Individaul Accounts for Social Security Reform

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Appendix A

Dealing with Financial Market Risk: Guarantees in Individual Accounts

Guarantees can serve as a way of reducing financial market risks for pension participants. This appendix focuses on rate-of-return guarantees during the accumulation phase. First, the Chilean pension system is examined, to provide examples of different types of guarantees, including those for minimum benefits.

GUARANTEES IN THE CHILEAN SYSTEM

The Chilean government provides four guarantees in its private individual account system. First, it promises a minimum pension to workers who have contributed at least 20 years. This commitment is targeted to long-term, low-wage workers and serves as an antipoverty benefit. Second, it guarantees a lower minimum pension to workers who have contributed less than 20 years. Third, it guarantees a minimum rate of return in case a pension fund management company (an AFP) underperforms the limits set relative to the average rate of return received by other pension funds. Fourth, it ensures payments to pensioners receiving annuitized benefits from any insurance company that becomes bankrupt.

The Chilean AFPs are required to provide a relative rate-of-return guarantee for workers while they are accumulating an account for retirement. This guarantee has served as a model in other countries. In the Chilean AFPs, if the rate of return received by a fund is above or below a band around the average rate of return received by all funds, the worker is credited with the maximum or minimum band rate rather than the actual rate of return. The minimum guarantee on the annualized monthly rate of return is 50 percent of the average real rate of return for all pension funds or below the average by 2 percentage points, whichever is lower. Chilean pension fund managers are required to set aside the excess amount into a profitability reserve fund maintained for each pension fund whenever their real rate of return is 50 percent higher than the mean for all pension funds for the preceding 36 months or exceeds the industry average by 2 percentage points, whichever is higher.
Chile switched to a 36-month averaging period from the 12-month period it initially used in order to encourage investment in portfolios with greater risk and to give fund managers wider range for picking portfolios. A criticism of the guarantee with a 12-month averaging period was that it forced all of the pension funds to have similar portfolios, reducing the choices available to participants. That effect on pension portfolios is called “herding” (Chlon, Góra, and Rutkowski 1999).

The Chilean guarantee is an example of ways that a guarantee can be financed—it has three sources of financial underpinning. Should the rate of return on a pension fund fall below the guaranteed rate of return, the fund manager is required to make up the difference through its profitability reserve fund, which contains revenues from times when the rate of return exceeded the maximum allowed. If the reserve fund is inadequate, the pension fund manager must make up the remaining difference from its own reserve fund, provided by the fund’s owners. The fund’s owners must maintain a separate reserve fund using their own money, equal to 1 percent of the pension fund’s assets, invested in the same portfolio as the pension fund. If that also is inadequate, the government makes up the remaining difference, the pension fund management company is liquidated, and the pension fund accounts are disbursed to other companies. The government, using general tax revenue, serves as guarantor of last resort. The government does not charge a premium but provides that insurance without cost to the pension system. Employers play no role in providing guarantees.

This type of rate-of-return guarantee limits the plan-specific risk to workers, which is the risk that the plan’s rate of return differs from the average for all plans. The guarantee has little impact, however, on the bearing of financial market risk, which affects the rates of return received by all plans. For example, during 1995, the average real rate of return in Chile was negative (−2.5 percent) for all pension plans, against which this form of risk-sharing provided no protection.

RATE-OF-RETURN GUARANTEES

The Chilean rate-of-return guarantee is a prominent example of rate-of-return guarantees, but countries with mandatory individual accounts have structured those guarantees in a number of different ways. During the period of work and contributions before retirement, pension guarantees can provide either a minimum level of benefits at retirement or a minimum rate of return. Minimum benefit guarantees can be structured as antipoverty benefits that only
affect low-income workers, with a flat guarantee for all workers. Higher-income workers would not be affected because their benefits would exceed the guaranty amount. Alternatively, minimum benefit guarantees can be structured so that the guaranteed amount differs for each worker, depending on how much has been contributed to his or her pension account.

In structuring guarantees, there is a trade-off between the insurance provided by the guarantee and its cost. While the expected cost of a guarantee is an important factor to consider, it can be difficult to determine.

