australia for single pensioners and nearly 42 percent for couples. In Denmark the combined universal pension and supplement amount to 35 percent of average earnings.[3]

Table 3: Structure of Zero Pillars

Country	Type	Replacement Rate (Percent of average wage)	Clawback or Top Up Provisions
Australia	Universal	Single rare: 25% Couples: 41.7%	Income Test 40% clawback above low income threshold Asset Test 1.5 per mil clawback above high asset threshold
Chile	Universal pension to impoverished old people	Basic pension (PBS) 17% Maximum pension with solidarity (PMAS) 57%	Top-Up to Pillar 2 pension Universal pension is means tested
Denmark	Universal pension Supplement to low-income pensioners	Combined 35%	Universal pension: 30% clawback above high income threshold Supplement: 30% clawback above low income threshold
Sweden	Minimum pension guarantee for combined NDC and FDC benefits	About 30%	Top up to NDC and FDC benefits
Switzerland	Minimum pension from pillar 1 Supplement for impoverished old pensioners	Combined 24%	Supplement is means tested

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Chile closed down its old social security system to new workers when it implemented its pension reform in 1981. However, a new basic solidarity pension (PBS) was introduced in 2008. This is offered to pensioners who do not have adequate balances to purchase a life annuity above the PBS level. The PBS currently amounts to approximately 17 percent of the average wage. Low-balance workers are compelled to use phased withdrawals and the government pays the PBS after their balances have been exhausted. In order to minimize the probability of triggering the PBS, the 2008 amendments to the pension law

[3] The clawback provisions are discussed in section 2.4 below.

require that the calculation of PWs include a fair actuarial factor to account for this risk. The government also tops up any annuity payments that fall below the PBS level. In addition the Government provides a pension supplement to pensioners in the lowest 60 percent of the income distribution. This is equal to the PBS less 29.4 percent of the pension income of individual pensioners. The supplement is effectively eliminated when pension income is close to 60 percent of the average wage (the exact point of elimination depends on the level of the PBS relative to the average wage). This level is known as the maximum pension with solidarity support (PMAS). PMAS is gradually increasing and it is expected to reach approximately USD 600 in July 2011. The new universal pension effectively covers uninsured workers, who represent a significant proportion of all workers because of the continuing large relative importance of the informal labor market.

In Sweden a minimum pension guarantee of about 30 percent of the average wage covers the combined benefits from the new NDC and FDC schemes. In Switzerland, benefits from the first pillar are subject to a minimum level that is about 18 percent of the average wage. However, an additional means-tested supplement is paid from general tax revenues to pensioners with no other sources of income. This is estimated at 6 percent of average earnings, bringing the level of the combined benefit to 24 percent of average earnings.

Only Sweden and Switzerland have a first pillar (Table 4). These are contributory public schemes with earnings-related benefits.

Table 4: Structure of First Pillars

Country	Type	Contribution Rate (Percent of covered earnings)	Targeted Replacement Rate
Australia	No		
Chile	No		
Denmark	No		
Sweden	NDC	16%	39%
Switzerland	DB	8.4%	33%

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Sweden implemented a radical reform of its pension system in the mid-1990s. A new public unfunded NDC scheme was introduced to replace the pre-existing flat and earnings-related (ATP) DB pensions. The contribution rate for the NDC scheme is 16 percent of covered earnings. Out-of-employment spells are covered by government contributions and thus most workers are likely to have full contribution records. The targeted replacement rate for people on average earnings and retiring at normal retirement age amounts to 39 percent.

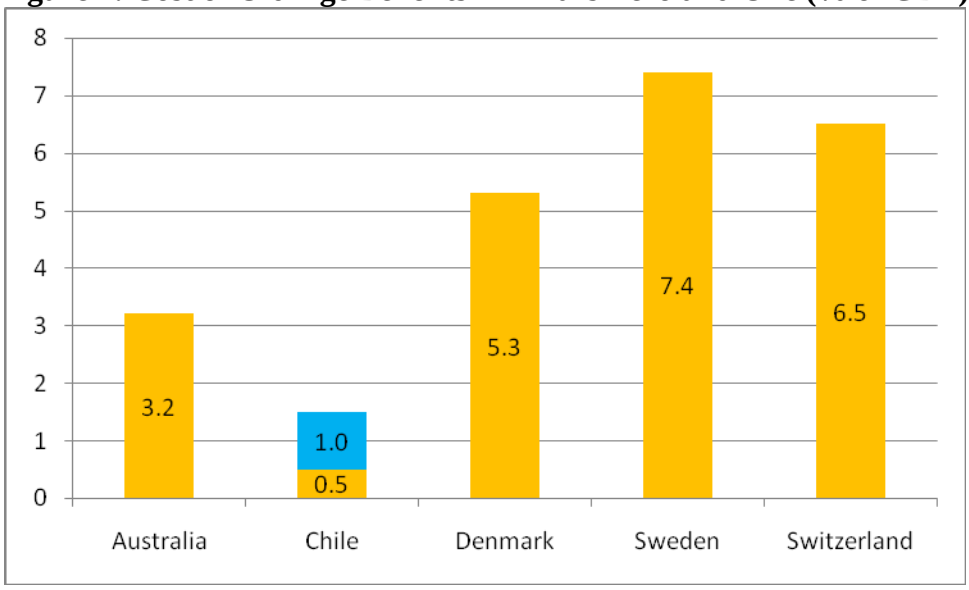
In the NDC scheme, the retirement decision is left to individual workers (within certain limits) but the pension benefit is adjusted to take account of the remaining life expectancy on retirement. NDC balances earn notional interest at 1.6 percent in real terms and NDC

annuities are calculated with cohort life tables and a real rate of interest of 1.6 percent. They are indexed to prices but are adjusted for real wage increases above 1.6 percent. The NDC scheme is supported by five buffer funds that have been created since the introduction of the general supplementary pension scheme (ATP) in 1960. The buffer funds, known as AP funds 1 to 4 and 6, have accumulated assets equivalent to 30 percent of GDP.

Switzerland operates an earnings-related and unfunded first pillar. The contribution rate is 8.4 percent for workers in dependent employment, equally divided between employers and employees. Self-employed workers pay a slightly smaller contribution. The government covers by design 20 percent of old age benefits and 50 percent of disability benefits. Pension benefits are set within a narrow range with very low dispersion. The maximum pension is double the minimum and amounts to about 36 percent of average earnings. The minimum and maximum benefits are set in Swiss francs by government decision and their relation to average earnings may vary from year to year. The maximum benefit requires a full contribution history, but most people receive the maximum benefit because even housewives, students and the unemployed are required to make contributions. The average benefit is close to 33 percent of the average wage.

The cost of public pensions from both pillars zero and one varies across the five countries, depending on the demographic structure of the population, the generosity of benefits and the maturity of the system (Figure 1).

Figure 1: Cost of Old Age Benefits in Pillars Zero and One (% of GDP)



Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); DIPRES (2009); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).
Note: The 1.0% figure in Chile is the expected annual long term cost of the solidarity pillar.

The highest level of cost among the five countries is found in Sweden at over 7 percent of GDP, followed by Switzerland and Denmark. This clearly reflects the high level of public

benefits, the universal coverage of the pension systems and the age structure of the populations. The cost of public pensions is lower in Australia because the level of the age pension is much smaller and the population is significantly younger. The lowest level is found in Chile, mainly because the public benefit is much lower and the pension supplement is paid to low-income pensioners. The younger demographic structure is also a factor.

2.3 Structure of Private Pillars

All countries have mandatory or quasi-mandatory second pillars based on defined contribution schemes, but this pillar is organized differently across countries (Table 5). In the cases of Denmark and Sweden it includes a combination of public and occupational pension funds. In Denmark, the ATP involves centralized administration, asset management and annuity provision, while in Sweden the PPM has centralized administration and annuity provision but offers to participants the option of decentralized asset management during both the accumulation and payout phases. Occupational funds in both countries are covered by collective labor agreements. In Denmark they are mostly managed by multi-employer funds and life insurance companies; in Sweden, by multi-employer funds that follow the PPM model.

In the other three countries the second pillar is operated only by private pension funds, but these funds are structured differently. The Chilean system is operated by open pension funds managed by dedicated pension fund managers, the Swiss system is based on occupational funds, managed by single-employer or multi-employer foundations and insurance companies, and the Australian system combines occupational funds (single or multi-employer) and retail funds.

Table 5: Structure of Second Pillars

Country	Institutional Structure	Type of Plan	Contribution Rate
Australia	Occupational & open funds	Mostly DC	9%
Chile	Open funds	DC	10%
Denmark	(1) Public scheme (ATP) (2) Occupational funds	(1) DC/hybrid (2) DC/hybrid	(1) 1% (2) 11%*
Sweden	(1) Public scheme (PPM) (2) Occupational funds	(1) DC (2) DC	(1) 2.5% (2) 3.5-4.5%
Switzerland	Occupational funds operated by foundations and insurers	DC with minimum investment return and annuity conversion factor	Age-related 7-18% on coordinated earnings (between 8 and 9 % on total earnings)

* see text for elaboration.

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Second pillars are now mostly (Australia, Denmark, Sweden and Switzerland) or entirely (Chile) based on DC plans. In Australia, defined benefit plans and especially hybrid funds, which combine elements of DB and DC plans, still have a significant presence. In Denmark, the ATP and some of the occupational funds offer deferred group annuities, which change their character to that of hybrid plans. In Switzerland, the mandatory component of pension plans is stipulated as minimum defined credits in notional retirement accounts. A minimum contribution rate and a minimum interest rate (MIR) are specified as well as a minimum annuity conversion factor (ACF) on retirement. Both the MIR and ACF were held constant for 17 years after the creation of the mandatory system in 1985 but the MIR is now set annually in line with the level of market rates, while the ACF is set to decline gradually over the next few years until it reaches a more sustainable level.

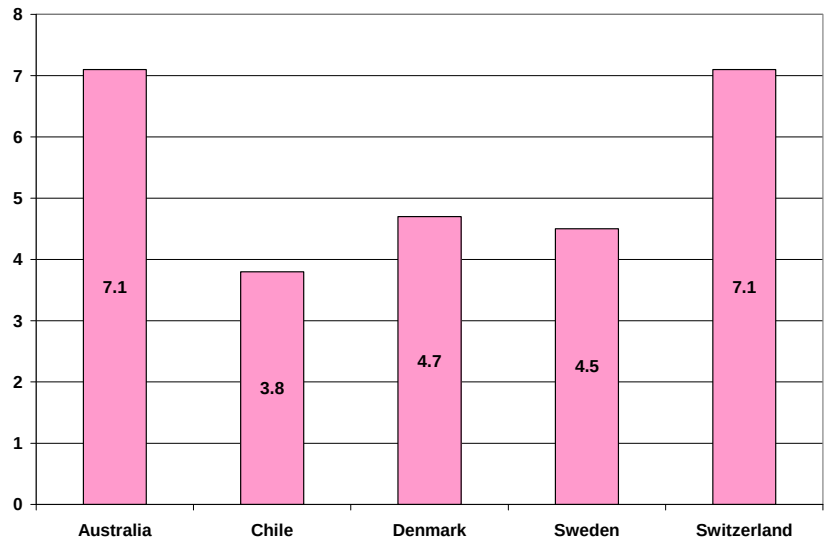
Contribution rates vary within a rather narrow range. They are lowest in Sweden where they equal a combined 6 to 7 percent depending on the type of collective labor agreement (2.5 percent for the PPM and 3.5 to 4.5 percent for occupational plans). In Switzerland, the postulated minimum contribution rates, which vary by age, are calculated on so-called "coordinated earnings", which range between 30 and 120 percent of average earnings. The average contribution rate, calculated on total earnings, amounted to between 8 and 9 percent in 2005. In Australia, the contribution rate is a flat 9 percent, while in Chile it amounts to 10 percent. Chilean workers also pay an average of 2.1 percent of salaries to cover the cost of group term life and disability insurance and the operating costs and profit margins of pension fund administrators. In the other four countries, operating costs are either covered by employers or deducted from investment returns. Contribution rates vary by collective labor agreement in Denmark. The OECD Pensions at a Glance study assumes an average contribution rate of nearly 12 percent of earnings, based on

contribution rates of the ATP and the collective agreement with the largest coverage (OECD 2007). However, the average contribution rate in Denmark may be significantly lower (see below).

The creation of second pillars has generated considerable flows of long-term savings into pension funds (Figure 2). The level of annual contributions varies from 3.8 percent of GDP in Chile to 7.1 percent in Australia and Switzerland. The higher level in these two countries is explained by the near universal coverage of their second pillars and the fact that covered salaries represent a higher proportion of GDP than in Chile. In the case of Australia, annual contributions also include the co-contributions made by government for low income workers, while in Switzerland they also cover contributions made for super-obligatory benefits.

