

# The Decumulation (Payout) Phase of Defined Contribution Pillars

## Policy Issues in the Provision of Annuities and Other Benefits

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The provision of annuities and other benefits during the decumulation phase of defined contribution (DC) pension plans raises major policy issues. Because private markets for annuities and disability benefits are not well developed even in the most advanced OECD countries, the resolution of these issues is likely to be a gradual process, with both countries and markets learning through experience.



## Summary findings

Most countries reforming their pension system focus more on the accumulation phase than on decumulation (payout), because the number of beneficiaries is likely to be small initially, especially if older workers are discouraged from joining the new system. Policymakers place a priority on the new accumulation system being administratively efficient and well regulated.

But the decumulation phase must also be well organized and efficient. The purpose of pension systems is, after all, to pay retirement benefits—old age, survivor, and disability pensions. James and Vittas argue that:

- Payout arrangements are likely to evolve gradually, through trial and error, as problems are discovered and tackled.
- Adverse selection may not be as great a problem as is sometimes thought.
- Many other annuity and insurance market problems have yet to be solved, and policies must be formulated to make these markets work as well.

The underdevelopment of voluntary annuity markets is only partly explained by adverse selection, argue James

and Vittas. Other factors are also at work: the bequest and precautionary motives for saving; individuals' myopia and ignorance; mistrust of insurance companies; the "luxury good" nature of annuities; tax policies that favor lump sum withdrawals; and last but not least public policies (such as the offer of social security pensions and the encouragement of occupational pension plans) that tend to crowd out individual annuities.

The long-term success of pension reform depends on vigorous efforts to develop the insurance industry. Weak and underdeveloped in most developing countries, the insurance industry should play a central role in providing old age, survivor, and disability benefits.

Many policy issues require careful thought and extensive empirical analysis: Should annuitization be mandatory, and at what level? Should indexed (or "real") annuities be required? Should variable annuities be permitted or encouraged? Should joint annuities be required? How much "group rating" and "risk classification" should be permitted?

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This paper—a product of Finance, Development Research Group—is part of a larger effort in the group to study the implications of pension reform programs. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Agnes Yaptenco, room MC3-444, telephone 202-473-1823, fax 202-522-1155, email address [ayaptenco@worldbank.org](mailto:ayaptenco@worldbank.org). Policy Research Working Papers are also posted on the Web at [www.worldbank.org/research/workingpapers](http://www.worldbank.org/research/workingpapers). The authors may be contacted at [ejames3@worldbank.org](mailto:ejames3@worldbank.org) or [dvittas@worldbank.org](mailto:dvittas@worldbank.org). October 2000. (28 pages)

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**Development Research Group  
The World Bank**

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## Introduction

Most countries that reform their pension systems initially focus more on the accumulation phase and pay less attention to the decumulation phase. Policymakers need to ensure that the new system is administratively efficient, or at least does not collapse under the weight of the information needs of systems based on many small individual accounts. They need to ensure that the new system is transparent and well regulated. Early failures of participating institutions through fraud and misuse of funds is likely to cause a major setback to the whole reform program. Finally, the number of beneficiaries is initially very small, especially if older workers are discouraged from joining the new system. While some disability and survivor benefits will be paid in the early years of the system, old age pensions will not arise for many years.

But for a successful new pension system the decumulation phase must also be well organized and efficient. The primary purpose of pension systems is to pay retirement benefits—old age, survivors and disability pensions. The success of a new pension system depends on its ability to use whatever capital has been amassed at the end of the active life of covered workers to provide a reasonably sufficient regular income to them and their dependents. This paper argues that 1) pay-out arrangements are likely to evolve gradually, through a trial and error process, as problems are discovered and tackled; 2) adverse selection may not be as great a problem as is sometimes thought; but 3) many other annuity and insurance market problems remain to be solved and policies must be formulated to make these markets work well. The insurance sector will play a central role in the provision of retirement benefits, as well as disability and survivors benefits, in reforming countries. However, most developing countries have very weak and underdeveloped insurance sectors. The long-term success of pension reform therefore requires a vigorous effort to develop the insurance industry.

The next section of this paper reviews the basic characteristics of disability and survivor pensions and compares arrangements for these types of benefits in different countries. Section 2 focuses on old age and early retirement benefits. It discusses the special issues affecting the development of annuity markets and draws on the experience of Chile as well as the recent academic literature on this subject. The third section reviews the measures that are needed to

modernize and strengthen the insurance sector. A Conclusion pulls together the policy issues that reforming countries must address regarding the payout of benefits.

### **I. Disability and Survivor Benefits.**

The literature on disability and survivor (term life insurance) benefits is not very large, even though the provision of these benefits is more immediate than that of annuities. In fact, disability and survivorship benefits constitute the large majority of benefit payments in the early years of reformed systems.

Disability and survivor benefits are linked to the active life of workers and are necessary to protect workers and their dependents from disability and death that occurs prior to retirement and often prior to the build-up of a large accumulation. Perhaps this accounts for a fundamental difference between the treatment of disability and survivor benefits on the one hand and old age benefits on the other. While in most reforming countries, old age benefits are based on defined-contribution plans and individual accounts, disability and survivor pensions are based on defined-benefits and group contracts. Usually the benefit is defined as 70% of the average covered salary over the past five or ten years.

Substantial differences exist in institutional arrangements across countries and the impact of these differences is an important topic for future study. In Chile and Argentina disability and survivor benefits are completely privatized—a response to the extensive abuse and high cost of the previous public system. In Mexico, they have been kept during the initial phase of the reform in the public sector in the pre-existing social security institution. This is also the approach adopted in Eastern Europe. In Peru and Colombia, responsibility is shared between the public and private pillars, depending on the pillar affiliation of individual workers. In Kazakhstan, no provision is made for disability and survivor benefits because of the underdevelopment of the insurance sector and the inability of government to handle these benefits. The intention is, however, to offer disability and survivor benefits once the insurance sector is better developed.