Rate-of-return guarantees may be absolute with a fixed minimum rate of return, or they may be relative to an index. One type of fixed guarantee is the return of principal: a guarantee of a zero nominal rate of return, which is required in Germany and Japan for voluntary individual accounts (Lachance and Mitchell 2003). A more generous promise is to return the real (inflation-adjusted) value of the principal.

The structure of rate-of-return guarantees for individual accounts can be used as a framework for a survey of the guarantees that countries have provided. The design of these plans can be divided into three elements: the measurement of the rate of return guaranteed, the guarantee’s payoff characteristics, and the guarantee’s financing.

**Measurement of the Guaranteed Rate of Return**

If one were a planner for a mandatory defined contribution system, the first element of constructing a rate-of-return guarantee would be deciding exactly what is to be guaranteed. The rate-of-return guaranteed can be measured in different ways.

**Real or nominal**

Uruguay uses a real rate-of-return guarantee for its individual account plans, adjusting for inflation as measured by the change in consumer prices, while Switzerland uses a nominal one.

**Fixed or indexed**

The guarantee can be a fixed rate of return (either nominal or real) or it can be a rate of return that varies according to a capital market index. The index could be based on the rate of return received on a given asset or portfolio of assets, the actuarial rate of return assumed for an associated defined benefit plan, or the rate of return received by a given group of investors, such as all pension fund managers. The defined contribution plan for teachers in Indiana offers a guarantee based on the actuarial rate of return assumed on the associated
defined benefit plan (Turner and Rajnes 2004). Uruguay uses a fixed rate-of-return guarantee, while Chile uses one that varies according to an index.¹

The averaging period for the guaranteed rate of return

The time dimension on the rate of return can be a fixed period, such as a month, a calendar year, or each consecutive 12-month period, or it can be a cumulative rate of return based on compounding annual rates of return over a longer period. Some plans for government workers in New Zealand use a cumulative rate of return. Before 1999, Chile used an annual rate of return over each consecutive 12-month period. Since then, it has guaranteed a rate of return averaged over rolling 36-month periods. When a longer time period is used, the cost of providing the guarantee declines. This occurs because the volatility of average rates of return is reduced the longer the averaging period. Thus, returns averaged over longer periods are less likely to fall below the guaranteed level.

Explicit or implicit rates of return

A rate-of-return guarantee is equivalent to promising a minimum level of assets in the worker’s pension account, given the contributions. Thus, a guarantee of a minimum level of the pension fund implicitly guarantees a minimum rate of return. Chile uses a guarantee based on explicit rates of return, while the guarantee on mandatory individual accounts in Mexico has an implicit rate of return, that being the rate of return that would be sufficient to provide the guaranteed minimum benefit.

The rate of return guaranteed

The rate of return guaranteed may be the actual one received on the pension portfolio of the participant, or it may be a benchmark rate of return. For example, the guarantee could stipulate that you would receive at least a zero rate of return assuming you had invested in the S&P 500, and, regardless of your actual investment, if the S&P 500 index rate of return was lower, you would receive the difference sufficient to raise a portfolio of your amount to a zero rate of return had it been invested in the S&P 500. A benchmark rate of return would eliminate the problem of moral hazard in the selection of investment portfolios by workers, employers, or pension fund managers, and would allow a wider range of portfolios to be selected. With moral hazard, if workers managed their pension portfolios but the pension fund manager provided the guarantee, workers would have an incentive to invest in very risky assets if the guarantee were based on the actual portfolio returns, rather than on a
benchmark. By investing in risky assets, they would benefit from the upside potential associated with the high risk but would not have to bear the downside risk since that would be limited by the guarantee.

Generally, forms of investment protection generate moral hazard (Whitehouse 2000). Once the losses from a risk are insured, people will take less care to avoid that risk. Chile uses the actual rate of return received but offers workers little choice as to the portfolio that is guaranteed. Feldstein, Ranguelova, and Samwick (1999) propose a guarantee based on a benchmark, which separates worker choice from moral hazard, allowing participants greater choice as to the investment portfolio.