Denmark and Sweden report lower annual contribution flows relative to GDP, despite the near universal coverage of their second pillars. In the case of Sweden this is explained by the lower contribution rate to second pillar schemes. However, including premiums paid on voluntary insurance schemes (third pillar plans), the total annual contributions amount to 6.8 percent of GDP. In the case of Denmark, the statistics imply that the average contribution rate is lower than the combined rate of 12 percent for ATP and occupational schemes indicated above. The combined rate is probably between 8 and 8.5 percent. In Denmark, workers contribute an additional 1.4 percent of GDP to personal pension plans.

Figure 2: Annual Contributions in Second Pillars (% of GDP)



Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

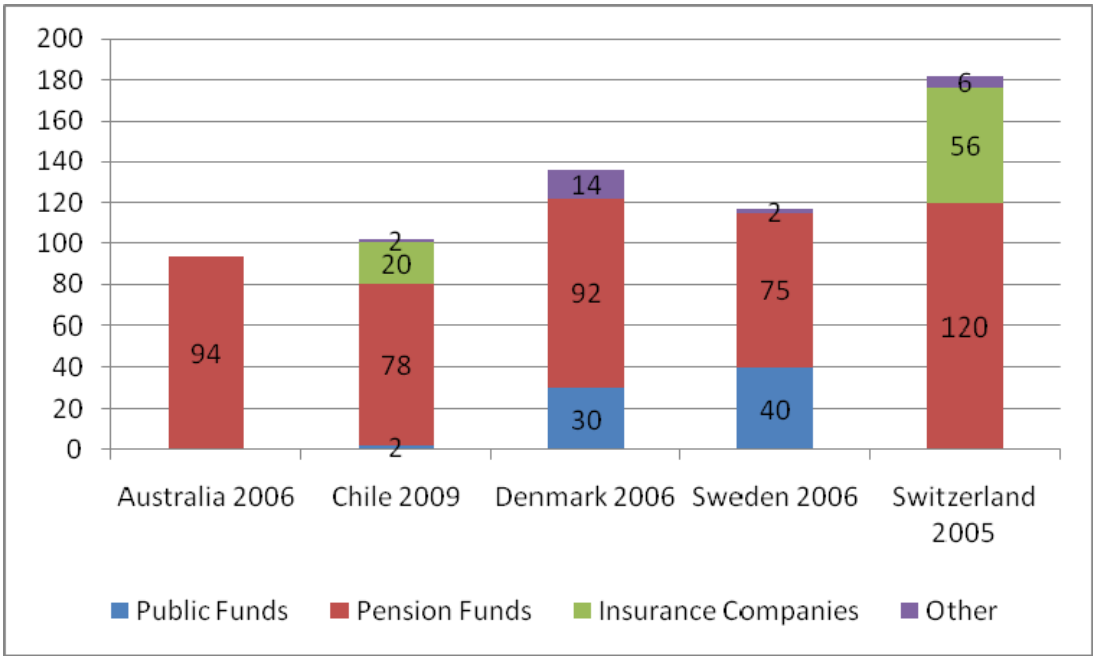
All countries have third pillars providing additional benefits and offering provision to the self-employed and other workers that are not covered by the mandatory and quasi-mandatory second pillars. There are some differences in the organization of voluntary arrangements but available information does not provide a detailed picture of the structure of third pillars. Voluntary schemes benefit from tax incentives that are

particularly powerful in the case of high-income professionals and other self-employed people. They also benefit from greater investment freedom and a lighter regulatory burden.

The high level of annual contributions combined with high investment returns and at least initially low levels of benefits have resulted in a large accumulation of retirement assets. Available data do not allow a clear identification of assets that have been accumulated on behalf of active workers and those that support the payout phase. In addition, the statistics on third pillar assets are not comprehensively and separately identified in all countries.

Total assets in the second pillar range from 120 percent in Switzerland to 75 percent in Sweden (Figure 3). Switzerland also reports very high levels of third pillar assets with insurance companies and banks, amounting to 62 percent of GDP. In Denmark and Sweden, third pillar assets held with insurance companies are reported together with second pillar assets. Those held with banks amounted to 14 percent of GDP in Denmark and 2 percent in Sweden. Denmark and Sweden also report high levels of assets with public pension funds. In Denmark these represent the accumulated assets of ATP and a couple of other smaller schemes. In Sweden, they include the buffer funds of the AP funds that support the benefits of the NDC scheme and the assets accumulated under the PPM scheme. PPM assets amounted in 2006 to 10 percent of GDP. In Chile, in addition to pension fund assets, the recently created pension stabilization fund holds assets amounting to 2.3 percent of GDP; insurers hold assets amounting to 20 percent of GDP and backing the provision of life annuities; and voluntary savings amount to approximately 2 percent of GDP.

Figure 3: Total Retirement Assets (% of GDP)



Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

2.4 Target Replacement Rates

Actual replacement rates (defined as the ratio of the initial benefit to the individual wage at retirement) depend on many factors, such as the generosity of public schemes, the period of contribution, the contribution rates to private funded schemes, and actual net rates of return on these schemes relative to wage growth. Actual replacement rates also depend on how final balances in funded schemes are converted into streams of retirement income, such as annuities and phased withdrawals.

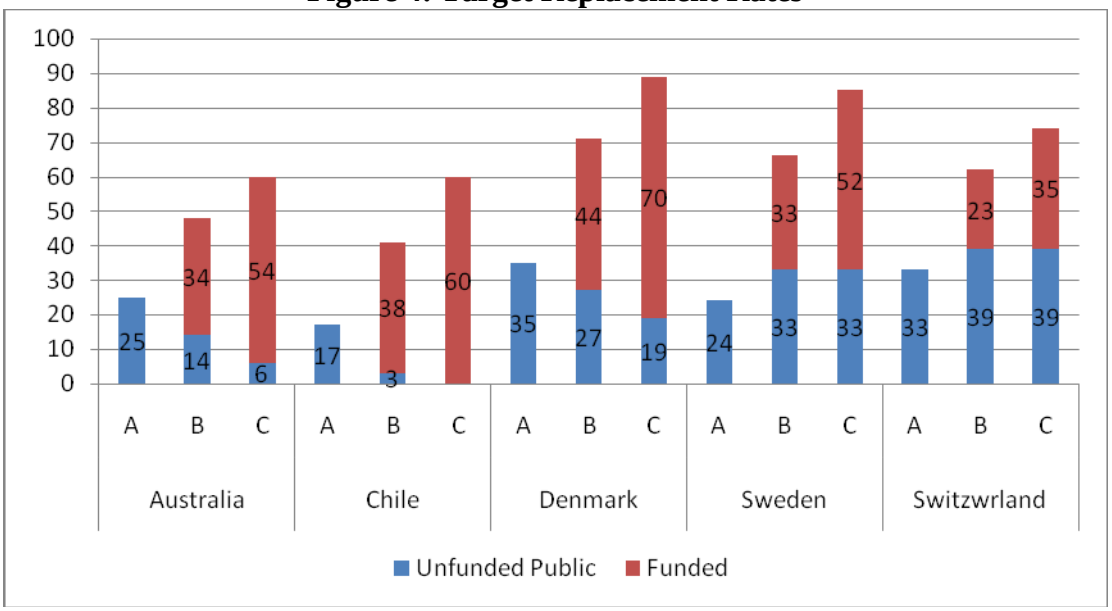
Comparing actual replacement rates across countries has proven difficult, as it requires detailed information on initial benefits from various pillars as well as wages at retirement. However, it is possible to estimate target replacement rates by making some basic assumptions about key variables, such as the period of contribution, net rates of return, and the conversion of final second pillar balances (Figure 4).

The results are highly sensitive to the retained assumptions, especially the relation between the rate of growth of real wages and the real rate of net investment returns. In this paper, we specify two scenarios of real net investment returns, 3.5 and 5 percent per year, combined with a 2 percent growth of real wages. The calculations assume contributions over 40 years and a retirement life of 20 years. Use of a life annuity is assumed and everything is indexed to prices.

The target replacement rates also reflect the interaction between the clawback provisions of the public pillars and the replacement rates achieved in the second pillar. In Australia, the replacement rate of the universal pension is set at 25 percent of the average wage for single pensioners. If the second pillar achieves a replacement rate of 34 percent, as would be the case if the investment return amounts to 3.5 percent, the age pension would be reduced to 14 percent of the average wage. But if the second pillar achieves a replacement rate of 54 percent, which would result from a 5 percent investment return, the public pension would be lowered further to just 6 percent of the average wage.

These calculations imply a severe application of clawback provisions. However, at present, this is not the case. Australia applies two tests for the clawbacks. An income test reduces the pension by 40 percent of the excess income above a low income threshold of about 6 percent of the average wage (11 percent for couples). And an asset test that used to deduct 3 per mil above a high threshold level but since 2007 applies a clawback of only 1.5 per mil.

Figure 4: Target Replacement Rates



Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

The universal pension in Australia should be eliminated at a relatively low level of income (69 percent of the average wage for singles and 115 percent for couples) if the tests were strictly applied, but because of the limited use of lifetime income streams and the exemption of owner-occupied houses from the asset test, 53 percent of old Australians received the full universal pension in 2007. An additional 27 percent received a reduced age pension and only 20 percent were not entitled to a public pension. However, in the longer run, when the mandatory system will reach maturity, it is likely that a growing proportion of retirees will not receive the full age pension. Recipients of the full age pension are expected to decline sharply to 38 percent by 2050, while those receiving a reduced pension will grow to 40 percent.

In Denmark, the other country that has clawback provisions, the universal pension and supplement each amounts to close to 18 percent of average earnings, yielding a combined benefit of 35 percent. The clawback rate for both benefits is 30 percent above a threshold income. This is about 75 percent of average earnings for the universal pension, but only about 16 percent for the supplement.[4] The vast majority of Danish pensioners receive a universal pension but a much smaller number are recipients of a supplement.

Figure 4 shows that for a worker on average earnings, a 3.5 percent investment return and a contribution rate of 12 percent would produce a replacement rate of 44 percent from the second pillar. The combined public benefit would fall to 27 percent. If the investment

[4] These threshold levels applied in 2003 (OECD 2007). The levels may vary from year to year because the thresholds are set in absolute terms and not in relation to average earnings.

return amounts to 5 percent, the replacement rate from the second pillar would equal 70 percent and the public benefit would fall to 19 percent.[5]

Sweden and Switzerland do not apply clawbacks to their main public benefits. As a result, the overall replacement rates are quite high, especially in the 5 percent investment return scenario. It should, however, be noted that the rules regarding the minimum interest rate and the minimum annuity conversion factor that are applied in the mandatory second pillar in Switzerland would result in a lower replacement rate of 36 percent in the second pillar, at least in the cases of funds that do not provide super-mandatory benefits.

In Chile the new public benefit is a top-up benefit that is paid to retired workers with low incomes and low balances. A worker on average earnings with a full contribution record would not qualify for the PBS, but would receive a top up benefit (Pension Solidarity Supplement) of approximately 3 and 0 percent for portfolios with returns of 3.5 and 5 percent respectively. Replacement rates from the second pillar will be 38 percent with a 3.5 percent investment return and 60 percent with a 5 percent investment return.

3. Product Regulation and the Level of Annuitization

The regulation of retirement products and the terms and conditions attached to the use of alternative payout options play a major part in the choices that workers make when they retire. The offer of public pensions is another major regulatory factor that also affects the regulatory framework of payout options from the second pillar. In this section we discuss the differences in product regulation and review the prevailing level of annuitization across the five countries.

3.1 The Regulation of Payout Options

The five countries covered in this paper have adopted different approaches to the regulation of payout options. Australia has the most liberal regime of the five countries and Chile the most restrictive. In Denmark and Sweden, the supplementary public schemes impose more restrictions than the private plans. Switzerland has a highly restrictive regime, although lump sum payments are free from government restrictions (Table 6).

[5] The replacement rates for Denmark are significantly higher than those of the other countries. This provides another indication that the assumed average contribution rate of 11 percent to occupational pension funds may be too high.

Table 6: Regulation of Payout Options

	Free Lump Sums	Term Annuities	Lifetime PWs	Fixed Nominal Annuities	Fixed Real Annuities	Gtee & Bonus Annuities	Unit-Linked Annuities
Australia	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chile	No*	No	Yes	No	Yes	No	Yes
Denmark: ATP	No	No	No	No	No	Yes	No
Denmark: Other	No*	Yes	No	Yes	No	Yes	Yes
Sweden: PPM	No	No	No	No	No	Yes	No
Sweden: Other	No	Yes	No	Yes	No	Yes	Yes
Switzerland	Yes	No	No	Yes	No	No	No

* Restricted lump sums are permitted.