The assessment of disability appears to be a highly subjective process. The incidence of disability therefore varies greatly over time and across countries (Lee and Skinner 1999; Havemann and Wolfe 1990). Given this subjectivity, one might expect that private companies

would be overly reluctant to certify workers for disability, while public agencies might grant eligibility too easily, sometimes based on political considerations such as the desire to enable unemployed older workers to retire on disability when they are not yet eligible for ordinary pensions. The variety of institutional arrangements that has developed should enable this kind of question to be analyzed.

In Chile and Argentina, each pension fund management company is required to arrange for a group insurance policy covering all its affiliated workers. In principle, the past experience of the group is presumably taken into account when the group rate is set, once a year. The group premium is then charged back to individual workers as a percentage of their covered wages, without distinguishing by age, sex, occupational risk, or any other characteristic. In practice, however, the rate agreed between the pension fund management company and the insurance company, which are often affiliated to the same financial group, is also influenced by other factors, especially tax considerations. When disability or death of an active worker occurs, the outstanding balance on that worker's account and the proceeds of the recognition bond (if any) are supplemented by a payment from the insurance company concerned, sufficient to provide the level of benefit set by the pre-determined formula.

As noted, all workers pay the same premium as a percent of covered wage. No allowance is made for the age of covered workers or for differences in family structure (especially for differences in the ages of spouses and other beneficiaries). In effect, this means that young workers with low balances, particularly those in hazardous occupations or many dependents, are subsidized by older workers who have accumulated large balances in their accounts. The young workers impose a heavier burden on insurance companies that make up the shortfall in capital needed to purchase the required benefit. However, a partially compensating mechanism is at work: Young workers face a lower risk of death or disability and a lower pensionable wage base. No such compensating mechanism is at play for older female workers, particularly those in safe occupations, who have lower mortality and disability rates, have built up their individual account balances, but pay the same insurance premium as higher risk workers. Thus, it can be argued that

female workers, especially those in safe occupations, subsidize male workers, especially those in hazardous occupations.

The gradual trial and error process that is likely to take place in reforming countries is well illustrated by the early experience of Chile. Initially, the law did not impose the use of uniform premiums for all workers. Variations in insurance premiums reflected the age of family members, the balance in individual accounts, the years of contributions, and the proportion of income covered by the insurance policy. This led to a short-lived but considerable confusion, as different pension fund management companies adopted different pricing approaches, making comparison of the cost of insurance nearly impossible. Eventually a law was passed standardizing the premium for all members of a given AFP. While solving one problem, this may have created another: An individual would now be better off participating in an AFP that has many members with low probabilities of death or disability, since this, rather than his own characteristics, will determine his premium. If insurance charges became an important determinant of AFP affiliation, this could lead to instability in membership and fees; however, as of this point in time we have not heard that this poses a problem.

The benefit was initially set equal to 50% of basic income for those with five years of contributions rising by 5% for every five years of contributions up to 70% of basic income for those with 25 years of contributions or more. Workers were permitted to increase the level of the benefit up to 150% of basic income by paying a higher premium, on a voluntary basis. Basic income was equal to the average of the past 12 months earnings indexed to inflation. However, the right to increase the level of insured benefit exposed insurance companies to adverse selection, while the use of the 12-month average real earnings as basic income allowed manipulation of the pensionable wage base. Higher earnings could be declared in the months prior to the submission of a claim. In some cases, fake contracts with imaginary employers were used by self-employed people for this purpose (Titze and Viancos 1998:165). These problems were fixed with the changes in regulations enacted in 1987 with passage of the so-called “train

bill”.<sup>1</sup> The right to increase the level of insured benefits was removed and basic income was redefined as average real earnings over the preceding ten years.

Another early problem concerned certification of disability: some workers claimed they had not been treated fairly. A central medical commission was established to adjudicate on complaints and appeals. Closely related was the treatment of partial disability. Because of the greater strictness in the definition of disability, an increasing number of workers were rejected, who were partially disabled but did not meet the definition of total disability (a loss of two-thirds of the ability to work). Partial disability for those who lost between one-half and two-thirds of the ability to work was authorized in the early 1990s. At the same time, insurance companies were allowed to pay temporary pensions for the first three years after disability was claimed and to delay transferring the required capital for the payment of a permanent pension until re-certification of disability three years later.

In the late 1980s, extensive fraud was discovered with regard to disability claims. Fake disability reports were sold to healthy people, involving fabricated medical tests and impersonated medical examinations (Ariztia 1998:79, Titze and Viancos 1998:174). To prevent such fraud, the regulations were changed to require the use of authorized medical centers with more rigorous procedures for identifying members.

A basic issue concerned how to encourage greater choice and competition, given that AFP's controlled these contracts. In Chile and other countries that have followed its approach, competition has been inhibited by the fact that the pension fund management companies and the insurance companies with which they deal often belong to the same group of companies. In Chile, there was extensive use of transfer pricing for most of the 1980s in the division of total charges between insurance premiums and administrative fees. The same pattern was observed in Argentina in the mid-1990s. Tax factors and other considerations (such as the allocation of revenues and profits between the affiliated companies) rather than actuarial factors were using in

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<sup>1</sup> The “train bill” (Law 18646 of 1987) was the result of an exhaustive review of the operation of the system that was started in 1984 and was completed in 1987. The bill became known as the “train bill” because new “trucks” were continuously added containing new modifications (Titze and Viancos 1998:162).

determining insurance premiums. In such cases a lower insurance premium implied a higher operating fee for the pension fund management company and vice versa. To tackle this problem the “train bill” decreed that, on the occurrence of disability or death, the insurance company contracted by the AFP had to transfer to the individual account the necessary funds that, combined with the accumulated account balance (and the recognition bond), would be sufficient to purchase the specified pension. The worker could then use this money to purchase the annuity from the insurance company of his or her choice. Perhaps in response, Chilean AFP’s have started to sign contracts with non-affiliated insurance companies, from which they get better terms. These procedures are assisting in the development of a competitive insurance market in Chile.