The Guarantee’s Payoff Characteristics

The guarantee’s payoff characteristics can be analyzed in terms of the risk and expected return the worker faces when the guarantee is in place.

Risk-sharing in the guarantee

A minimum guarantee (with the possibility of the worker receiving a higher rate of return) may be offered, versus a point guarantee, where the rate of return the worker receives is specified. Guarantees differ with respect to who receives the investment returns when the rate of return is above the promised level. When this occurs, the institution providing the point guarantee, rather than the worker, receives the entire rate of return above the guarantee.

With a minimum guarantee, the worker can receive the entire rate of return above the promised level, or the institution providing the guarantee may receive part of it. In Chile, workers receive the total rate of return above the minimum and below the maximum, but none of the rate of return above the maximum, that amount being deposited into a reserve that is used to fund the rate-of-return guarantee. This is a form of hedging, with the risk of loss being lowered by reducing the potential gain. In Poland, workers receive the entire amount above the minimum guaranteed level. In Switzerland, most mandatory plans pay the fixed guaranteed rate regardless of whether the actual portfolio return is above or below that rate.

The application frequency of the guarantee

The guarantee period determines the point at which the guarantee is exercised. It can be at a fixed interval, such as a quarter or a year, so that it is a series of successive guarantees; alternatively, it can be a cumulative guarantee, so that the period is from the start until the end of the worker’s participation, and the guarantee is based on the termination value of the person’s account. A
cumulative guarantee can provide that the rate must exceed a minimum cumulated rate at the end of every year or only that it must exceed that rate at the end of participation in the plan. Some of the guarantee funds in Hong Kong require a minimum stay in the plan in order to qualify for the guarantee.

**The extent of liability of the guarantor**

The guarantor, or the party making the guarantee, can have limited or unlimited liability. When the guarantor has limited liability, there is a cap on the expenditure the guarantor is required to make. This is analogous to caps in health insurance policies.

**The risk that the guarantee will be changed**

The guarantee may be viewed as an enduring promise or as one that is likely to be revised in the future. All commitments have some likelihood that they will be changed, but this probability is greater with fixed rate-of-return guarantees than with relative ones, which have more flexibility. With the bear market in the early 2000s, a number of mandatory individual accounts with fixed nominal guarantees lowered the guarantee rate. For example, Switzerland, which had set its guarantee at 4 percent for many years, reduced that rate to 2.5 percent in 2003.

**The type of insurance provided**

A guarantee can be set fairly high relative to the expected return (a non-catastrophic guarantee), or it can be set low so that it only provides protection against a low rate of return (a catastrophic guarantee).

**Mandatory or voluntary**

The guarantee can be mandatory or voluntary, and this aspect can differ for employers and employees. For example, it could be voluntary for employers to offer, but employers could stipulate it for all their employees. Alternatively, it could be mandatory that employers providing a defined contribution plan offer a guarantee as an option, but it could be voluntary for employees to choose that option. In Norway, the parliament proposed, but subsequently rejected, a guarantee that would be voluntary for employers in that they would not be required to provide such a plan, but would be mandatory for workers at firms that chose it. In Hong Kong, the mutual funds may offer a guaranteed fund as an alternative, and it is voluntary for employees to select that option.
The Financial Backing for the Guarantee

Guarantees require a source of funds to provide their financial backing.

**Funded or pay-as-you-go**

Guarantees can be fully or partially advance-funded or they can be pay-as-you-go financed. The guarantee on mandatory individual accounts in Chile is partially funded, with the government having a residual liability on a pay-as-you-go basis if the private sector funding for guarantees is insufficient.

**The party financing the guarantee**

A guarantee can be financed by the employee, the employer, the pension fund management firm, or the government. In Chile, the guarantee is partially financed by the employee in that, in some periods, part of the rate of return received on the worker’s account is set aside to finance the guarantee. It is partially financed by the pension fund management company, which must set aside some of its own money to finance the guarantee. It also is partially financed by the government, which is the insurer of last resort.