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Australia imposes no restrictions on payout options from the second pillar. Lump sums, term annuities, allocated annuities (which are similar to the Chilean phased withdrawals but can be based either on fixed terms or on remaining life expectancy) and various types of life annuities are all permitted and left to the choice of individual retirees. The public age pension is a life annuity that is indexed to wages.

In Chile, the basic choice until 2004 was among lifetime phased withdrawals (PWs), fixed real (inflation indexed) life annuities, and a combination of temporary lifetime PWs with deferred life annuities. Since 2004, retiring workers have been allowed to use a combination of a minimum pension fixed real annuity and either a phased withdrawal or a variable annuity. The PBS is a life annuity that is indexed to prices.

Lump sums are subject to tight restrictions. They are permitted for balances in excess of amounts required to provide specified pension benefits. Before 2004, the specified pension income was set at 50 percent of the retiree's average real earnings over the previous 10 years and 110 percent of the old minimum pension.[6] 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 replaced the minimum pension requirement with an 80 percent of the PMAS requirement.[7]

Workers meeting these conditions can opt for early retirement. This does not preclude them from continuing to work. Even workers retiring at the normal age of retirement are allowed to continue to work. This is therefore more a "withdrawal of AFP balances" rule than a "retirement" provision. However, the potential release of excess balances and access to two incomes explains the prevalence of early retirement and the close association between annuitization and early retirement. The tightening of retirement conditions in 2004 reduced the proportion of early retirees as a share of total retirees from 41 to 37 percent between 2004 and 2007.

[6] The basic solidarity pension has replaced the minimum pension.

[7] This 80 percent requirement becomes effective on 2012.

In Denmark**,** compulsory use of life annuities is imposed for the public ATP fund, except in the case of very small balances. The menu of payout options is richer in occupational pension plans and includes life annuities, term annuities and lump sums. Available options depend on the terms of different collective labor agreements. Tax considerations play an important part in shaping individual choices. Public pensions are life annuities that are effectively indexed to wages.

In Sweden**,** the pattern of payouts is broadly similar to that in Denmark. The main difference is that in addition to the public PPM scheme, lump sums are also not permitted in the occupational pension schemes. The main choice in occupational plans is between life and term annuities. Public pensions from the NDC scheme are life annuities that are effectively indexed to wages.

In Switzerland, the basic choice is between lump sums and joint life annuities. The terms and conditions of pension plans are left to be determined by their trustees in consultation with their sponsors. Term annuities and phased withdrawals as well as deferred annuities are not provided for in the government regulations of the mandatory pillar. Lump sums are not restricted by government regulations but are subject to plan restrictions. Government rules mandate the offer of an option for a lump sum commutation of at least 25 percent of balances. A 3-year notice is required for the exercise of the lump sum option. Public pensions in Switzerland are paid for life and are linked to the average of price and wage inflation.

3.2 The Regulation of Life Annuities

In addition to the regulation of payout options, different countries also apply special rules to particular products. Of particular interest are the regulations and rules applied to the offer of life annuities.

The regulation of life annuities is most pervasive in Switzerland, at least as regards the minimum benefits of the mandatory pillar. Switzerland is the only one of the five countries that regulates the pricing of annuities.

Annuities from the mandatory part of the occupational pillar must take the form of joint life annuities and are subject to a minimum conversion factor. This was set equal to 7.2 percent of accumulated balances for nearly the first two decades of the scheme, despite the intervening fall in interest rates and continuing increase in longevity. The annuity conversion factor was lowered after the collapse of investment returns in the first few years of the new millennium and is scheduled to fall gradually to 6.8 percent by 2014. The stipulation of a minimum annuity conversion factor aimed at protecting workers from annual fluctuations of investment returns and interest rates but keeping it unchanged for two decades has underscored the pitfalls of price regulation (Buetler and Ruesch 2007:53).

The same annuity conversion factor is used for men and women as well as married and single persons. Women have a longer life expectancy and used to retire at a younger age.

But the distortion of applying the same conversion factor to men and women is mitigated by the compulsory use of joint life annuities. In addition, the retirement age of women is gradually being raised to that of men. Applying the same uniform annuity conversion factor to single persons, especially single men, imposes a heavy penalty on them. Nevertheless, available evidence shows that single men are as likely to use life annuities as married men.[8]

Table 7: Types of Life Annuities

	Price Regulation	Types and Terms
Australia	None	Various but little demand
Chile	None	Prior to 2004: Fixed real annuities; joint life annuities for men; option for guaranteed annuities (very popular) Since 2004: Option of combination of a fixed real annuity (at least equal to PBS for normal age retirees and above 80% of PMAS and 70% of worker's real wage for early retirees) and either a phased withdrawal or a variable annuity
Denmark: ATP	Unisex Life Tables	'Guarantee and Bonus' life annuities Longevity and investment risks shared with participants
Denmark: Other	Unisex Life Tables	'Guarantee and Bonus' or 'unit-linked' life annuities Longevity and investment risks shared with participants
Sweden: PPM	Unisex Life Tables	'Guarantee and Bonus' or 'unit-linked' life annuities Longevity and investment risks shared with participants
Sweden: Other	Unisex Life Tables	'Guarantee and Bonus' or 'unit-linked' life annuities Longevity and investment risks shared with participants
Switzerland	Fully regulated (minimum annuity conversion factor)	Fixed joint life nominal annuities Possibility of bonus

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Chile also applies an extensive regulation to the use of life annuities. Until 2004, only fixed real life annuities (i.e., annuities linked to inflation) and annuities denominated in a foreign currency (mainly the US dollar) were permitted. Fixed nominal, escalating and variable (bonus-based or unit-linked) annuities as well as term annuities were not allowed. However, in 2004 the use of a combination of a fixed real annuity equal to the PBS with either a variable annuity or a program of phased withdrawals was authorized. Early retirees can opt for a combination of alternatives when the fixed part of the annuity

[8] This is probably explained by two factors: single men have a weaker bequest motive; and annuity conversion factors in the open market are likely to be significantly lower (Buetler and Ruesch 2007:19, 49).

is at least higher than 150 percent of PBS. The market of variable annuities has not developed yet.

The use of joint life annuities is compulsory for both spouses.[9] Life annuities with guaranteed periods are permitted and are widely used, implying the presence of a strong bequest motive. The guaranteed period ranges between 5 and 25 years, with most annuitants opting for 10 or 15 years. Deferred life annuities in conjunction with temporary phased withdrawals are permitted but are not widely used. Most deferred annuities go up to one year.

Insurance companies are required to maintain minimum mathematical reserves based on prescribed life tables and technical discount rates and are also subject to capital requirements for prudential purposes, but are free to determine their own annuity prices. In fact, insurance companies change their annuity prices frequently and oscillate between aggressive and passive marketing campaigns.

In Denmark the public ATP offers deferred group life annuities with guaranteed minimum benefits and annual bonuses that depend on investment performance and longevity experience (Vittas 2008). Guaranteed benefits used to be based on a rate of interest of 4.5 percent, but this was lowered to 2 percent for all new contributions in 2002. A new scheme was introduced in 2008 that converts annual contributions to deferred annuities by using long-term market rates of interest and forward-looking life tables. This applies to 80 percent of the annual contribution. The remaining 20 percent will be used, together with income from investment and hedging operations, to fund annual bonuses that will depend on the overall investment performance and longevity experience of the fund.

The use of life annuities in occupational plans depends on the terms of different collective labor agreements. Some plans offer deferred group annuities with guaranteed annuity conversion factors and allow deductions for the payment of insurance premiums for term life and disability insurance but not for lump-sum withdrawals or term annuities. Other plans are more flexible and permit lump sums, term annuities or life annuities and the latter can be deferred or immediate. The choice of payout options must be indicated at the time of contribution and is influenced by the tax treatment of different options, which has varied over time.

In occupational plans life annuities can take the form of either policies that offer guaranteed benefits, supplemented with annual bonuses that reflect both investment returns and longevity experience, or unit-linked policies. The guaranteed rate in occupational plans used to be equal to 4.5 percent but was lowered to 2.5 percent in 1994 and further to 1.5 percent in 1999. Demand for unit-linked products has increased after the fall in guaranteed rates of return but unit-linked premiums still represent a small fraction of total contributions. The collective labor agreements determine the calculation of initial payments and the distribution of profits between providers and policyholders but the calculation of technical reserves for both guaranteed benefits and future bonuses is

[9] Until 2008 only married men were required to use joint life annuities.

governed by the prudential rules established by the supervisory authority (see section 4.2 below).

In Sweden**,** compulsory use of life annuities is required by the public PPM system. Workers have the right, but are not required, to select a joint life annuity. Two types of annuities are offered.

The first type is a profit participating annuity with minimum guaranteed benefits and annual bonuses that depend on investment performance and also reflect the longevity experience of pensioners. In 2006 the guaranteed rate amounted to 2.75 percent, while the total rate of return including anticipated bonuses was estimated at 6 percent, but in 2007 the guaranteed rate was lowered to 0 percent with the intention to increase the potential for a higher bonus and a higher total return by investing more aggressively in equities and other high-yielding assets.

The PPM uses highly conservative assumptions of future increases in longevity in calculating the guaranteed benefits. The assets backing these annuities are transferred from worker individual accounts to the PPM, which is responsible for their management. PPM has adopted a conservative portfolio that comprises 73 percent bonds and 27 percent equities.

The second type of life annuity is a unit-linked variable annuity, where the investment risk is borne by individual retirees and the longevity risk is shared among the annuitant pool. Asset management is decentralized among authorized asset managers as during the accumulation phase. Most of the small number of PPM retirees have opted for the unit-linked product (Palmer 2008:47-48).

Life annuities in occupational plans also take the form of either the traditional 'guarantee and bonus' variety or the unit-linked type. However, term annuities for 5 or 10 years are permitted and tend to predominate. The calculation of initial payments and the declaration of bonuses are governed by the collective labor agreements that cover the offer of these variable annuities. However, the maintenance of reserves for the guaranteed benefits and for future bonuses is subject to the prudential rules established by the supervisory authority.

Denmark and Sweden require the use of unisex life tables in determining annuity premiums and conversion factors but annuity providers are otherwise free to set their own prices, subject to the terms and conditions stipulated in collective labor agreements.

All types of life annuities are available in Australia which imposes no pricing and product restrictions on their providers.

3.3 The Regulation of Term Annuities and Phased Withdrawals

Term annuities are not allowed in the compulsory pillars of Chile and Switzerland. The Swiss law does not provide for any type of term annuities (and phased withdrawals) from

pension institutions. Recipients of lump sums can in principle purchase such products in the open market but are highly unlikely to do so because the terms of life annuities from the second pillar are more favorable than products available in the open market. In Chile, term annuities are not allowed but lifetime phased withdrawals are provided for and even mandated in the case of retiring workers with low balances on their individual accounts.

Term annuities are permitted in Australia, although like all types of annuities their use is very limited. Term annuities for up to 25 years are allowed in the occupational plans of Denmark and Sweden. These two countries do not have any detailed data on the pattern of payouts but available evidence from other sources suggests that the use of term annuities of between 5 and 10 years is widespread in occupational pension plans.

In both Denmark and Sweden term annuities take two forms: 'guarantee and bonus annuities' and 'unit-linked' annuities. In either case, monthly payments are determined on the basis of the term of the annuity and a stipulated interest rate. Then, monthly payments are adjusted once a year to reflect the performance of the fund in which the reserves are invested. The capital is exhausted at the end of the agreed term.

Phased withdrawals are a form of term annuities. They differ from them in that they can have either a fixed or a variable term and withdrawals can vary on the basis of a specified withdrawal rule. Phased withdrawals may follow the fixed benefit rule or the fixed percentage benefit rule. The latter is widely used by retirees who adopt self-annuitization plans. However, the most important type is the lifetime or life expectancy phased withdrawal where the withdrawal fraction is each year set equal to the inverse of the remaining life expectancy of the account holder or the remaining joint life expectancy of the account holder and spouse if a joint benefit is specified.

Table 8: Types of Term Annuities and Phased Withdrawals

	Types and Terms
Australia	Term annuities for 5 to 25 years Allocated annuities (lifetime PWs)
Chile	Lifetime PWs
Denmark: ATP	Not allowed
Denmark: Other	Term annuities mainly for 5 to 10 years
Sweden: PPM	Not allowed
Sweden: Other	Term annuities mainly for 5 to 10 years
Switzerland	Not allowed in the mandatory pillar

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Use of lifetime phased withdrawals is compulsory in Chile for retirees with low account balances, i.e., balances that cannot purchase an annuity that is at least equal to the PBS. In these cases, the monthly withdrawal equals the PBS and when the account balance is exhausted, the government steps in and takes responsibility for continuing payments for the remaining life of beneficiaries. The 2008 amendments to the pension law require the creation of reserves in individual accounts that cover a much higher than average life expectancy. This will lower the probability of triggering the PBS and limit the exposure

of the government. This change is likely to reduce the relative attractiveness of PWs compared to annuities.