Disability and survivors insurance premiums have declined over time, especially in Chile where a long record of loss experience has been built up. They started at over 2% of wages and are now only .5% (Schmidt-Hebbel 1999), although transfer pricing may have inflated the insurance premiums for most of the 1980s. It is closer to 1% in Argentina, and 2.5% in Mexico, where the system is very new, hence the insurance liability is high since individual accounts are still minuscule. Another relevant factor in Mexico may be that disability and survivor pensions are provided by the pre-existing social security institution, which may find it more difficult to impose rigorous criteria. We are not aware of any study that estimates load factors (percentage of total premiums that are retained by the insurance companies rather than being paid out to beneficiaries) in the disability and survivors programs of these countries.

In contrast to Latin America, Switzerland has adopted a different approach, sharing responsibility for disability pensions between the public and private pillars to ensure that the granting of disability pensions is neither too generous nor too strict. In Switzerland the public portion is financed on a PAYG basis; it does not draw on the funds built up in the worker’s individual accounts. Partly for this reason, disability and survivor pensions cost 2.4% of covered wages--approximately the same as in Latin America in the first years of the new systems, when account balances were negligible, but much higher than is currently the case in Chile or Argentina. (The cost of disability insurance in the Swiss private pillar is not known). Another

reason for the higher current cost in Switzerland may be that disability pensions have tended to be granted to older workers in declining industries rather than paying such workers unemployment benefits. This spares workers the stigma of redundancy, but it also conceals the true level of unemployment and thus reduces social tensions as well as political pressures to increase employment in other ways.

The last aspect of disability pensions concerns the encouragement of rehabilitation and re-entry into the labor force. Rehabilitation can be very expensive but if well administered can be self-financed from the suspension of disability pensions to rehabilitated workers. Rehabilitation, combined with a more vigorous program of re-certification, has been actively used in the Netherlands in the 1990s as a means of reducing the large expenditures on public disability pensions. We have no evidence on the use of these techniques in countries that have privatized the provision of benefits, although it may be in the interest of insurance companies to do so.

To summarize briefly: whether privatized or handled by public institutions, mandatory disability and survivor pensions have tended to be organized on the basis of group contracts with uniform insurance premiums and no allowance for known differences in risk. Thus, low-risk workers subsidize high-risk ones. An efficient system of disability pensions, whether public or private, requires a sophisticated certification and re-certification mechanism, use of authorized medical centers to prevent various types of fraud, and the compilation of comprehensive data on loss experience. Rehabilitation programs, although expensive to operate, may also contribute to a reduction in the cost of disability pensions. On the one hand, most developing countries have weak institutional capacity in the insurance area. On the other hand, most public systems have abused their disability programs, lacking the incentive to apply rigorous criteria and using them as a substitute for early retirement and unemployment insurance. High priority should be given to an analysis of the efficiency, cost and equity of the criteria for granting and denying benefits, in public, private and mixed system; we now have enough variety to enable a careful study.<sup>2</sup>

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<sup>2</sup> Pension systems often offer other “pre-retirement” benefits such as allowing withdrawals for housing, medical and education costs. In countries where contribution rates are very high (as is the case in Singapore) provision of such facilities is unavoidable. In general, however, care must be taken to ensure that the accumulated balances in the pension accounts are large enough to support a reasonable annuity income in old age. The issues raised by the provision of “pre-retirement” benefits are not

## II. Old Age and Early Retirement Benefits

Old age retirement benefits can take three basic forms: lump sum payments; scheduled withdrawals; or life annuities. We start by discussing the first two forms, but concentrate on annuities, the only form that provides longevity insurance. On the one hand, some degree of longevity insurance may be essential for old age security. On the other hand, annuities markets pose potentially serious problems and difficult policy choices that need to be addressed.

*Lump sum payments.* These are used extensively in many Anglo-American countries. In some of these countries, e.g. Australia, New Zealand and South Africa, the widespread use of lump sum payments in private pension plans is influenced by the availability of universal public pensions. In others, e.g. Malaysia, Singapore, Sri Lanka, the use of lump sums is associated with the operation of national provident funds.

Lump sum payments are easier to operate as they do not require any of the complex calculations involved in scheduled withdrawals and annuities. But this does not tell the whole story. For instance, some workers may use part of their lump sums to purchase annuities, while others may replicate on an individual basis the system of scheduled withdrawals. Use of the latter is difficult to detect and analyze, while the former requires an examination of the market for voluntary individual annuities. Lump sum payments also raise some social policy concerns as some workers may waste their capital in gambling or excessive consumption and thus deprive themselves and their families of adequate protection in old age. In cases where the public benefit is means-tested (as in Australia) moral hazard problems arise when private benefits are lump sum.

In most OECD countries, company pension schemes and the tax rules that affect their operations, allow partial commutation of future benefits into a lump sum. This varies between

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addressed in this paper. One sensible compromise approach could include a rule that permitted withdrawals that did not exceed 80 to 100 percent of the accumulated account balance or 20 to 30 percent of the projected account balance at retirement. This would ensure that an adequate balance is left in the account for retirement purposes. It would also be consistent with the nearly universal practice of allowing lump sum withdrawals in defined benefit plans of between 20 and 30 percent of the value of pension rights.

25% and 33% of the discounted present value of benefits. Available evidence suggests that most workers opt to make use of this facility.

***Scheduled withdrawals.*** Often described as programmed withdrawals, these were introduced in the Chilean pension reform as an alternative to purchasing life annuities—perhaps because of uncertainty regarding the availability and price of annuities. They are also available in other Latin American countries like Argentina, El Salvador, Mexico and Peru, though not in Bolivia where mandatory annuitization is imposed. Similar arrangements are available in the United Kingdom and Australia, although with some important differences. For instance, in the United Kingdom scheduled withdrawals are only allowed up to age 75, when annuitization becomes mandatory (Valdes-Prieto 1998:39).

Scheduled withdrawals have two advantages over life annuities. In the event of early death, remaining account balances are inherited by dependents, accommodating a bequest motive. Scheduled withdrawals also allow participation in the likely higher returns achieved by pension funds compared to the rates offered by insurance companies. They thus operate like variable annuities but without the benefit of longevity insurance. The absence of longevity insurance is their main weakness, but they are also exposed to fluctuating payments as a result of the volatility of pension fund returns.