**The party insuring the guarantee**

The party insuring the guarantee, which is not necessarily the same as the party financing the guarantee, can be an employer, a pension fund provider, an insurance company, or the government. For the United States, Jefferson (2000) has proposed a rate-of-return guarantee for individual accounts financed by employer premiums paid to the Pension Benefit Guaranty Corporation, which would then insure the guarantee.

**The Cost of Guarantees**

Whether providing a guarantee is a desirable option depends in part on the cost of the guarantee, which varies greatly with its features. Clearly, the higher the rate of return guaranteed, the greater its expected cost. The guarantee of the return of principal has very low cost when applied over a period of years.

The cost of a guarantee of return of principal when the underlying investments are restricted to bonds declines with increases in the investment period and is practically nothing after seven years. The cost of the same guarantee for an asset invested only in equities also falls with the length of the investment period but is still 2.7 percent after 20 years (Maurer and Schlag 2003).
Features of a guarantee that increase the likelihood that it will be effective also raise its expected cost in the following ways.

- A guarantee that restricts the underlying portfolio to bonds is less costly than one that is based on equity investments. Generally, the greater the investment risk, the greater the cost of the guarantee (Lachance and Mitchell 2003).

- A real rate-of-return guarantee of zero (return of real principal) is more expensive than a nominal rate-of-return guarantee of zero because the real return would have to compensate for inflation.

- Similarly, real rate-of-return guarantees of greater than zero tend to be more expensive than nominal rate-of-return guarantees because the former promise automatically to adjust upward (in nominal terms) for changes in inflation.

- Rate-of-return guarantees that apply for short periods (such as a year) are more costly than guarantees for longer periods (such as three years) because fluctuations in rates of return can be averaged out within the longer guarantee period.

- Guarantees in which there is no ceiling on the rate of return received are more expensive to provide than guarantees with a maximum limit, with the excess returns above that point going into a fund to finance the guarantee in the future.

To give an idea of the expense of guarantees, for someone with a 40-year investment horizon who holds a portfolio that is half bonds and half stocks, the cost of guaranteeing the 10-year Treasury bond return would be 0.65 percent of assets annually, nearly doubling to 1.27 percent for an all-stocks portfolio (Lachance and Mitchell 2003). This is expensive, considering that a low-cost equity index mutual fund would have fees of about 0.20 percent of assets annually. If, instead, the guarantee was the return of nominal or real principal, the cost would drop to 0.02 percent for the real principal guarantee and approximately zero for the nominal principal guarantee (Lachance and Mitchell 2003).

**What Guarantees Accomplish**

The relative and fixed rate-of-return guarantees are designed for different purposes. A relative guarantee ensures that, at a particular point in time, all participants will receive a similar rate of return. It, however, provides no protection against a decline in market rates. A fixed guarantee is designed to protect against declines in market return. However, the three-year decline in
world capital markets, starting in 2000, showed the limits to fixed rate-of-return promises. A number of countries with such policies reduced the guaranteed rate. For example, Switzerland, which requires a guaranteed rate of return for its mandatory employer-provided pensions, lowered the rate because of the decline in returns in financial markets.

GUARANTEES IN MANDATORY INDIVIDUAL ACCOUNTS AROUND THE WORLD

Because of concern for the level of financial risk borne by workers, many mandatory defined contribution systems provide guarantees. This survey of rate-of-return guarantees around the world indicates the range of approaches that have been developed. Table A.1 gives an overview, summarizing the presence and types of guarantees found in mandatory defined contribution systems. A few countries with mandatory individual accounts do not offer guarantees (e.g., Australia, Bolivia, Sweden). Among the majority that do provide them, the guarantees can be categorized as either being relative or absolute. Table A.1 is organized by type of guarantee, while the text, which provides greater detail, is organized by region of the world. Countries were selected for discussion so as to provide examples of the different types of guarantees.