The rate of return and the life tables that pension companies must use in calculating the annual benefits of phased withdrawals are prescribed by the authorities. This is linked to the need to prevent abuse of the minimum pension guarantee, since use of an overly generous rate of return and inappropriate life tables in calculating the annual benefit from PWs could accelerate the depletion of account balances and expose the government to larger PBS payments.

Phased withdrawals are known as allocated annuities in Australia. They are either life expectancy phased withdrawals similar to those used in Chile or fixed term. The latter is often set equal to life expectancy at retirement. Allocated annuities are fundamentally investment products, placed in a wide array of instruments, ranging from capital guaranteed products to market-linked funds. Their balances fluctuate with changes in investment performance. They provide considerable flexibility and access to funds but offer no protection against longevity risk.

Although the choice of payout options has not been restricted in Australia, allocated annuities have been subject to specified rules and restrictions. Until 2007 allocated annuities were subject to both a minimum and a maximum annuity conversion factor. For a 65 year old beneficiary, the minimum annuity conversion factor was 6.37 percent in 1998, while the maximum equaled 12.35 percent.[10] The maximum and minimum limits decreased as people grew older. The maximum payment per year aimed at ensuring that the account balance would not be exhausted before reaching age 80, while the minimum payment was the account balance divided by life expectancy at that age.

The imposition of a minimum limit aimed at limiting the use of tax-advantaged savings by wealthy retirees and was similar in spirit to the minimum distributions imposed on IRA accounts in the US. On the other hand, the imposition of a maximum limit on the annuity conversion factor was not very meaningful in the context of permitting free withdrawals of accumulated balances in the form of lump sums. Changes in the regulations that were implemented in 2007 removed the maximum and lowered the minimum limits. The new minimum limit for a 65 year old beneficiary is 5 percent.

3.4 The Regulation of Marketing

With the notable exception of Chile and to a lesser extent Denmark, life insurance companies have not undertaken aggressive campaigns in marketing annuities. This is clearly related to the weak demand for voluntary life annuities in most countries, which is primarily explained by the presence of social security and company pensions. In most countries, life insurance companies focus their marketing activities on promoting life insurance and investment products, including the offer of retirement savings facilities.

[10] In the relevant tables, the minimum pension factor was expressed as a divisor and equaled 15.7 for the minimum and 8.1 for the maximum benefit (Knox 2000:25).

Because of the limited marketing effort, the regulation of marketing annuities and other options during the payout phase has lagged behind the regulation of saving products in the accumulation phase in all countries except Chile.

In Australia, the marketing and selling of annuity products is subject to the same conduct rules, such as the "know-your-customer" rule and adequate disclosure of the terms and conditions of different products. There is no requirement to offer a minimum number of annuity options or to disclose the level of commissions received from different companies.

In Denmark and Sweden there is little individual choice in the selection of annuity provider, which is often determined in the collective labor agreement that sets the terms and conditions of different pension plans. Marketing activity is targeted at the trustees of different plans who may decide to transfer the whole plan to another provider. Life insurance companies and other pension institutions compete by attracting attention to their investment performance record, their bonus distribution policies, and the allocation of profits between shareholders and policyholders.

Marketing activity per se is subject to little regulation, other than observance of typical conduct rules, which are more relevant for the offer of payout options in personal pension plans. Insurance companies and pension funds are free to set their own prices but, under European Union law, they are required to use unisex life tables in calculating annuity prices. Perhaps because the offer of most variable annuities is governed by collective labor agreements where representatives of employers and workers monitor the performance of providers and protect the interests of workers, neither country has so far created a central register with a systematic compilation of performance data on different providers. The complexity of collective labor agreements, which cover many types of benefits, has also impeded the development of a central database. A central register of performance data would be indispensable in a system of non-employer-based individual accounts.

In Switzerland, the scope for marketing is even more limited since the pricing of annuities in the obligatory part of the second pillar is subject to federal regulation. The same annuity conversion factor is used for men and women, although women live longer and retire earlier than men,[11] and also for joint and single life annuities, even though joint life annuities have a much higher probability of continuing to make payments for a longer period. General conduct rules apply in the case of voluntary personal pension plans.

Chile is the exception among the five countries, probably because of the central role played by open market annuities in the provision of retirement income after the closing down of the social security system to new entrants and the granting of recognition bonds to workers who joined the private pension pillar.

[11] As already noted, the normal retirement age of women is gradually being raised to that of men. But women continue to have a longer life expectancy than men.

Table 9: Marketing Regulation

	Types and Terms
Australia	Occupational plans are not active providers of annuities. Marketing of annuities is subject to ordinary conduct rules.
Chile	. Licensing requirements for pension advisors. Caps on broker commissions. Electronic quotation system.
Denmark: ATP	No marketing is involved.
Denmark: Other	Annuities are provided through occupational plans. Marketing focuses on enhancing brand names, competition for mandates, declaration of bonuses.
Sweden: PPM	No marketing is involved other than creation of brand names by decentralized asset managers.
Sweden: Other	Annuities are provided through occupational plans. Marketing focuses on enhancing brand names, competition for mandates, declaration of bonuses.
Switzerland	Annuities are provided through occupational plans. Little marketing is involved in view of federal regulation of products and prices.

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

However, the marketing of the two main payout options, phased withdrawals and life annuities, is highly asymmetrical and one-sided. The pension companies (AFPs) focus on the very profitable accumulation phase of the pension business and adopt a passive marketing stance on phased withdrawals. The commission income that pension companies can raise from offering phased withdrawals is a modest fee of around 1 percent of benefit payments, 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.

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. Pension advisors play an important part not only in the choice of the annuity option but also in the decision to retire early.[12] 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.

Chile applies an extensive regulation of marketing activity in the annuity market. Pension advisors 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 pension advisors are legally obligated to represent their clients and generate their income from commissions on the sale of annuities. They are not

[12] In 2008, brokers were replaced by pension advisors. Stricter certification requirements have been imposed.

permitted to accept volume-related remuneration from insurers. However, they are not required to disclose the level of commissions they receive from different insurers. Pension advisors do not have a self regulatory body that may sanction or enforce a code of good practices on its associates.[13]

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 and 2008 revisions of the pension system: the conditions for early retirement were tightened; a cap of 2 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 fixed real annuities for higher income individuals; and a new electronic quotation system was introduced.

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, 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.

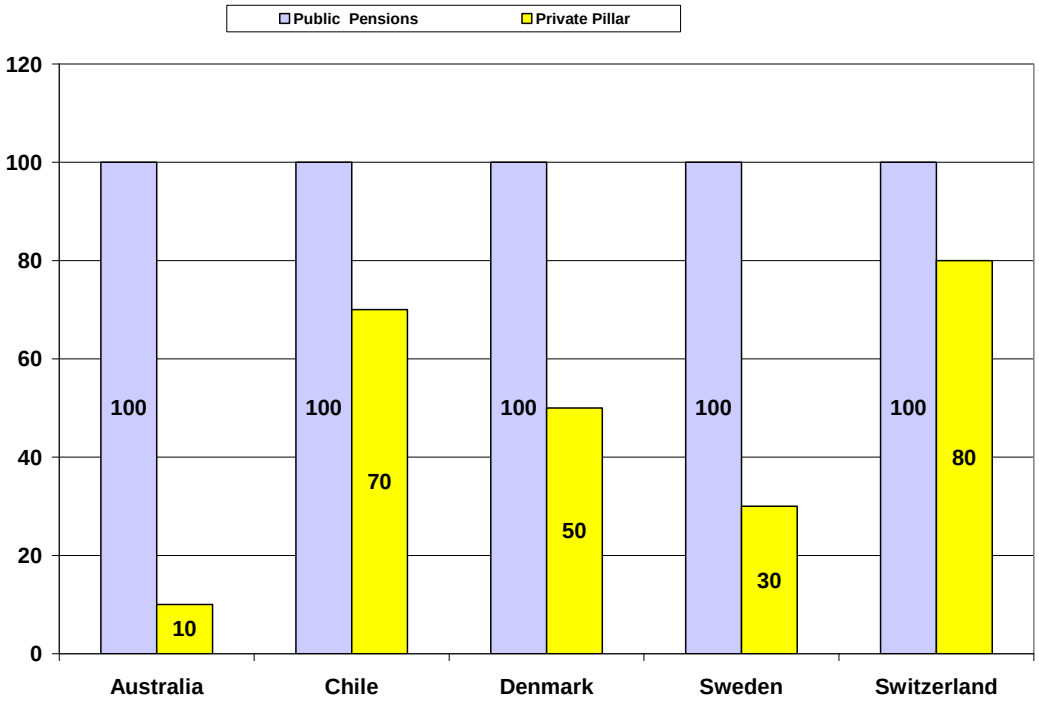
3.5 Level of Annuitization

It is difficult to ascertain with a reasonable degree of precision the level of annuitization in different countries because adequately detailed data are not available. In principle, we are interested to know the proportion of people who opt for lump sums, the proportion that buy life annuities, and the proportion who use phased withdrawals. In practice, however, people may use a combination of payout options, withdrawing part of their balances in lump sums and using the remainder for life annuities or phased withdrawals. In these cases, a weight reflecting the allocation of balances to each payout option could be used but the information that would be required for making these computations is not available. An alternative approach is to use the proportion of the total accumulated balances of retiring workers that is allocated to each option, but this information also is not published in any of the five countries.

[13] The *Colegio de Corredores de Seguros de Chile* does not operate as an SRO.

Figure 5 shows our estimates of the level of annuitization in different countries. There is 100 percent annuitization with universal coverage from the public pillars, including in the case of Denmark and Sweden the supplementary public ATP and PPM schemes and in the case of Chile the PBS. The level of public benefits is between 30 and 40 percent of average earnings in Denmark, Sweden and Switzerland. In Australia, it is lower because only half of pensioners receive the full age pension. And in Chile it is around 17 percent for recipients of the PBS.

Figure 5: Level of Life Annuitization



Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Despite the imposition of mandatory or quasi-mandatory participation in funded second pillars, the level of annuitization of accumulated savings in the second pillar varies considerably across the five countries. This mostly reflects differences in the menu of permitted payout options, while the menu itself reflects the level of benefits from the public pillars (which take the form of pensions for life and are thus equivalent to full annuitization). In addition to the menu of permitted payouts, the level of annuitization also reflects other factors such as risk aversion, clawback provisions, tax incentives, and the terms and conditions of annuities.

The estimated level of annuitization from the second pillar is highest in Switzerland at 80 percent, followed by Chile at 70 percent. It is very low in Australia at less than 10 percent. It is probably 50 percent in Denmark and less than 30 percent in Sweden.

Table 10: Level of Annuitization in the Second Pillar

	Level of annuitization (percent of balances)	Comments
Australia	**Very low** Probably less than 10%	Lump sums are allowed without restrictions and account for 55% of all payouts from superannuation funds. Retirees also favor allocated and term annuities over life annuities.
Chile	**High** About 70%	Lump sums are restricted. The share of annuitants in total retirees exceeds 60% overall, and exceeds 70% excluding disability and survivor pensioners. PW holders account for most of the remaining 30%.
Denmark	**High** ATP: 100% Occupational schemes: 50%	ATP: **mandatory annuitization,** except for very low balances. Occupational schemes: annuitization depends on the terms of collective labor agreements. Average level of annuitization is **relatively high**, based on choices made during contribution period: 50% of contributions are allocated to life annuities, 35% to term annuities, and 15% to lump sums.
Sweden	**High** PPM: 100% Occupational schemes: Low, probably less than 30%	PPM: **mandatory annuitization** Occupational schemes: annuitization depends on the terms of collective labor agreements. Lump sums are not permitted in occupational plans, but extensive use is made of term annuities for 5 or 10 years.
Switzerland	**High** Occupational schemes: 80%	Lump sums are allowed, but joint life annuities are favored by the terms and conditions of annuities.

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

In Chile there are data on the numbers of retirees who opt for life annuities or phased withdrawals and estimates of the proportion of accumulated balances that are converted into life annuities. Including deferred annuities, 62 percent of pensioners selected life annuities in 2004. However, excluding disability and survivor pensioners, who are covered by group disability and term life insurance and have no choice in the matter, the share of retirees who selected annuitization rises to 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.

Most annuities are joint life annuities, reflecting the regulation that forces married males to take this type of annuity. The share of annuities with guaranteed periods is large and most of these annuities are guaranteed for periods of 10-15 years and even longer. The strong demand for guaranteed annuities reveals a preference for bequests.

There is a very strong association between annuitization and early retirement in Chile. 90 percent of early retirees buy annuities and only 10 percent use PWs. In contrast, 65 percent of normal age retirees use PWs and only 35 percent purchase annuities. 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 stock of annuities increases to 80 percent.