In Latin American countries, scheduled withdrawals are recalculated each year on the basis of the remaining life expectancy of the family of covered workers and a stipulated rate of return. By regulation, the rate of return is equal to the average real return achieved by the pension fund concerned over the past 10 years. The life table to be used is also set by the regulators.

When rates of return are constant, scheduled withdrawals decline over time because the life expectancy of their owners falls each year by less than one year. For people who live too long, the remaining balances and the monthly withdrawal may become too small. This can become a problem, especially for women, who live longer than men and whose accumulations are, on average, smaller to begin with.

In Chile, the use of scheduled withdrawals is required in the case of workers whose pension is below the minimum guaranteed pension, but workers with benefits that are slightly

above the minimum may also have an incentive to use scheduled withdrawals rather than life annuities. They will benefit from the achievement of high returns and their dependents will inherit any remaining balances in the event of early death, but they will receive the minimum guaranteed pension if returns are low or if they live too long. One way to contain this moral hazard is to require the purchase of a deferred life annuity for the minimum amount (Vittas and Iglesias 1992:7).

As in the case of disability and survivor benefits, the use of scheduled withdrawals in Chile also went through a series of stages. Initially, no workers were allowed to receive an old age benefit until they had been in the system for five years, a restriction that was lifted in January 1983. The first calculations of scheduled withdrawals did not allow for future (positive or negative) investment income; the real rate of return used in calculating scheduled withdrawals was effectively set at zero. But in the face of the large real returns of the 1980's this resulted in very low initial pensions and large increases when scheduled withdrawals were recalculated in 1984. The regulations were changed in 1987 and stipulated that the assumed rate of return should be the lower of the following two rates: the average real return of the past five years for the pension fund concerned or the weighted average between this rate and the average interest rate for all life annuities granted over the previous 12 months, with assigned weights of 20% and 80% respectively (Titze and Viancos 1998:167). Although this was a backward-looking rate, it was felt that it would be stable enough to avoid large fluctuations in the value of scheduled withdrawals. However, the second of these definitions exposed insurance companies to a time lag effect. If they became aggressive in one year, using higher rates and offering better annuities, they would face stronger competition from scheduled withdrawals in the following year.

In December 1996 the backward-looking period for the rate of return of the pension fund concerned was increased from five to ten years. This may have been motivated by the decline in real returns in the mid-1990s and the desire to avert sudden substantial falls in the amount of scheduled withdrawals, but it highlights the difficulty in determining the appropriate rate of interest for these calculations as well as the risk inherent in tying withdrawals to volatile rates of return. If real returns continue to be lower than their high levels of the 1980's (as is likely),

workers who retired in the early 1990's and took scheduled withdrawals may find themselves with low remaining balances and annual incomes in the twenty-first century. This history also underscores the almost incessant streamlining of the regulations needed to govern the pension funds, including the payout phase.

***Life annuities: market development and adverse selection.*** The third type of retirement benefit is the life annuity. Among countries with mandatory second pillars, only Switzerland and Bolivia impose the use of annuities. Eastern European countries are also leaning toward compulsory annuitization. Apart from Bolivia, all other Latin American countries allow the use of scheduled withdrawals, making annuitization voluntary or rather semi-voluntary because workers do not have the option of lump sum withdrawals. In Australia annuitization is voluntary and the existence of the means-tested public pillar creates a moral hazard problem and an incentive not to annuitize, since the longevity risk is born by the public sector.

Compulsory annuitization is often advocated in order to avoid the problems caused by adverse selection due to asymmetric information. Suppose that insurance companies start out pricing annuities on the basis of the average life expectancy for the population as a whole. Retiring workers who know that they have a lower life expectancy because of terminal illness or other health factors that are not observable to insurance companies will not buy such an annuity, so the expected lifetime of annuitants will be above average, forcing insurance companies to raise their prices and leading to another round of adverse selection--with the result that the annuity market will be smaller and less well developed than if all workers were forced to purchase an annuity. According to this scenario, workers with average life expectancy will not have access to longevity insurance at actuarially fair prices in a voluntary insurance market because of adverse selection.

Markets for voluntary individual annuities are not well developed even in the most advanced OECD countries, let alone in developing countries. Adverse selection, which causes average annuity prices to be higher than they would otherwise be, is a factor explaining this underdevelopment, but it is not clear that it is the most important factor. In recent work at the World Bank we have started identifying different reasons for the underdevelopment of annuity

markets. We started from 4 but soon increased their number to 10 and adverse selection is only one of them. In fact, given the product innovations that insurance companies have introduced over the years and the growing emphasis on risk classification to avoid cross subsidization between different groups, one could argue that adverse selection should be far less important in practice than is often claimed.

In addition to adverse selection, other reasons for the low development of annuity markets include:

- The bequest motive and the precautionary motive for saving (to deal with life contingencies such as large medical bills), which suggest that people will choose to annuitize, at best, only a part of their retirement savings (Hurd 1989, Bernheim et al 1985);
- Ignorance and myopia by individuals (who may not understand these complex contracts and fail to appreciate the benefit of insuring against the risk of outliving their assets);
- Mistrust of insurance companies (who may fail to honor these long-term, irrevocable, and non-transferable contracts or to produce high investment returns in the case of variable annuities);
- Aggressive marketing efforts (which are necessary to overcome the ignorance and mistrust of the public but which raise the total cost of annuities);
- Uncertainty about future inflation, real investment returns and overall improvements in mortality risk (which force insurance companies to adopt conservative policies, use low discount rates and mortality probabilities, and thus raise reserves and annuity prices);
- The likelihood that annuities are a luxury good with a very high income elasticity of demand, hence an appeal mainly to upper income groups (who have left-over wealth to annuitize after reserving funds to meet their bequest and precautionary motives);

- Tax policies (that may favor the use of lump sum payments on retirement); and last, but not least,
- Public policies such as the offer of social security pensions and the encouragement of occupational pension schemes that tend to crowd out the use of individual annuities (Vittas and Skully 1991:43-44, Walliser 1998, Auerbach et al 1995, Gokhale et al 1996).