Latin America

Uruguay

Uruguay permits both private and government management of pension funds. For the state-owned fund management company, the government guarantees a minimum annual real rate of return equal to 2 percent. If the fund earns less for a year, the government transfers money to the fund to make up the difference. The private pension fund management companies must maintain a guarantee fund, used to supplement pension accounts of workers if the return of their portfolios falls below a defined minimum rate of return: the lower of 2 percent real and the average industry return minus 200 basis points (2 percentage points). This regulation may create a competitive disadvantage for the private companies, which must bear the costs of maintaining the guarantee fund (Mosconi 1997), and seems to have contributed to the dominance of the state-owned fund in the pension industry, which ranks among the most highly concentrated in Latin America.
### Table A.1 Guarantees in Mandatory Defined Contribution Systems

<table>
<thead>
<tr>
<th>Country and type of guarantee</th>
<th>Level of guarantee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries with no guarantee</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td></td>
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<tr>
<td>Bolivia</td>
<td></td>
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<tr>
<td>Latvia</td>
<td></td>
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<tr>
<td>Mexico</td>
<td></td>
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<tr>
<td>Sweden</td>
<td></td>
</tr>
<tr>
<td>Countries with an absolute level guarantee</td>
<td></td>
</tr>
<tr>
<td>Denmark (ATP plan)</td>
<td>4.5% nominal</td>
</tr>
<tr>
<td>Singapore</td>
<td>2.5% nominal</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2.5% nominal</td>
</tr>
<tr>
<td>Countries with a relative guarantee</td>
<td></td>
</tr>
<tr>
<td>Argentina (private only)</td>
<td>70% of the average nominal rate of return for all plans or 2 percentage points below, whichever is lower</td>
</tr>
<tr>
<td>Chile</td>
<td>50% of the average real rate of return for all plans or 2 percentage points below, whichever is lower</td>
</tr>
<tr>
<td>Colombia</td>
<td>Minimum based on a composite of the average performance of all pension funds and the performance of the country’s three stock exchanges</td>
</tr>
<tr>
<td>Hungary</td>
<td>Minimum rate set each year, depending in part on expected market rates</td>
</tr>
<tr>
<td>Poland</td>
<td>50% of the average nominal rate of return for all plans or 4 percentage points below the average, whichever is lower</td>
</tr>
<tr>
<td>Uruguay (private only)</td>
<td>2 percent real or the average return of the system minus 2 percentage points (200 basis points), whichever is lower</td>
</tr>
</tbody>
</table>

NOTE: This table necessarily involves some simplification in its categorization and description of guarantees. Refer to the text for a fuller description of the individual countries.

In setting an absolute rate-of-return guarantee, Uruguay differs from most other reform countries in the region (Argentina’s absolute guarantee applies only to the state-run pension fund manager, Administradoras de Fondos de Jubilaciones y Pensiones [AFJP]). The return is calculated monthly on a rolling basis.

**Mexico**

Mexico does not provide an explicit rate-of-return guarantee, but, during the transition phase of its system, it provides an implicit assurance through its minimum pension guarantee. While “transition” may suggest a short time period, this phase actually lasts decades. Workers who were already participating in the old system when the reform was instituted have the option when they attain age 65 (with 25 years of contributions) of receiving a benefit based on their defined contribution plan or on their former social security plan. If the former social security’s plan benefits are higher, the defined contribution funds are taxed at 100 percent and the government pays the old benefit level. The government decided to offer this “life-switch” option instead of acknowledging the previous contributions of transition workers through recognition bonds, as in Chile. There, workers were given special government bonds to compensate them for the benefits they had accrued under the old social security system. Once the old system is completely phased out, this guarantee will no longer be provided. The government supervisory organization, Comisión Nacional del Sistema de Ahorro para el Retiro (CONSAR), requires that at least 51 percent of a worker’s account balance be invested in inflation-linked bonds; this stipulation provides another guarantee aspect of the system (Sinha 1999).