Several factors explain the high level of annuitization and its relation to early retirement. First, restrictions on lump-sums have increased the demand for all retirement products, including life annuities. Second, the demand for life annuities has been stimulated by the absence of a front-ended public pillar benefit, while the back-ended MPG has provided a low level of protection to middle and high income retirees. Third, the marketing of retirement products has been highly asymmetric. AFPs have focused on the accumulation phase of the pension business and have not marketed PWs actively. In contrast, life insurance companies have depended on the annuity business and have marketed their products aggressively. Insurance brokers obtain their income from commissions on annuity premiums. They have targeted their marketing efforts primarily to higher income workers, frequently inducing these workers to retire early and annuitize. Brokers do not receive any commission from a client or provider when a PW is used.

In Switzerland, there are no official statistics on the level of annuitization in the second pillar. Published data show the level of annual benefits, divided between annuity payments and capital (lump-sum) payments, but do not report the proportion of accumulated capital of newly retired workers (both under the mandatory and super-mandatory parts of the system) that is withdrawn as a lump sum and the part that is converted into a life annuity. They also do not report the number of new retirees who convert all their accumulated capital into an annuity, those who withdraw the total capital, and those who withdraw a fraction of the available capital and convert the rest.

Lump-sum payments have fluctuated over the years between 15 and 20 percent of all benefit payments. This would imply that the level of annuitization is between 80 and 85 percent. The same broad level would also be obtained if the size of accumulated balances of retiring workers is estimated on the basis of the change in annual pension payments and applying to them the inverse of the regulated annuity conversion factor.[14] This calculation shows that lump-sum payments represent between 20 and 25 percent of the total value of balances of retiring workers. On the basis of these calculations it would thus be reasonable to assume that the level of annuitization in the second pillar amounts to 80 percent.

This would be a high level of annuitization, coming on top of the full annuitization of first pillar benefits. This high level is attributed to the way pension plans are structured. Although there are no government restrictions on lump-sum payments, the rules of most pension funds, which are determined jointly by employer and worker representatives,

[14] This rough calculation overlooks two offsetting factors: any increase due to inflation adjustment in pensions in payment and the termination of pension payments to deceased pensioners.

appear to favor annuitization.[15] The existing strong link between the accumulation and decumulation phases of the second pillar, where both are with the same sponsor with almost no exceptions, has reinforced the preference for life annuities.

In some plans individuals are allowed to cash out their old-age savings and could, in principle, purchase another annuity contract in the open market. In practice, virtually no one does that. This is mainly because occupational pension plans offer two advantages over open market annuities. First, they are not affected by adverse selection problems. And second, and far more importantly, the regulated annuity conversion factor has been much higher than what could be obtained in the open market.[16]

In Denmark ATP balances must be converted into life annuities, except for very small account balances, which are paid out as lump sums. The level of annuitization in occupational pension plans depends on the rules specified in different collective labor agreements. Detailed data on payouts are not available but the level of planned annuitization can be gauged from choices made at the time of contribution. This is required for tax purposes. Available data indicate that 50 percent of contributions were allocated to life annuities in 2004, down from 60 percent in 2000. The use of lump sums fell from 30 to 15 percent, while demand for term annuities rose from 10 to 35 percent There is a possibility of additional immediate or deferred annuitization at retirement but no information on this is available (Andersen and Skjodt 2007:4-21).

In Sweden use of life annuities is compulsory for the public PPM scheme. Lump sums are not permitted in occupational plans, but extensive use is made of term annuities for 5 or 10 years. As in Denmark, there are no data on payouts, but Palmer (2008:22) calculates that replacement rates for workers over 75 fall drastically to 58 percent of income at age 65 compared to 74 percent for retirees aged between 65 and 74. While other factors may explain part of this decline, Palmer infers that this is mainly due to the extensive use of term annuities from occupational pension plans. Use of life annuities is likely to be low, although no detailed data are available.

The level of annuitization is low in Australia but it is very difficult to obtain reliable estimates of the actual use of lifetime income streams. Readily available data show that lump sums have been declining steadily in recent years as a proportion of total benefits and pension payments have correspondingly increased. From a level of nearly 20 percent in 2002, pension payments rose to 45 percent of total benefit payments in 2007.

There are large differences in the composition of benefit payments across different types of pension funds. Pension payments accounted for 69 percent of total benefits in public pension funds in 2007, but they represented 30 percent in retail funds and had even smaller shares in corporate and industry funds.

[15] However, many pension funds, especially of small companies, allow the entire capital to be withdrawn on retirement.

[16] Arguably, the regulated high annuity conversion factor has compensated workers for the lower than market returns that have been earned during the accumulation phase, at least during the first twenty years of the operation of the second pillar.

The large majority of pension payments involves term and allocated income streams that are not paid for life. Allocated and term annuities have been far more popular than life annuities and have accounted for more than 80 percent of all balances invested in regular income streams. Assets backing life annuities represent less than 2 percent of the total assets of life insurers and correspond to less than 0.5 percent of GDP.

The preference for lump sums has been reinforced by the clawback provisions of the age pension. The age pension is subject to both income and asset tests. However, for a number of years in the 1970s and 1980s, the asset test had been suspended, encouraging retirees to opt for lump sums and avoid regular income streams. Even after its reintroduction, the asset test is significantly less onerous than the income test. The preference for lump sums also reflects a strong inclination for greater control and flexibility in financial management and for reliance on self-annuitization.

In summary, the main factors that have affected the level of annuitization have been restrictions on lump-sum payments and other payout options, the presence and rules of public schemes, the intensity of marketing and the prevailing mentality.

Restrictions can be legal restrictions imposed by government or plan restrictions applied by the sponsors and trustees of occupational plans. The presence and rules of public schemes play an importan part as shown by the experience of the zero and first pillars everywhere and by the experience of the ATP in Denmark and the PPM in Sweden. The absence of a public pillar pension for middle and high income workers in Chile is a notable factor. An important third factor is the intensity of marketing activity, which has been underscored by the role of insurance brokers in Chile. Finally, culture and tradition also play their part. This is highlighted by the prevailing pension mentality in Switzerland in sharp contrast to the lump-sum mentality in Australia.

In the case of Chile, the more restrictive menu is justified, given the key role of the second pillar. Inflation indexed life annuities protect against investment, inflation, and longevity risks, while joint life annuities for married couples extend longevity insurance to spouses. The more liberal rules for occupational schemes in Denmark and Sweden also seem justified, given the high level of annuitization in the zero and first pillars and in the public schemes in the second pillars of the two countries. Use of short term annuities allows higher payouts in the first years of retirement. This responds to public demand, especially in countries that have well developed national health systems.

The very high level of annuitization in Switzerland is partly explained by restrictions on lump-sum payments in plan rules that may have led to over-annuitization. The recent government regulation that introduced an obligation to pension plans to offer an option of a minimum 25 percent lump-sum payment is probably a response to public demand and an attempt to correct the emphasis on annuitization.

The Australian case is more intriguing. The strong role and rapid growth of the second pillar would call for some restrictions on lump-sum payments and for a greater promotion

of annuitization. There is an inherent contradiction in mandating workers to save for retirement during their working lives but allowing unrestricted access to lump sums in retirement. However, the historical application of clawback provisions for the universal pension has encouraged the emergence of a so-called lump-sum mentality, while the public has shown a strong preference for flexibility and financial control over retirement wealth.

3.6 The Value of Annuities and Money Worth's Ratios

Money worth's ratios (MWRs) measure the value of an annuity to its purchaser at the time the annuity is bought. The MWR is defined as the ratio of the expected value of benefits payable under the contract to the paid premium. A cohort life table and an interest rate yield curve are required to calculate the present value of promised benefits.

MWRs are calculated by using two life tables, one covering the general population and the other the population of annuitants, and two interest rate yield curves, one based on risk-free interest rates on government bonds and the other on interest rates on corporate bonds. In most countries, calculations are based on annuity quotes since data on sold annuities are not readily available. Chile is a major exception because it has a very rich database on sold annuities.

The calculation based on the population of annuitants and corporate bond rates reflects the expected longevity experience of annuitants and the risk of insurance insolvency faced by them, especially when insurance companies invest primarily in corporate bonds. However, country comparisons are often focused on calculations based on the general population and government bond rates because the underlying data are more reliable. Moreover, in countries where the corporate bond market is underdeveloped and insurers invest primarily in government bonds, use of the risk-free rate would be more appropriate. Use of the risk-free rate would also be appropriate when governments guarantee annuity payments, at least up to the level of the government guaranteed benefits.

A MWR that is close to unity, perhaps around 0.97, would indicate an efficient and competitive annuity market that offers fair prices to annuitants. This would allow for a 3 percent load factor to cover commissions paid to brokers and other expenses as well as risk premiums and profit margins. In most countries where such calculations have been made, MWRs based on the annuitant population and government bond (risk-free) rates have been higher or close to this level. But MWRs based on corporate bond rates have been significantly below this level. This has reflected higher load factors because of higher expenses and higher risk premiums resulting from greater uncertainty about future longevity and asset/liability mismatching.

In the country studies commissioned for this project and presented in the papers listed in footnote 1, MWRs were calculated for only two countries, Chile and Switzerland, and in the latter case, only for annuities from the mandatory component of the second pillar. In Australia, the very small size of the annuity market did not warrant a detailed calculation

of MWRs, while in Denmark and Sweden the calculation was impeded by the lack of data on ex ante and ex post bonus payments. Without detailed data on bonus payments, the calculation of MWRs, based only on minimum guaranteed benefits, would have been meaningless.

The calculated MWRs are very high in both Chile and Switzerland. Joint life indexed annuities in Chile had a MWR of 1.078 in March 2004 when discounted by the government bond yield curve and based on cohort annuitant tables. However, this fell to 0.892 when corporate bond rates were used (Rocha and Thorburn 2007:172).

In Switzerland, the MWR for joint life nominal annuities of the second pillar amounted to 1.152 in 2004 when discounted by the government bond yield curve. The very high MWR reflects the use of a fixed annuity conversion factor of 7.2 percent at a time of very low interest rates. In 2000, when interest rates were much higher, the MWR stood at 1.025 (the five-year bond rate equaled 3.80 percent in 2000 against 2.36 percent in 2004).

Table 11: Money's Worth Ratios

Country	Joint Life Annuities Cohort Annuitant Tables Government Bond Rates	Joint Life Annuities Cohort Annuitant Tables Corporate Bond Rates
Indexed		
Chile 2004	1.078	0.892
UK	0.880	
Nominal		
Switzerland 2004	1.152	
Switzerland 2000	1.025	
Switzerland*	0.985	0.875
UK*	0.987	0.873
US*	0.929	0.841
Canada*	0.980	0.868

* See Rocha and Thorburn (2007:173) for details.
Source: Buetler and Ruesch (2007) and Rocha and Thorburn (2007).

The MWRs in Chile and Switzerland compare favorably with those prevailing in other countries and indicate that they may not be sustainable in the longer run (Table 11). Switzerland has already decided to lower gradually the uniform annuity conversion factor in its second pillar, while use of improved mortality data and greater appreciation of the long-term risks of annuities may contribute to a lowering of MWRs in Chile.

4. Provider Regulation

The regulation of providers of retirement products covers both the providers of annuities (which are usually life insurance companies) and the providers of phased withdrawals (which are usually the pension institutions that handle the accumulation accounts). The regulatory framework includes the institutional structure of the market, the regulation of investments, and capital regulations. The latter relate to the valuation of assets, the measurement of liabilities and the application of risk-based capital rules. Investment and capital regulations aim to ensure the solvency of annuity providers and play a crucial part

in protecting the interests of policyholders. This section also discusses country approaches to risk management and risk sharing.

4.1 Institutional Structure

Most countries have adopted a competitive decentralized institutional structure where multiple pension institutions and life insurance companies compete in the provision of retirement products, subject to the product regulations and restrictions on payout options discussed in the preceding section. In Chile, only institutions specializing in life insurance and pension fund administration are authorized to offer retirement products. These institutions are set up as profit seeking institutions. In the other four countries, participating institutions also include not-for-profit mutual groups, such as industry funds in Australia, multi-employer pension funds in Denmark and Sweden, and pension foundations in Switzerland.

Sweden, and to a lesser extent, Denmark have also created a centralized structure for a significant component of their retirement systems. Sweden established a centralized structure for the funded component of its public pillar. Centralized administration lowers operating costs because of scale economies and avoidance of high marketing costs, while the centralized offer of life annuities benefits from using a larger customer base and thus more efficient risk pooling. The centralized institution, the PPM, is a state institution.