Moreover, while annuities protect against longevity risk, they accentuate many other types of risk (Walliser 1998, Richter and Ritzberger 1995). For example, annuitizing a substantial portion of your wealth increases the risk that you will be:

- Unable to pay large unexpected medical bills or other lumpy emergency needs,
- Unable to benefit from higher future rates of return (if the annuity is not variable),
- Unable to protect yourself from inflation (if the annuity is not indexed),
- Without the income that you counted on, due to the failure of the insurance company to honor its commitment.

Insurance markets try to deal with potential adverse selection through risk classification and product variety that leads people to self-select themselves into different risk categories. Product innovation also enables potential consumers to protect themselves against some of the other risks mentioned above. For example, joint and last survivor annuities, in which payments continue until the death of the last to die of the named annuitants, address the potential adverse selection caused by a short life expectancy linked to terminal illness--since it is unlikely that both spouses would suffer from terminal illness at the same time. Joint and last survivor annuities with guaranteed payment periods, say 10, 15 or 20 year certain, deal with both adverse selection and the bequest motive, especially protecting the dependents of annuitants in the event of early death.

Life annuities with guaranteed payment periods are effectively a combination of a series of certain dated payments and a deferred annuity starting at the end of the guaranteed period.

Deferred life annuities cost less than immediate life annuities but they may involve excessive amounts of reserves since they are exposed to a greater risk of large improvements in cohort mortality. The combination of deferred annuities and scheduled withdrawals has been offered in Chile since the late 1980s but its use has been limited and has involved a short period of deferment.

Real annuities, which are widely used in Chile and are growing in popularity in the United Kingdom, provide protection against inflation but require the availability of index-linked government and other bonds. In Argentina, there are no real annuities because the use of inflation indexed instruments is not encouraged by the authorities. However, companies are allowed to issue annuities linked to the US dollar and other foreign currencies that protect against local hyperinflation. In the United States the recent issue of indexed treasury securities has yet to be reflected in a supply of real annuities. In the United States and Australia, graded annuities, that have payouts growing by a specified percentage, are in some use.

Participating annuities allow insurance companies greater flexibility in both investment policies and reserving for mortality risk. Annuitants participate in the profits earned by insurance companies as a result of improved efficiency, better investment results, or higher than anticipated mortality. Variable annuities are an extension of participating annuities as they link payouts to the performance of some underlying asset. Variable annuities shift the investment risk to annuitants but they also allow them to benefit from the higher returns that may be achieved by investing in equities and other higher risk instruments. Variable annuities may also shift the mortality risk to annuitants. The so-called CREF annuity does this by adjusting the value of units in the light of both investment performance and mortality risk. New financial instruments may allow the construction of annuities that have some upward potential but are also partially protected from downside risk (Bodie 1998). We would expect to see further developments along these lines as mandatory retirement savings plans grow and partially replace traditional PAYG social security.

Nevertheless, despite this plethora of products, the fact remains that annuitization decreases certain risks but increases others and it conflicts with other rational objectives; hence it

is not at all clear that a risk-averse individual would choose to annuitize a large portion of his or her retirement wealth. Yet, in most countries with social security, social security wealth is the largest component of retirement savings and this is compulsorily annuitized. As a result, low-income workers may find themselves over-annuitized relative to their optimal division of wealth. And high income workers, who are likely to have a stronger effective demand for annuities, often have access both to social security and tax-advantaged occupational pensions, thereby fully satisfying their demand as well. It is hardly surprising, therefore, that additional annuitization does not take place.<sup>3</sup>

If mandatory saving plans replaced social security, as in the reforming countries we are examining, it is likely that the level of voluntary annuitization would increase. In Chile, for example, the majority of people who have retired have voluntarily annuitized. The proportion of those opting for a life annuity has increased from 33% in 1988 to 59% in 1997. This greater demand for voluntary annuitization, in turn, reduces the potential adverse selection problem. It should, however, be noted that the decision to annuitize is influenced in Chile by the ability to convert future income into a lump sum withdrawal. This seems to be achieved through the payment of a high commission to selling agents and subsequent refund of some of this commission to the retiree (Valdes-Prieto 1998:35, Titze and Viancos 1998:181). Without the significant commission refund, voluntary annuitization might be considerably less. It is interesting to note that all annuities in Chile are indexed, contradicting the often cited statement that the private sector is unable to insure against inflation.

Like the disability market, the annuity market in Chile evolved over time and its growth was strongly influenced by regulations, especially those concerning the use of discount rates and the treatment of early retirement. In the early 1980s, insurance companies were forced to use a 3% discount rate in setting their reserves, even though their policies were based on higher rates

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<sup>3</sup> In one of the seminal works on annuities, Friedman and Warshawsky (1990:136) recognize the potential crowding out effect of social security and occupational pensions but they argue that “it is difficult to believe that the combination of Social Security and private pension coverage so precisely matches each individual’s preferences for annuity holding as to leave only negligible individual annuity demand remaining”. In their view, adverse selection is therefore a plausible explanation for the low level of voluntary annuitization. Given all the factors mentioned above, it is equally plausible that social security and occupational pensions exceed the demand for annuities of many individuals.

that were available in the market. This forced insurance companies to hold more capital as the debt/equity ratio was set at 15:1. However, in 1988 the rules were changed and insurance companies were allowed to calculate their reserves by using market rates, provided they matched their assets and liabilities. They then began to actively compete with scheduled withdrawals and introduced life annuities with guaranteed payments for 10 or 20 years. Regulations can thus determine how actively insurance companies compete for the annuity business as well as their prices and the variety of products that are offered.

Insurance companies also benefited from the regulatory changes that made early retirement more attractive. In the early years of the new system, early retirement was permitted if a worker could obtain a pension equal to the guaranteed minimum pension or 70% of earnings over the previous 10 years (whichever was higher). Moreover, the proceeds of the recognition bond could not be used for financing early retirement since the recognition bond did not mature until normal retirement age. But in the late 1980s, discounting of the recognition bond by the insurance company that issued the life annuity was allowed, and early retirement was permitted if the worker could obtain 110% of the guaranteed minimum pension or 50% of earnings over the previous 10 years. This increased the demand for early pensions, which could only be in the form of life annuities. Later on, recognition bonds were permitted to be traded on the stock exchange, thus lowering the discount rate charged by insurance companies and making early retirement even more attractive, while early pensions could also take the form of scheduled withdrawals (or a combination of scheduled withdrawals with deferred annuities).