**Central and Eastern Europe: Hungary**

Hungary has second-tier defined contribution funds, with a traditional defined benefit social security plan constituting the mandatory first tier. Workers are required to choose a fund to which they contribute. Several guarantees apply to these pension funds. First, each year, prospectively, the Private Fund Supervisory Board sets the minimum and maximum rates of return that may be received on fund accounts. Second, at retirement, each worker is guaranteed to receive a minimum benefit from his or her pension fund. Hungary has a mandatory defined benefit pension that will provide a replacement rate of 48.8 percent after 40 years of contributions. The defined contribution plan is guaranteed to provide a pension benefit equal to at least 25 percent of that of the mandatory defined benefit plan after 15 years of contributions (Hungary 1997).
The Hungarian mutual associations that manage pension funds are required to maintain rate-of-return guarantee reserves. If the rate of return on the fund’s investments exceeds the maximum rate of return, a portion of the surplus (the portion determined by government decree) is transferred to the return guarantee reserves. If the return on the fund’s investments is less than the required minimum return, funds from the reserves are transferred to the worker’s individual account. The reserves are required to be no lower than 0.5 percent of the funds in the individual accounts. In years when the reserves are less, 0.5 percent of the workers’ contributions are deposited into the reserves.

The benefits in these funds are further insured through a central Guarantee Fund in which all pension funds must participate, at a required rate that varies between 0.3 and 0.5 percent of contributions to the pension funds. In addition, Hungarian law requires that the average annual value of the Guarantee Fund may not be less than 0.3 percent or more than 1.5 percent of the total combined assets of the funds it is insuring. The Hungarian government may order Hungarian pension funds to make special contributions to the Guarantee Fund if the assets of the fund are insufficient to meet its financial obligations. Moreover, it may borrow from the National Bank of Hungary, with the central budget of the government of Hungary guaranteeing repayment of the loan. If the assets of the Guarantee Fund exceed the upper limits allowed, it will suspend the required payment of contributions from pension funds.

Thus, the Guarantee Fund provides a backup if the pension fund cannot fulfill the minimum rate of return. It also guarantees the minimum benefit, providing the additional funds if the worker’s account is insufficient.

Mandatory Individual Accounts without Guarantees

While most countries with mandatory individual accounts provide rate-of-return guarantees, some do not. In certain cases, the latter have regulations that limit the financial market risk that plans can take; alternatively, the plans may provide a small part of retirement income, being a second tier on top of basic social security. Latvia has established a second-tier mandatory defined contribution system without a rate-of-return guarantee. It has strict limits on the investments that pension funds can hold, which reduce the risk of these funds and form a partial substitute for a guarantee. Sweden has a mandatory second-tier defined contribution plan without a rate-of-return guarantee; however, the plan has a required contribution rate of only 2.5 percent, compared to one of 16 percent for the notional defined contribution plan that forms the first tier. Australia does not provide a minimum rate-of-return guarantee, but it offers a relatively generous means-tested benefit that serves as a form of benefit guarantee. If the contribution rate for the mandated individual accounts is com-
paratively low, and the program is a second tier on top of a relatively generous social security plan, a rate-of-return guarantee is typically not provided.

**CONCLUSIONS**

Perhaps the most important criticism of mandatory defined contribution systems, although one not accepted by all pension analysts, is that they may place too much financial market risk on workers. This view depends in part on the size of the plans and whether they are add-ons or carve-outs from traditional defined-benefit social security programs. Because of this concern, most mandatory defined contribution systems that provide the majority of retirement benefits offer benefit or rate-of-return guarantees. (See the discussion of guarantees and financial market risk in Chapter 1 of this book.)

Among countries that provide guarantees, these are typically backed by some type of reserve or insurance fund, often with the government providing further support if those sources should fail. In Switzerland, by contrast, the first source of backing is additional contributions by employers. The reserve funds are often financed through contributions from the pension fund in years when the rate of return exceeds a set level, but in some countries special contributions are made by employers or employees into the funds.

Many of the countries providing rate-of-return guarantees do so relative to a financial market index. These features limit the extent to which participants will receive different rates of return, which is an inherent aspect of allowing participants choice as to how their accounts are invested, but do not protect against capital market risk. Absolute rate-of-return guarantees, however, may provide protection against some degree of capital market fluctuations; the three-year decline in financial markets starting in the year 2000 proved that these types of guarantees can prove to be too expensive to maintain during a prolonged downturn.

**Note**

1. Pennacchi (1999) has analyzed the guarantees used in Uruguay and Chile, while Lindset (2001) analyzes guarantees more generically.