During the accumulation phase, the PPM offers centralized administration, while asset management is decentralized among a large number of approved asset managers that offer an even larger number of investment funds. The selection of asset managers and investment funds is made by individual participants. The PPM collects all individual mandates and transfers funds to the asset managers without revealing the names of their clients.

During the payout phase, retiring workers are compelled to use the life annuities offered by the PPM on a centralized basis. Two types of life annuities are provided: profit participating annuities with minimum guaranteed benefits and annual bonuses; and unit-linked annuities. The first are managed centrally by the PPM, which assumes the investment risk of guaranteed benefits but declares annual bonuses on the basis of investment performance and longevity experience. For unit-linked annuities a similar pattern is used to that of the accumulation phase: centralized administration, including centralized longevity risk pooling, by the PPM and decentralized asset management, based on decisions of individual annuitants. Retirees bear the investment and longevity risk, the latter through risk pooling with other annuitants.

The institutional structure of the four main occupational funds (for salaried employees, blue-collar workers, local government employees, and civil servants) follows a similar pattern as the PPM. There is a central agency in each plan to collect contributions and organize benefits and there are decentralized asset managers who are chosen by workers who opt for unit-linked annuities. The main difference is that occupational plan benefits are for the most part provided in the form of 5 or 10-year term annuities.

Table 12: Institutional Structure

	Types and Terms
Australia	Decentralized competitive structure. High operating costs and fees in retail funds. Weak marketing of life annuities.
Chile	Competitive but highly concentrated structure in accumulation phase and PWs. High operating fees and profit margins. Competitive decentralized structure for life annuities. Price competition and high MWRs.
Denmark: ATP	Centralized administration and asset management during both accumulation and payout phase.
Denmark: Other	Decentralized structure. Competition for plan mandates among multi-employer funds and life insurance companies. Accumulation and payout phase by same institution subject to pension plan rules.
Sweden: PPM	Centralized administration but decentralized asset management during accumulation phase. Centralized administration, longevity risk-pooling and asset management for traditional annuities. Centralized administration and longevity risk-pooling but decentralized asset management for unit-linked annuities.
Sweden: Other	Four large multi-employer schemes with similar structure to PPM.
Switzerland	Decentralized and fragmented structure among foundations and insurance companies. Accumulation and payout phase by same institution governed by pension plan rules. Pervasive product and price regulations.

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Denmark follows a mixed approach. In the case of the ATP, the supplementary public fund, account administration, risk pooling and asset management are all centralized. But in occupational and personal pension plans, there is a high degree of decentralization. In occupational pension plans, much depends on the rules of collective labor agreements. Insurance companies and multi-employer pension funds compete for winning occupational mandates. Individual workers have limited choice. Most insurance companies are profit-seeking commercial entities but multi-employer pension funds and some insurance companies are organized as mutual not-for-profit institutions. In Denmark and Sweden, the determination of annual bonuses and the distribution of net investment returns between policyholders and shareholders is an important issue.

Switzerland has a highly decentralized structure and its system suffers from a high degree of fragmentation, reflecting the presence of a large number of pension funds. However, the extensive product and price regulation of the payout phase limits the scope for competition and excessive spending on marketing campaigns, while pension plan rules restrict the choice of individual workers, during both the accumulation and payout phases. The only workers in the mandatory pillar who have individual choice are those

who decide to commute to a lump sum a substantial part or the totality of their pension balances.

Australia probably has the most decentralized structure with large numbers of insurance companies and superannuation funds competing in a market that is not constrained by pervasive product and price controls. Some of the institutions are single-employer or multi-employer funds that operate as not-for-profit entities, while a significant number are set as master trusts, owned and operated by profit-seeking financial groups. Retail funds operate with high operating costs and fees, which result in significantly lower net investment returns. The apparent preference of retiring workers for lump sums limits the potential for aggressive marketing campaigns in the selling of life annuities. Pension institutions focus on promoting allocated annuities, which are effectively investment products. The use of life annuities declined in recent years from very low levels, even though the share of lump sums in total benefit payments also experienced a fall. Term and allocated annuities have experienced significant increases.

Chile has a system that is based on a competitive decentralized structure. Pension fund administrators and life insurance companies are established as profit-seeking commercial undertakings. There is strong competition among a small number of authorized pension companies (AFPs) in the accumulation market and among a larger number of insurance companies in the annuity market. 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 resulted in a major containment of marketing costs. AFPs operate with high operating fees and high profit margins. Life insurance companies engage in greater price competition which has resulted in thinner margins and high MWRs.

As a mechanism to induce price competition in the accumulation phase, a recent change in the regulation requires all new entrants to the pension system to be allocated through a public auction and for a period of two years to the pension fund that levies the lowest fee. The winner has to offer the same fee to the rest of its affiliates. The first auction took place in February 2010 and the winner offered a fee that was 24 percent lower than the weighted average fee of the industry. Interestingly, the winner was a new pension fund administrator that did not face the high marginal cost that lowering operating fees to existing affiliates would have implied.

4.2 Capital and Prudential Regulations

Financial institutions used to be subject to highly restrictive investment regulations in most countries around the world. Ostensibly the regulations had a prudential objective, but in practice this was often mixed with fiscal and macroeconomic objectives. In general, investment regulations have not been binding and have been significantly liberalized over time. Investment regulations have a greater impact on annuity providers

because of the paramount importance of avoiding asset and liability mismatching. However, this issue has increasingly been tackled by capital and prudential regulations.

The capital and prudential regulation of providers of retirement products depends on the type of products they offer and the risks they assume. They have a greater impact on fixed nominal or real annuities where providers assume the investment and longevity risks. They are less onerous for products that transfer the risk to pensioners.

In the case of phased withdrawals, where pensioners assume both the investment and longevity risks, the capital regulation is relatively simple. This is clearly shown by the experience of the Chilean pension companies (AFPs), which are not allowed to offer annuities and can only provide phased withdrawals. In contrast, the capital regulation of annuity providers is much more complex. It depends on the particular features of the types of annuities that are offered (fixed or variable, nominal or real, with or without guaranteed periods, with or without deferment periods) and on the types of risk-sharing arrangements that are used. According to the 2008 amendments to the pension law, pension fund administrators need to build reserves to account for the probability that individuals may trigger the minimum return guarantee. The formula for calculating PW includes a fair actuarial factor, which translates into reserve accumulation.

Chile is the first country in the world that has mandated for the second pillar the use of retirement products with regular income streams over the expected life of beneficiaries (in the form of life annuities or lifetime 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 AFP with 10,000 members or more, the minimum capital amounts to 20,000 UF or about 800,000 USD. A more stringent capital requirement is the obligatory reserve (*encaje*) of 1 percent of the value of assets under management. 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. This is similar to the capital requirement imposed on insurance companies for their unit-linked business.

The *encaje* is required to be invested in units of the same fund(s) 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 over the preceding 12 months. The period of calculation was later extended to 36 months and was then applied to each of the five funds that AFPs were 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. 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.[17]

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 is required to be marked-to-market. As most assets have to be invested in instruments that are traded on public markets, asset valuation is straightforward. The only major deviation from this practice concerns placements in bank deposits. However, these are usually of a short-term nature and thus the use of book rather than market values for them does not create any large discrepancies.

The capital regulation of life insurance companies is far more complex. Since 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. This imposes higher technical reserves and capital requirements for companies that suffer from unmatched liabilities.[18]

The CALCE rule was adopted because insurance companies were not required to use mark-to-market asset valuation, partly because the companies followed a 'buy and hold' strategy and held debt instruments to maturity. 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.

In addition to the CALCE reserve, insurance companies were required to operate with a leverage of not higher than 15, which implied a required equity ratio of 6.7 percent. The leverage limit was raised to 20, lowering the required equity ratio to 5 percent. In addition, an asset sufficiency test was introduced. This requires a detailed calculation of future asset cash flows, allowing for 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 (approximately USD 1,800). 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.

[17] The relative-rate-of-return guarantees were removed by the 2008 amendments.
[18] For a detailed exposition of this complicated rule, see Rocha and Thorburn (2007:118-130).

Table 13: Capital and Prudential Regulations

	Main Regulations by Types of Institutions
Australia	**Superannuation Funds** No capital buffer requirement. Actuarial funding and solvency certificate. Own life tables and discount rates subject to review. Licensing of trustees. **Life Insurance Companies** Solvency margins on wind-up basis. Capital adequacy margins on a going concern basis. Own life tables and discount rates subject to review. Close monitoring of free assets and target surplus.
Chile	**Pension Fund Administrators** Capital adequacy requirement (*encaje*). Market valuation of assets. **Life Insurance Companies** Capital adequacy requirement. 'Held to maturity' valuations. Prescribed life tables. CALCE rule discount rates and capital backing for mismatched asset/liability maturity bands.
Denmark: ATP	Broadly similar to occupational funds.
Denmark: Other	**Life Insurance Companies and Pension Funds** Solvency I capital requirement. 'Fair value' accounting. Decomposition of technical provisions. Use of market maturity-dependent discount rates. Own life tables subject to review. Application of 'static' stress testing.
Sweden: PPM	Broadly similar to occupational funds.
Sweden: Other	**Life Insurance Companies and Pension Funds** Solvency I capital requirement. 'Fair value' accounting. Own life tables subject to review. Own discount rates subject to ceiling. Application of 'static' stress testing.
Switzerland	**Pension Funds** Combination of book and market valuations. Own life tables and discount rates subject to review. Temporary underfunding permitted. Expert certificate requirement. **Life Insurance Companies** Solvency I capital requirement. No underfunding allowed. Own life tables and discount rates subject to review. Combination of book and market valuations. Application of 'static' stress testing.

Sources: Andersen and Skjodt (2007); Brunner and Thorburn (2008); Buetler and Ruesch (2007); Palmer (2008); Rocha and Rudolph (2010); Rocha and Thorburn (2007); and Vittas (2008).

Denmark completely revamped the solvency monitoring of life insurance companies and pension funds over the past decade or so. This has covered the use of "fair value" accounting for both assets and liabilities and the introduction of stress testing. The change has been gradual. Market values are used as fair values for assets that are traded on active and liquid markets but, for less liquid assets, fair valuation is obtained by applying sophisticated and acceptable valuation models.

The valuation of liabilities faces more difficult conceptual issues since there is no active market for insurance and pension liabilities and therefore no readily observable market prices. By necessity, fair valuation is based on valuation models. A fair valuation model must overcome two major obstacles: the difficulty of determining the nominal value of insurance and pension liabilities in a market that is dominated by with-profits policies that are subject to minimum guaranteed benefits; and the perennial question of the appropriate rate of discount for calculating the present value of these liabilities.

The valuation model that has been adopted involves the decomposition of technical provisions by level of guaranteed benefits and the use of a market-determined zero-coupon yield curve. Pension institutions are free to set their own life tables but may be asked to provide justification for the tables used. However, all pension institutions are required to use the same maturity-dependent discount rates, which are given by the market-determined zero-coupon yield curve, published by the central bank on a daily basis.[19]

Investment rules were relaxed in 2001 with a significant increase in the limit for investments in risky assets. However, this relaxation was accompanied by the introduction of the so-called traffic light system. This covers stress testing that is divided into two scenarios, yellow and red, and measures the ability of individual pension institutions to cope with adverse changes in market conditions, such as changes in interest rates and substantial declines in equity prices. However, the stress tests are still at an early stage of development. They are specified in static terms, do not reflect past experience, and are the same irrespective of the state of financial markets.

At present, the required capital of pension institutions follows the EU Solvency I approach, which does not take into account the riskiness of assets. When the institution bears the investment risk, capital must be no less than 4 percent of technical provisions plus 0.3 percent of the risk sum for life assurance and pension business. The capital requirement is reduced to 1 percent when the institution does not bear the investment risk, as for example in unit-linked products that are offered without any guarantees.

[19] During the 2008 global financial crisis, the regulators allowed pension institutions to use the mortgage bond interest rates for valuing liabilities. The dispensation was granted for one year that was later extended and was prompted by the large impact of the crisis on the mortgage bond market. The intention was to prevent an even bigger collapse of the market and to allow pension institutions to remain technically solvent. It was a form of regulatory forbearance but was seen as a pragmatic response to the exceptional impact of the global crisis. The dispensation will be removed when normal market conditions are restored. The market capitalization of the Danish mortgage bond market is higher than the government bond market.

Denmark (in line with other EU countries) will introduce risk-based capital requirements when the Solvency II approach is finalized.

In Sweden, insurance companies and pension funds are subject to prescribed rules on the investment of assets backing their technical reserves for guaranteed benefits but are free from quantitative restrictions for all other assets.[20] Risk-based supervision has followed a broadly similar approach to that used in Denmark but with a time lag. The traffic light system was introduced in 2006 while the use of a market-determined discount rate based on government bond and swap rates was mandated in 2007. However, the stress tests follow different specifications from those used in Denmark and insurance companies and pension funds are not yet required to use a marked-based yield curve published by the central bank. Insurance companies and pension funds use the same cohort life tables that are prepared by the insurance federation. Although the specifications of the stress tests differ from those used in Denmark, they share the same shortcomings: they are specified in static terms, do not reflect past experience, and are the same irrespective of the state of financial markets.