Early pensions increased from 1% of all pensions in 1988 to 35% in 1997, when 80% of early pensions were in the form of annuities. In contrast, (normal) old age pensions are preponderantly in the form of scheduled withdrawals (69% in 1997). To the extent that early pensions are mainly affordable by high income workers, who have a high income elasticity of demand for annuities and also have greater longevity, while normal old age pensions are taken by low income workers who are more likely to choose scheduled withdrawals, this would add to the appearance of adverse selection although the longevity differential between the two groups would not in fact be due to adverse selection (asymmetric information).

*Annuities: load factors and money's worth calculations.* One of the most controversial aspects of annuities markets and how they would function in an old age security system with mandatory retirement saving accounts concerns their load factors—how much of their premiums do they retain versus paying back to beneficiaries? Several studies in the United States (Mitchell et al 1997, Poterba and Warshawsky 1999, Brown et al 1999) have estimated a closely related concept, the “money’s worth” of annuities, defined as the expected present discounted value of lifetime payouts divided by the initial cost of the annuity. The money’s worth can be less than 1 for a worker with average longevity, due to administrative expenses or adverse selection. The smaller the money’s worth, the less desirable annuities would be.

The money’s worth calculations made thus far use two alternative interest rates—the government and corporate bond rates--and two alternative mortality tables—(1) for the general population and (2) for the population of annuitants. Since annuitants have a higher expected lifetime than the population as a whole, the second mortality table yields a much higher money’s worth than the first. The difference between the two is usually attributed to adverse selection; it could, alternatively, be due to a high-income elasticity of demand for annuities combined with the positive correlation between income and longevity (on the latter points see Feinstein 1993, Menchik 1993, Walliser, 1998).<sup>4</sup> In either case, the load factor due to differential mortality of these two groups does not represent a real resource cost; rather, it represents a potential utility loss of indeterminate size to average-longevity people who would like to annuitize on actuarially fair terms but are not given this opportunity by markets.<sup>5</sup>

The calculations and reported results are highly complex and difficult to summarize because they cover several combinations of discount and mortality rates as well as types of annuitants and contracts. Combining results from various papers one can show the following

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<sup>4</sup> Finkelstein and Poterba (1999) draw an interesting distinction between “active selection”, in which individuals use private information about their mortality prospects in deciding whether to purchase an annuity, and “passive selection”, in which individuals who choose to purchase annuities may have other attributes that correlate with greater longevity. Passive selection may be far more important in practice than active selection, although this is an issue that remains to be investigated empirically.

<sup>5</sup> This effect on price would be accentuated if, as is likely the case, high-income annuitants tended to purchase larger annuities. The data are usually not available to do weighted money’s worth calculations.

pattern in money's worth ratios (Table 1). Focusing on the general population and using the term structure of government bond yields for discounting, the money's worth ratio for US men aged 65 appears to have risen from 75% in 1985 to 85% in 1998. (Using corporate bond rates, the improvement is from 68% to 77%.) However, using the population of annuitants, the money's worth ratio appears to have increased from 83% to 97% based on government bond rates (from 74% to 87% with corporate bond rates). Poterba and Warshawsky (1999) have shown that group or quasi-group contracts arranged through the Thrift Savings Plan for federal employees and by TIAA-CREF for academic personnel in the US, offer superior money's worth ratios to those available to individuals through the retail market—possibly because they reduce marketing and other transactions costs and reap the gains from increased information and bargaining power of group negotiators.

These results suggest that: (1) the competitiveness of annuity markets has improved over time; (2) adverse selection or longevity-correlated-income elasticity of demand accounts for 10-12 percentage points of the load factor while administrative costs account for 3-13 percentage points, depending on which discount rate is used, and (3) group contracts lower administrative costs and adverse selection and should perhaps be utilized.

The part of the load factor that stems from administrative expenses represents a real resource cost to the economy. However, the part that stems from the higher longevity of the annuitants' group is more difficult to interpret. Taking the person with average population-wide longevity as our reference point, the cost of annuities to such persons is 10-12 percentage points higher than it would be if they could use actuarially fair terms. (For similar calculations that produce a much lower cost of adverse selection in Canada see Milevsky 1997). If all such persons did in fact end up annuitizing, this cost would represent a real utility loss to them. But we know that most of them do not annuitize (given that the annuitants' group has above-average life expectancy). The utility loss to persons who could have annuitized but chose not to do so is, by definition, equivalent to less than 10-12 percentage points; it depends on how much they would have been willing to pay, which we do not observe. In the extreme, for those who would not have been willing to purchase annuities even at actuarially fair prices (for all the reasons we

have given above), the utility loss from not being able to do so is zero. Thus, the utility loss stemming from the non-availability of annuities on terms that are actuarially fair to the average member of the population may be much less than these numbers imply.

As for administrative costs: If one thinks of the government rate as the appropriate rate because the income stream from annuities is (virtually) risk-free, these numbers imply that the average annuitant pays little for administrative costs and gets a high money's worth—surprisingly high in view of the reputed high marketing costs, mortality reserves and other expenses of insurance companies. This poses the question--how do these companies cover their administrative costs and earn their profits? According to these numbers, 10 percentage points of cost recovery and profits come through risk transformation—charging according to a risk-free rate but investing the premiums in riskier assets, and retaining the differential. Insurance companies may be in a good position to mediate risk because they aggregate resources, can therefore diversify, reinsure and pass the residual risk on to their stockholders who are willing to bear it. In this case, the utility frontier is expanded by this combination of longevity insurance and risk intermediation.

However, for workers who prefer to accept more risk themselves, and who view risky investments as their alternative, the appropriate discount rate may be the corporate bond rate or higher, in which case the money's worth ratio would be lower and estimated administrative costs charged by insurance companies would be higher. Such individuals might prefer to purchase variable annuities, which would permit them, rather than the insurance company, to earn the higher return from risky investments. But they may fear making their income dependent on the investment skills of a particular insurance company, given principal-agent problems and the very long term irrevocable nature of annuity contracts, which can span 20 years or more. Such individuals, torn between earning low risk-free rates or potentially higher rates that put them at the mercy of the investment policy of an insurance company that they do not fully trust, may end up not purchasing annuities at all. In fact, this may be one of the reasons for the small size of voluntary annuity markets.

One way around this dilemma (advocated by Valdes-Prieto and Edwards 1997 and Valdes-Prieto 1998) would be the development of insurance pools, into which individuals are placed based on their expected longevity, which give annuitants some control over their own investment portfolio. For example, each pool could be associated with a group of mutual funds among which annuitants could choose. Depending on the amount that was initially annuitized, each individual would be assured a given number of annuity units, but the unit value would vary depending on the success of the investments and the mortality experience of each group (see Valdes-Prieto 1998 for a more detailed explication of this idea).

A simpler method that would minimize principal-agent problems would be to link unit values to some well-established benchmark such as the S&P 500.<sup>6</sup> This would only work in a fairly stable financial market where today's benchmark is expected to be a reasonable benchmark 20 years into the future; it would not yet work in most Latin American or Asian countries. In a country like the US, this procedure would allow workers who were less risk averse to capture some of the equity premium. However, it would also require insurance companies to charge more explicitly for their administrative costs, since the profit-earning potential of the risk-intermediation function would be reduced.

Table 1 also summarizes data on the cost of real annuities. In the United Kingdom where government indexed bonds have long been used, but the market for indexed annuities is small, the additional administrative cost of real annuities for men aged 65 is slightly over 5%, while for the United States, where treasury indexed securities were issued only a couple of years ago, in a program offered by one company the incremental administrative cost of real annuities is as high as 16%. Loads for real annuities may in theory be higher because they are purchased by workers with above-average longevity who derive a greater value from inflation protection—but we do not know if this turns out to be true empirically. An alternative explanation for the higher load factor is that, to avail themselves of the asset-liability matching afforded by index-linked government bonds, insurance companies must forego their profits from risk intermediation, while

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<sup>6</sup> Pensioners who do not want to be fully exposed to the volatility of stock market returns may opt for participating annuities or they may use new synthetic annuities that provide protection from the downside risk of equity funds.

if they continue to mediate, they take on greater inflation risk themselves; either way, the consumer must pay more. We are currently conducting a study for the World Bank which will carry out similar calculations for a variety of other countries, including Chile, where indexed annuities dominate, to ascertain what conditions and products lead to a higher money's worth for annuitants.

Finkelstein and Poterba (1999) report money's worth ratios for nominal, real and 5% escalating annuities for the UK compulsory and voluntary annuities markets. They generally find that money's worth ratios are similar to those in the United States for voluntary nominal annuities, while real annuities cost less than in the United States, presumably because of the longer availability of indexed bonds in the UK. They also find that money's worth ratios are higher in the compulsory market, mainly because of a smaller incidence of adverse selection. However, because the UK compulsory market entails an element of choice in that low-income workers may opt to stay with the social security system, there is both active and passive selection in this market, although on a smaller scale than in the voluntary market.

Apart from the numbers derived by these studies, perhaps one of their greatest lessons is the complexity of the calculations involved. While straightforward estimations of the expected present discounted value of annuity payouts are ostensibly involved, this requires highly complicated derivations of the discount and projected mortality rates, with sensitivity analysis given the uncertainty surrounding these rates. When calculations are so complex and nontransparent, it is difficult to argue that individuals have a clear notion of the value of annuities and the extent to which annuity prices may or may not be unfair. Workers may overestimate future interest rates and underestimate their life expectancies, yet another reason why they may refrain from purchasing annuities. Additionally, this analysis points to the need for stronger regulation, higher transparency and better education of workers if they are expected to engage in such calculations upon retirement.

### **III. Modernizing the Insurance Sector**

The insurance sector is expected to play a major part in the disability, survivors' and annuity components of the new pension systems and is in fact likely to be one of the main

beneficiaries of pension reform. However, in most developing countries the insurance sector suffers from major structural problems. A generally repressive regulatory framework has impeded competition, innovation and efficiency. Both premiums and new products are subject to vetting and control by regulatory agencies that are staffed with bureaucrats rather than experienced professionals. A frequent problem is the imposition of investment rules that force pension funds and insurance companies to invest their assets in government bonds with highly negative real rates of return.

The insurance sector in developing countries is often either dominated by one or two state-owned companies, with limited presence of privately owned and foreign companies or it is highly fragmented with a large number of undercapitalized and insolvent companies. Insurance companies are characterized by inadequate capital, low investment returns, high operating costs, lax control over brokers, high levels of receivables, exposure to fraud and unduly high claims by some insured, and protracted disputes and long delays in settlement with most customers. These problems reinforce the mutual mistrust that exists between insurance companies and consumers.

Because of the imposition of tight controls and the absence of reliable data, insurance companies in most developing countries have not developed the technical expertise for pricing risks and setting reserves, while their financial management is inadequate. Data on loss experience are not collected in any systematic way and life tables are not properly constructed. In fact, in most developing countries insurance companies use life tables from advanced countries but pertaining to the patterns prevailing in those countries 20 or 30 years ago. Price competition in the retail annuity market is limited by the information and other search costs involved and by the heavy role that selling agents play, leading to a wide dispersion in annuity prices even in the US and other advanced markets.

Thus, to develop and modernize their insurance sectors, most reforming countries need to undertake radical reforms. These may include restructuring and privatizing dominant state-owned companies, recapitalizing and consolidating a fragmented sector, opening the local market to foreign institutions or to joint ventures with multinational insurance groups, modernizing insurance regulation, enhancing the transparency of insurance policies and annuity contracts, and

creating an effective insurance regulatory authority. Insurance regulation needs to abandon its preoccupation with premium and product controls and prescribed investments and to rely on solvency monitoring and prudent investment policies for ensuring the soundness of individual companies and the protection of policyholders and annuitants. Of major importance is the compilation of current and projected life tables and the publication of comparative tables on the prices charged by insurance companies for different types of products. Training of actuaries and asset managers is essential and in this foreign companies may play a big part.