In Switzerland, life insurance companies are subject to strict prudential rules and are not allowed to have any underfunding in their pension operations. Following the imposition of new standards of transparency in 2004, life insurance companies are now required to create a separate *Security Fund* for their liabilities related to the pension funds they manage, the assets of their pension business must be segregated from other assets, their pension business must be reported in a separate annual report, and strict rules apply to the distribution of investment profits. According to these rules, insurance companies must allocate at least 90 percent of the net investment income to the accounts of insured individuals. Insurance companies have been using cohort life tables elaborated by the insurance association since 2000.

Insurance regulation is gradually moving in the direction of a Solvency II approach. In addition to imposing risk-based solvency requirements, this will also mandate the use of market-based maturity-dependent discount rates and will require a fair valuation of both assets and liabilities. Use of the traffic light system to assess the vulnerability of individual companies to specified financial shocks will also be included.

In contrast, the solvency regulation of pension funds remains imprecise. Pension funds are required to employ certified pension experts to attest that they are able to meet their financial obligations. The prudential rules do not mandate the use of fair values for assets. In addition, pension funds are free to use their own mortality tables and discount rates for estimating the present value of liabilities. Autonomous pension funds are allowed to have a temporary underfunding, while public sector pension funds that benefit from a cantonal guarantee have been allowed to operate with significant actuarial shortfalls on the grounds that the cantonal authorities would stand behind the pension funds and guarantee their liabilities.

[20] A 25 percent limit is placed on equity investments for the technical reserves of guaranteed benefits. The corresponding limit for the PPM is set at 30 percent.

The prudential supervision of autonomous pension funds is fragmented among several cantonal authorities and is characterized as passive and largely ineffective. Pension funds tend to understate their funding shortfalls and are usually required to correct their reported funding gaps but without any specified deadlines. As a result, funding gaps can persist for several years. The prudential regulation and supervision of pension funds is currently under intensive review.

In Australia, there are significant differences between the capital regulation of pension funds and life insurance companies. Superannuation funds are not required to maintain capital buffers. Instead, a superannuation fund which offers a defined benefit is required to have an actuary sign a funding and solvency certificate, indicating that the fund is solvent and likely to remain so for a period of up to five years.

On the other hand, the Life Insurance Act requires life companies to maintain both solvency and capital adequacy margins. Capital required to satisfy solvency requirements is determined on the basis that each Statutory Fund has sufficient assets to fund existing liabilities in the event of a wind-up of that fund. Capital adequacy rules require sufficient assets to fund existing liabilities on a going-concern basis. Capital adequacy requirements are generally higher than solvency requirements and act as an early warning trigger against the breach of solvency levels.

Though not explicitly risk-based, the approach seeks to take into account risk factors and the likely volatility of assets and liabilities through the use of conservative prudential buffers. Most life insurers hold assets in excess of the capital adequacy requirements and many have a policy of monitoring these excess or "free assets" against what is known as a target surplus. There are no regulatory requirements in relation to the target surplus and the methodologies and rationale behind the development of target surplus by life insurers vary widely. However, APRA places increasing focus on the target surplus policies and practices of insurance companies, which it uses in its own risk rating of insurers and in determining the resources it devotes to their supervision.

4.3 Risk Management

The risks faced by annuity providers can be classified into five major categories: underwriting risks, market risks, credit and other asset risks, operational risks, and liquidity risks (Rocha and Thorburn 2007:44-46, 60-70). The handling of these risks depends on the sophistication of internal management systems and the complexity of operations and instruments.

In the five countries covered in this book, insurance companies and pension funds have over time improved considerably their risk management capabilities, although their success in dealing with these risks has been influenced by many factors that are not related to risk management per se. For instance, corporate sponsors of pension schemes in Australia, as in most Anglo-American countries, have converted their pension schemes to a defined-contribution basis, benefiting from the contribution holidays they were able to take as well as from releasing some of the funding surplus that had been built into the

schemes. The investment risk has been transferred to workers, although pension funds and insurance companies retain some investment risk in connection with their capital guaranteed products. As life annuities are little developed in Australia, retired workers bear the longevity risk.

Life insurance companies and superannuation funds are required to have in place risk management strategies and to develop risk mitigation and control policies. Segregation of duties and avoidance of conflicts of interest in assigning responsibilities are underscored as important components of internal control systems. But the preponderance of investment-linked assets and the underdevelopment of life annuities have implied a limited exposure to investment and longevity risks. As a result, except for defined benefit and hybrid superannuation funds and investment products with guaranteed benefits, there has been little interest in promoting the use of hedging instruments, such as long-term interest rate swaps, longevity bonds or longevity derivatives.

Switzerland is at the other extreme of the spectrum. The use of a uniform annuity conversion factor protects retiring workers from fluctuations in interest rates at the time of retirement and from the dispersion of annuity prices among competing providers. Investment and longevity risks are borne by providers, which are exposed to large risks when regulated prices deviate significantly from market levels and large shortfalls emerge.

However, changes in the uniform annuity conversion factor in the face of changing demographics and investment returns cause long-term risks to be shared among successive generations of retirees, while investment risk is lowered by more frequent changes in the minimum interest rate in line with changes in market returns. Inflation risk is borne by pensioners, although pension funds are expected to make adjustments to pensions in payment to cover inflation, provided this is permitted by their financial situation.

Insurance companies and the large pension funds have adopted increasingly sophisticated asset/liability management strategies. In the 1990s, the larger institutions expanded considerably their investments in domestic and foreign equities. The high returns relative to the minimum guaranteed interest rate allowed greater leeway to pension funds to assume higher risks and also to take contribution holidays or increase benefits. Smaller funds applied more conservative investment policies.

Asset/liability management policies became more conservative when financial returns declined in the new millennium. Greater emphasis is now placed on ensuring that the pension funds are able to meet their long-term obligations. The larger institutions undertake detailed measurement of risks and calculate the impact on their financial position of adverse changes in interest rates, foreign exchange, equity prices, private equity, and real estate values. There is also increasing use of hedging facilities, including interest rate derivatives and swap contracts.

Because pension funds have little scope in setting the terms of the annuity contracts in the mandatory part of the system, they have not adopted an active management of longevity risk. Almost all pension funds use the mortality tables provided by the Federal Insurance Fund (FIF), with possible adjustments based on past experience, especially for pension funds with a high degree of homogeneity among their annuitants (e.g., construction workers, teachers or bank employees). Insurance companies introduced in 2000 cohort life tables for pricing their annuities in the open market, but in the mandatory pillar most institutions augment their actuarial liabilities by 0.4 to 0.5 percent every year, until the new FIF mortality rates become available, i.e., every 10 years. No attempt has been made so far to use longevity bonds or derivatives to hedge longevity risk.

In Sweden, life insurance companies and pension funds engage in asset/liability matching that is dictated by the prevalence of 5 to 10 year term annuities. Since retired workers assume both the investment and longevity risks, providers are essentially concerned with managing the risks arising from the offer of minimum guaranteed benefits. Providers invest in domestic and international equities and real estate with a view to enhancing returns and bonuses but maintain an adequate cushion of bond holdings to avoid the need to declare negative bonuses and to cover their guaranteed benefits.

The PPM where use of life annuities is compulsory has a longer horizon. It adopts a highly conservative estimation of future trends in longevity, while the recent lowering of the guaranteed benefits from an interest rate of 2.75 to 0 percent has simplified its risk management task.

In Denmark, pension institutions had expanded their equity investments in the 1990s but were hit by the dramatic fall in interest rates and large declines in equity prices between 2001 and 2003. They reacted by reducing their equity portfolios (in large part caused by the very fall of equity prices), selling short-duration bonds and buying long-duration ones, especially foreign bonds, and engaging in extensive hedging operations, mostly through the use of long-term interest rate swaps in the more liquid euro market.

Investment and risk management policies reflect the terms and conditions of collective labor agreements. Some of them provide for risk-sharing among both active and retired workers. The statutory ATP fund operates a scheme with deferred group annuities where guaranteed benefits are specified for each year's contributions and periodic bonus payments aim to maintain the real value of benefits and reflect longevity experience and investment performance. The ATP fund is hedging all its pension liabilities in the euro swap market and is using excess investment returns from its active investment management to finance longevity reserves and periodic bonuses. It has also expanded its investments in foreign bonds. Some multi-employer pension funds and life insurance companies follow similar policies, but others make less extensive use of long-term swap contracts. However, all pension institutions have adapted their guaranteed benefits to the new reality of lower nominal interest rates and have adjusted their investment portfolios to the demands of the traffic light system and regular stress testing.

Finally, in Chile life insurance companies are required to offer indexed annuities and cover the inflation risk by investing predominantly in inflation-indexed securities. Life insurance companies have expanded their investments in higher-yielding corporate and mortgage bonds, which are also indexed to inflation. This has allowed them to offer better terms on their annuity products and thus raise the MWRs. However, insurance companies assume the longevity risk as well as extensive reinvestment risk in view of the significant mismatching in the duration of assets and liabilities. Very little use is made of reinsurance arrangements and risk hedging instruments. Despite several attempts, the market has not succeeded in issuing a longevity bond in Chile. A government guarantee protects pensioners from the risk of insolvency of individual insurance companies.

4.4 Risk Sharing Arrangements

Risk-based capital requirements force annuity providers to apply conservative assumptions on their investment and longevity risks. However, this approach is not immune from problems. Excessive conservatism may lead to overly expensive products and higher than anticipated profits, creating pressures for the sharing of excess profits with annuitants and for price regulation. To avoid these problems annuity providers use risk-sharing arrangements, whereby annuitants share in the investment and longevity risks.

Risk-sharing arrangements are not formally used in the mandatory pillar of Switzerland. However, as already noted, the recent change in the uniform annuity conversion factor has effectively introduced an inter-generational risk-sharing arrangement.

In Australia their use is limited to allocated annuities with capital guarantees. Risk-sharing arrangements were authorized in Chile in 2004 with the introduction of variable annuities in conjunction with the purchase of PBS fixed real annuities.[21] During the accumulation phase, the investment risk will continue to be borne by workers, within the limits set by the relative rate of return guarantees that are applied to the different types of permitted funds, but in the payout phase the risks will be shared among annuitants using these products. However, despite its authorization since 2004, the variable annuity market has yet to be developed in Chile.

Risk-sharing arrangements are widely used in Sweden and Denmark. Pension institutions assume the investment and longevity risks up to the level of guaranteed benefits, while pensioners share these risks for bonus payments. Inflation risk is covered by the payment of bonuses, which aim in the first place to maintain the real value of benefits. In Sweden, a basic objective of public policy is to prevent intergenerational transfers and thus active workers bear the investment risk during the accumulation phase but do not share in the investment and longevity risks of pensioners.

However, in Denmark the ATP and some occupational pension schemes offer deferred group annuities where the investment and longevity risks of profit participating policies are shared among both active and retired workers. In contrast, in unit-linked annuities, the

[21] In the case of early retirement pension, it has to account at least for 150 percent of the PBS

use of which has been growing in both Denmark and Sweden, the investment risk is borne by individual pensioners and only the longevity risk is shared by annuitants.

5. Lessons for Other Countries

Policymakers in countries that have reformed or are planning to reform their pension systems face several questions regarding the organization of the payout phase of the new systems. The first question concerns the feasibility of creating a sound market for lifetime retirement products. The second concerns the role that restrictions on payout options can play in promoting an adequate level of annuitization. Other questions address the regulation of pricing and marketing policies, the institutional structure of markets, the creation of a robust regulatory framework and the development of appropriate hedging instruments for managing the main risks of retirement products. The experience of markets for retirement products in the five countries reviewed in this paper suggests several lessons for other countries.[22]

5.1 The Feasibility of Sound Market Development

The experience of Chile confirms the feasibility of developing a sound market for retirement products from a very low initial base. When Chile implemented its 1981 pension reform the market for retirement products did not exist. Twenty nine years later Chile has a well developed and rapidly growing market for phased withdrawals and life annuities.

The Chilean approach entailed restrictions on lump-sum distributions. These were justified by the absence of an adequate public pension for middle and high income workers. It also mandated the use of fixed inflation-indexed annuities or lifetime phased withdrawals to protect pensioners from inflation risk. Requiring the use of joint life annuities initially for married males, and more recently for married couples, provided protection to surviving spouses, while allowing use of guaranteed life annuities for 10 or 15 years addressed the bequest motive. As the market matured, the rules were adapted and allowed the use of combinations of minimum fixed real annuities with either phased withdrawals or variable annuities.