Most countries in Latin America as well as several Eastern European countries have reformed their insurance sectors. Asian countries are currently reforming their insurance sectors in response to the financial crisis that exposed serious structural weaknesses. In Chile, life insurance premiums, which include disability, term life and annuity premiums, rose from 0.94% of GDP in 1984 to 2.11% in 1996, while the total reserves of life insurance companies grew 2% of GDP to 7% over the same period. In the long run, the reserves of life insurance companies are expected to surpass the assets of pension funds. But in most other countries, life insurance premiums remain very low, while the annuities business is almost nonexistent.

#### **IV. Conclusions and Policy Issues**

We have shown that the development of the payout phase of defined contribution pillars is likely to be a gradual process, as countries learn through experience. One of the key issues for policy-makers to think about, as this system evolves, is how much group rating and how much risk classification should they permit or even encourage? It is interesting to note that in Chile and other Latin American countries group rates are negotiated for disability and survivors' benefits, while the retirement annuity market is still organized on an individual basis. Perhaps a move toward greater individualization for disability (as has recently begun) and more group contracts for annuities (as has recently been considered) would be in order. Group contracts might reduce search, transactions, marketing and adverse selection costs. Risk classification would prevent large amounts of cross-subsidization in inequitable directions (e.g. from short-lived poor people to long-lived rich people) and would avoid the problem that insurance companies might otherwise try to shun "bad risks." Therefore it is critical to get the right mix. One method might

place workers into broad risk categories, with a group rate negotiated for each category with a small number of insurance companies on a competitive bidding basis.

Other policy issues regarding annuities that reforming countries will need to address are:

Should annuitization be mandatory and, if so, at what level? The above discussion leads us to believe that some level of annuitization should be mandatory, but the appropriate level should be modest—designed to keep workers and their families out of old age poverty. Beyond that, households should be given considerable latitude in determining their time-stream of consumption in old age. Moreover, the optimal level of mandatory annuitization depends, in part, on the stream of consumption that workers can expect from durables such as housing that they may own, and on what arrangements society has made for potential lumpy expenditures such as health insurance. Allowing partial lump-sum withdrawals could also avoid the problems of high commissions that is prevalent in Chile. Instead of early pensioning, the rules could allow contribution holidays for workers who have accumulated the necessary amount of capital for a minimum pension.

Should indexed annuities be required to avoid large declines in real income during inflationary periods? This will reduce initial incomes for fixed annuities and may require the individual to forego the benefits accruing from equity investment in variable annuities.

Should variable annuities be permitted? This enables risky investment with high returns to be made, but exposes the individual to volatility at the same time. It may also lead insurance companies to charge higher explicit administrative fees, since their risk intermediation function and profits would be reduced.

Should the gradual purchase of annuities be encouraged, to minimize the exposure of the worker to risk stemming from interest rate fluctuations around his or her retirement date?

(Variable annuities would accomplish the same objective.)<sup>7</sup>

Should joint annuities be required (as they are in Chile), so that spouses are also protected; this may be particularly important given the systematically greater longevity of

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<sup>7</sup> The impact of the gradual purchase of annuities and use of variable annuities is examined in Alier and Vittas, 1999.

women who often have not worked for their full adult lives and have little or no retirement savings accounts of their own.

Which criteria are permissible for risk classification? Race? Occupation? Age of death of parents? Genetic testing? Obviously we have here a conflict between the value of privacy, on the one hand, versus the desire to avoid adverse selection and cross-subsidization on the other hand. Each society must choose its own trade-off here and the trade-off will likely evolve over time.

One of the most controversial such criteria concerns gender—which is not an allowable criterion for employment-related pensions in the United States and some European countries, although it is in most Latin American countries. The argument for unisex tables is that women who have worked should get the same annual benefits in retirement as men, since many such women will not outlive many men, even though the average lifetime of females exceeds that of males; moreover, giving women lower benefits due to their greater longevity may lead to the socially undesirable outcome that very old women live close to the poverty line. The argument against unisex tables is that they imply a redistribution from men to women (including from poor men to rich women), an incentive for insurance companies to “cream” by trying to sell to men rather than women, and financial problems for companies that unexpectedly end up with a disproportionate share of women. This topic, too, is currently under examination at the World Bank. For a discussion of these and other policy issues see Walliser 1998.

In fact, all these policy choices require careful thought and extensive empirical analysis (See James and Vittas 1999 for a first attempt at an international comparative study). Unlike many predictions that are needed to place a value on disability, survivors and annuity insurance, that have a wide margin of error, it is safe to predict that reformed social security systems will make the study of these insurance products a growth industry for many years to come.

**Table 1**  
**Money's Worth Ratios**

		General Population		Annuitants	
		Treasury	Corporate	Treasury	Corporate
US Men 65	1985	0.749	0.677	0.827	0.740
	1990	0.814	0.745	0.912	0.828
	1995	0.816	0.742	0.916	0.825
	1998	0.849	0.772	0.970	0.871
US JLS 65					
	1995	0.841	0.750	0.890	0.788
ILONA US 1998					
	Nominal	0.864	na	0.987	na
	Real	0.702	na	0.822	na
UK Men 65, 1998a					
	Nominal	0.908	na	0.908	na
	Real	0.854	na	0.854	na
UK Men 65, 1998b					
	Compulsory, Nominal	0.897	na	0.944	na
	Voluntary, Nominal	0.865	na	0.953	na
	Compulsory, Real	0.822	na	na	na
	Voluntary, Real	0.791	na	na	na
Compulsory, 5% Escalating		0.858	na	0.922	na
Voluntary, 5% Escalating		0.804	na	0.930	na

**Sources:**

US Men 65 for 1985, 1990 and 1995 (pre-tax): Mitchell et al (1997)  
 US Men 65 for 1998: Poterba and Warshawsky (1999)  
 US JLS 65 (pre-tax): Mitchell et al (1997)  
 ILONA US 1998: Brown et al (1999)  
 UK Men 65, 1998a: Brown et al (1999)  
 UK Men 65, 1998b: Finkelstein and Poterba (1999)

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