Chile created a rigorous regulatory regime for providers of retirement products to minimize the bankruptcy risk faced by pensioners. It also promoted the offer of inflation-indexed products and financial instruments to support the efficient operation of providers of retirement products and introduced state guarantees to protect pensioners against provider insolvency as well as aberrant behavior.

The market for lifetime retirement products is not well developed in Australia. This is not attributed to any major supply constraints but largely reflects the presence of a modest means-tested universal age pension, the strong preference of Australians for lump sum

[22] These questions as they affect the design of the payout phase in Central and Eastern European countries have been addressed in Vittas et al (2010).

withdrawals and term annuities, and their effective reliance on self-annuitization. The absence of any restrictions on lump sums and term annuities has been a contributing factor.

Denmark and Switzerland provide large annuitized benefits to most retiring workers from their public and occupational pillars, while in Sweden the two components of the public pillar offer large benefits, also in the form of life annuities. All three countries have adopted policies that promote the offer of lifetime retirement products on a sound financial basis. Sweden, in particular, has adopted many changes in the structure of its public pension system and the regulation of insurance business that have transformed the landscape for the market of retirement products. However, as in Denmark and Switzerland, the market continues to be dominated by lifetime products from the public and occupational pillars. The demand for life annuities in the open market continues to be limited in all three countries.

5.2 The Regulation of Payout Options

The degree of annuitization observed in different countries is largely explained by regulatory or plan restrictions on payout options. If a high degree of annuitization is a policy objective, the menu of retirement products and payout options must be regulated accordingly. However, it is important to avoid over-annuitization. This implies taking into account other conditions prevailing in different countries, in particular the presence and relative importance of public pensions from pillars zero and one. The optimal policy on payout options is bound to be country specific.

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-sums increase the potential demand for all retirement products, including life annuities. A PW formula that is based on life expectancy prevents a very premature exhaustion of funds.[23] The imposition of fixed annuities indexed to inflation, and joint annuities for married couples, contributes to prevent 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 a minimum level of investment and longevity insurance. This is very important in countries where the public social security system is either closed down or reduced to a subsistence level.

Countries with larger zero and/or first public pillars could adopt a more liberal approach to the regulation of payout options since in these cases the exposure of retiring workers to investment and longevity risk is more limited. Fewer restrictions could be imposed on lump-sum withdrawals, although very liberal rules for lump-sums can hinder significantly the development of the market for retirement products, especially the market for life annuities.

[23] This requirement was recently extended to a well-above-average life expectancy, limiting the exposure of government funds to this risk.

The appropriate policies in this area will vary significantly from country to country. In some cases it may be appropriate to continue restricting lump-sums, but adopt a more liberal approach to the design of retirement products. For example, the regulation of phased withdrawals and term annuities may be more liberal, allowing designs that enable a faster withdrawal of funds. Term annuities play an important part in Denmark and Sweden and have a rapidly growing presence in Australia. Likewise, variable and adjustable annuities may be introduced without the obligation of a minimum fixed annuity component.

5.3 The Regulation of Pricing and Marketing Policies

The experience of Switzerland indicates that pervasive regulation of products and prices entails both benefits and costs. The use of a minimum annuity conversion factor for joint life annuities avoids an excessive dispersion of annuity prices across annuitants with similar characteristics and also protects retiring workers of different cohorts from large fluctuations in market prices of both assets and annuities. A high level of price dispersion and exposure to annuitization risk are present in countries that do not regulate prices.

However, rigid price regulation may generate large income transfers across annuitants of different gender and marital status and may even jeopardize the solvency of annuity providers if it is not subject to flexible adjustment to market prices. The Swiss authorities are still grappling with the problem of defining a pricing formula that will protect annuitants from price dispersion and annuitization risk while being flexible enough to avoid unintended intra and inter-generational transfers and cope well with changing financial market conditions.

The regulation of pricing policies for variable annuities is confronted with some difficult challenges. In Denmark and Sweden, where these products are widespread, pricing issues, such as the calculation of initial payments and profit-sharing rules, are governed by collective labor agreements. As a result, they require less government regulation. But in systems that are based on non-employer-based individual accounts, pricing policies need to be subject to government regulation and oversight. The calculation of initial payments may need to be regulated to prevent deceptive offers. And a central register of performance data of different providers, emphasizing operating fees, profit-sharing rules and consistency of investment policies rather than just past investment returns, should be created to enhance the transparency of the system.[24]

The regulation of the marketing of retirement products, especially life annuities, is another area of major policy interest in countries with open annuity markets. Adopting an electronic quotation system, such as the one introduced in Chile in 2004, should receive ample consideration. This would be a centralized service that would compile and validate

[24] If the authorities choose to specify a low technical interest rate, say 0 or1 percent, for the calculation of initial payments in order to provide greater scope for future bonuses, they should avoid the trap of applying the same technical rate for the calculation of technical reserves. The latter should require the use of market-based maturity-dependent discount rates to ensure a proper valuation of reserves and allow room for investments in equities and other real assets.

individual data on retiring workers and would solicit quotes from participating institutions. Such a system would reduce the influence of brokers, lower the search costs of retiring workers, enhance the quality of information available to them, and ensure broad access to competitively prices annuities.

A necessary requirement of an effective regulation of marketing would be compliance with basic conduct rules, such as the "know-your-customer" rule and an adequate disclosure of the terms and conditions of different products. Because annuity products are highly complex as well as irreversible and nontransferable, there would also be a need for extensive training of agents and brokers. Licensing and training of brokers and financial advisers involved in the marketing of annuities would be essential for promoting good business conduct and preventing potential abuse of less informed consumers.

In addition to adequate training, brokers would need to pass a certification test as well as the standard "fit and proper" test. Licensed brokers must be legally obligated to represent their clients, must generate their income from commissions on the sale of annuities, and must not be permitted to accept volume-related remuneration from insurers. Since supervision of brokers and pension advisors can be costly and time consuming, support in enforcing codes of good practices from SROs are welcome. Some countries have felt the need to introduce harsher regulations, such as the imposition of regulated caps on broker commissions in Chile or the complete prohibition of the involvement of brokers in Colombia.

5.4 The Institutional Structure of Markets

Another policy issue concerns the institutional structure of the market for retirement products. The main choice is between centralized provision through a single provider and provision through a decentralized competitive market. Centralized provision is usually channeled through a public entity although it could also in principle be based on a highly regulated private entity. The zero and first public pillars, where they exist, rely on centralized provision through a public agency. As they almost always involve the offer of inflation-indexed compulsory lifetime annuities, their products play a central part in the annuity markets of most countries. Denmark and Sweden among the countries covered in this book also use public agencies for the centralized offer of supplementary lifetime annuities.

Centralized provision has several potential advantages. It allows for a larger base of risk pooling, especially if annuitization is compulsory. It also benefits from scale economies and avoids the heavy marketing costs that are incurred by decentralized providers. The main disadvantages are the potentially weaker incentives for product innovation and operational efficiency that may result from compulsory participation and monopoly market positions.[25] With public ownership and/or extensive public regulation, there is also a high risk of extraneous interference in annuity pricing and asset management. Such

[25] It should, however, be noted that, despite their weaker incentives, public entities have often taken the lead in product innovations. A good example is offered by the Danish ATP, which has been a leader in both product innovation and sophisticated asset management.

interference may well result in transferring the investment and longevity risks back to the state.

However, because of scale economies, decentralized markets veer over time toward oligopolistic structures that negate their innovation and efficiency advantages. Recent progress in several countries in adopting robust governance safeguards and high levels of transparency for their public pension funds strengthens the case for the centralized provision of lifetime annuities, meeting at least some of the retirement needs of pensioners.[26]

5.5 The Creation of Robust and Effective Prudential Regulation and Supervision

Another major challenge concerns the creation of a robust and effective prudential regulatory and supervisory framework for the providers of retirement products. The framework should involve risk-based supervision rather than a checklist of rule compliance. It should also rely on risk-based solvency rules that specify solvency capital requirements on the basis of the asset and liability risks borne by providers.

Providers of retirement products should be able to price their products freely and use mortality tables that are most appropriate for their own clienteles. Any regulated parameters should be kept up-to-date by frequent validation and revision and should be based on market-based criteria in order to minimize persistent biases in pricing and selection. Providers of retirement products should be allowed to offer all types of retirement products, avoiding the market segmentation that has been prevalent in Chile. However, the institutions involved should be required to maintain separate accounting data for different products, distinguishing clearly between products with and without guaranteed benefits, and avoiding cross-subsidization across different products.

Strict regulation of risk management should also be introduced, requiring providers of retirement products to maintain adequate levels of technical reserves and risk capital and to apply regularly rigorous stress tests to their various products, depending on the allocation of investment and longevity risks. Clear rules should be applied to the valuation of assets and liabilities and to the capital buffers that would be needed to cover the financial impact of asset and liability mismatches. These are challenging issues even in the countries with the most developed markets. Regulatory practices would need to evolve and adapt to the emerging lessons from the growing global experience in the management of the many and varied risks facing the markets for retirement products.

Finally, intervention and bankruptcy rules should be modernized to prevent an early depletion of provider assets in a bankruptcy scenario. An effective resolution mechanism will avoid a significant reduction in the residual value of assets left to honor annuity and phased withdrawal payments and an increase in the cost of any government guarantees. In a system of mandatory savings, pensioners may deserve a preferential treatment over other claimants on the assets of providers of retirement products.

[26] Vittas et al (2008) reviews the recent experience of four public pension funds in some OECD countries.

The introduction of government guarantees for holders of retirement products, life annuities or phased withdrawals, may well be necessary in a system of mandatory saving for retirement purposes. These should cover both the accumulation and payout phases. The government guarantees should emulate evolving practice in deposit insurance schemes, including a reasonable amount of coinsurance by pensioners in order to minimize the possible loss of market discipline at the point of purchase and funding by ex ante or ex post risk-based assessments as well as some reliance on budgetary resources.

5.6 The Promotion of Efficient Risk Management

The regulation of payout options and retirement products needs to consider the supply of financial instruments and hedging tools that would enable the providers of retirement products to adopt efficient risk management techniques. The imposition of inflation indexation in the absence of inflation-indexed instruments may lead to the offer of poorly priced products with hefty risk premiums. Countries that consider mandating the use of inflation-linked annuities should make a serious effort to expand the supply of inflation-indexed financial instruments from both the public and private sectors or consider the use of alternative types of annuities, such as escalating annuities. Escalating nominal annuities, where regular monthly payments are adjusted once a year at a predetermined rate of between 2 and 5 percent would be a more suitable product for countries with underdeveloped financial and insurance markets.

The development of sound annuity and phased withdrawal markets necessitates the adoption of a clear and ambitious capital market agenda for the payout phase. For the government, the development of long-duration inflation-indexed instruments implies a significant modernization of public debt management, focusing on the promotion of liquid benchmark issues and the adoption of reliable issuance programs. For the private sector, it implies adoption of rules that eliminate any obstacles to the issuance of long-dated inflation-linked instruments.

In addition, governments need to promote the development of derivative markets, such as long-term interest rate swap and swaption contracts to allow hedging the investment risk of long-term liabilities as well as the use of longevity bonds and reinsurance markets to support the hedging of longevity risk. Developing longevity bonds and derivatives is likely to be a tall order for most countries around the world since such products have yet to emerge even in the most advanced financial markets.

An alternative approach would be to rely on extensive risk-sharing arrangements, similar to those widely practiced in Denmark and Sweden. These offer an attractive option in addressing the highly complex longevity and investment risks in markets with an inadequate supply of long-term instruments.

However, risk-sharing arrangements introduce their own challenges. They presuppose a high level of transparency and integrity of annuity providers, adoption of effective pricing rules, involving the use of cohort mortality tables to minimize subsequent

adjustments in annual bonuses, and rules that avoid transfers of income across different cohorts.

There is also a need for transparent and robust rules to ensure consistent long-term fairness in the distribution of profits between shareholders and policyholders. This is clearly a more important issue in the case of oligopolistic decentralized markets, where market discipline may be less powerful than is often assumed, but it is also relevant in the case of public monopolies, especially in ensuring a fair treatment of all cohorts and avoiding the use of surpluses for extraneous purposes.

5.7 In Conclusion

Clearly, the lessons learned from the experience of the five countries reviewed in this paper are manifold and challenging. The development of retirement products is a new challenge that emerges from the changing landscape in most countries, the result of increasing longevity, globalized competition, and market fluidity. Complete reliance on traditional social security systems and defined-benefit company pensions is no longer feasible anywhere in the world. As the development of robust systems of retirement savings both during the accumulation and payout phases attracts increasing attention in most countries, it is hoped that the review of lessons contained in this paper will help policymakers in many developing countries in better formulating their policy options and in addressing more effectively the difficult challenges ahead.

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