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John A. Turner and David M. Rajnes

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The Pensions Institute
Cass Business School
City University
106 Bunhill Row London
EC1Y 8TZ
UNITED KINGDOM

http://www.pensions-institute.org/

# Relative Rate of Return Guarantees for Social Security Defined Contribution Plans: What Do They Accomplish?[1]

John A. Turner

AARP

Washington, DC

Jturner@AARP.org

3713 Chesapeake St. NW

Washington, DC 20016

USA

David M. Rajnes

EBRI

Washington, DC

Rajnes@EBRI.org

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# Abstract

Many social security defined contribution systems provide a rate of return guarantee. Relative guarantees, the most common type used, are tied to an index. This article compares the guarantees used by Argentina, Chile and Poland, which represent the range of relative guarantees provided around the world in mandatory defined contribution systems. This comparison indicates that the structure of guarantees does matter. The guarantee in Chile generally provides a higher real rate of return, less variability in the real rate of return, and better protection against inflation than do the guarantees in Argentina and Poland.

While defined benefit plans have traditionally been the mainstay of social security retirement income systems, following Chile's lead a number of countries during the 1990s and into the 2000s have adopted mandatory defined contribution plans as part of their social security systems. In spite of their growing popularity, some analysts argue that these plans place too much financial market risk on risk averse workers, particularly lower and middle income workers, when they provide a major part of the worker's retirement income (Gillion, Turner, Bailey and Latulippe 2000). Because of concern for the level of financial risk borne by risk averse workers, rate of return guarantees are a central feature of many social security defined contribution systems (Turner and Rajnes 2001).

This article analyzes the minimum rate of return guarantees provided by social security defined contribution systems during the period before retirement when workers are accumulating retirement assets. It discusses the guarantees used in social security defined contribution systems in three countries that represent the range of guarantees provided in mandatory systems -Argentina, Chile and Poland. It discusses how the guarantees work--their structure and financial backing-- and what they accomplish.

## Types of Guarantees in Social Security Defined Contribution Pension Systems

When mandatory defined contribution plans incorporate a rate of return guarantee, they usually use a relative guarantee. A relative guarantee sets a minimum rate of return relative to an index, such as the average rate of return for all pension funds or the rate of return on government bonds. It is similar in some respects to the requirement to invest in an index fund, such as a fund that mimics a stock market index like the Standard and Poor's 500 index. The guaranteed rate rises and falls with movements in the index.

Governments establish relative guarantees in part out of concern for equity across

workers. When social security programs with defined contribution individual account plans allow individual workers a choice among pension fund providers with different investment portfolios, those guarantees limit the range of rates of return available to participants within a system at a point in time.

Minimum relative rate of return guarantees are also a means of monitoring and controlling the performance of social security pension funds, assuring that no fund performs significantly worse than the rest. In the absence of such a guarantee, a fund may underperform its competitors because its portfolio is significantly different, because its expenses are considerably higher, or because of its financial incompetence or malfeasance. A minimum relative rate of return guarantee also protects against the possibility that low income and low education workers systematically make poor choices concerning pension fund managers, ending up with a lower rate of return than more sophisticated workers. As workers gain more experience with the system, this concern, and thus this reason for a guarantee, lessens.

Because of costs to the pension fund management companies when they underperform and fail to meet the guarantee, guarantees contain incentives to maintain a portfolio that will meet or exceed the guarantee. With a relative rate of return guarantee, pension funds are encouraged to maintain a portfolio similar to that of the pension fund industry, whose rate of return forms the index, a practice called “herding.” To do so, they must incur costs to monitor the portfolios of their competitors and to adjust their portfolio to match them accordingly. The guarantee reduces the range of choice available to pension participants with respect to portfolio risk and expected return. An effect of

these restrictions thus is that some participants who may have preferred a less risky or more risky portfolio than was available are unable to make that choice.

Rate of Return Guarantees in Chile, Argentina and Poland

Three countries--Chile, Argentina and Poland--provide examples of the types of minimum rate of return guarantees used in social security defined contribution systems around the world, and permit a comparison across regions. When considering the functioning of these guarantees, it is useful to examine the details of how the guarantees are provided.

Chile. Chile has the oldest and best-known mandatory defined contribution system. That system replaced a traditional defined benefit social security system for all new workers entering the system. The mandatory defined contribution system forms the first tier of the Chilean retirement income system. It provides a relative guarantee that has been a model for other countries in Latin America and Eastern Europe.

The guarantee for nearly twenty years was based on the average (arithmetic mean) real rate of return for all pension funds over the previous 12 months, but the period has been raised to 36 months to give Chilean pension funds more flexibility in managing their portfolios, with the change being phased in. Thus the level of the rate of return guaranteed varies from month to month as the rolling 36-month average changes. The minimum guarantee g is 50 percent of the average real rate of return r or 2 percentage points less than the average, whichever is lower.

$$g = \min\{.5r, r-2\} \qquad (1)$$

If the rate of return received by a fund falls below that minimum, the worker's pension account is credited with the minimum rate rather than the actual rate of return.

Whenever the real rate of return is 50 percent higher than the average for all pension funds over the preceding 36 months or exceeds that average by 2 percentage points, whichever is higher, Chilean pension funds are required to set aside the excess investment income into a reserve fund. The worker's pension account is credited with the maximum allowed rate rather than the actual rate.

In 1999, the Chilean guarantee mechanism, which had been used since the pension system's inception, was reformed. Besides extending the averaging period from 12 to 36 months, the new requirements require each pension fund manager to offer two funds instead of one: one to be invested in a diversified portfolio as before and another fund whose assets are to be invested only in fixed income securities. Each worker must choose one fund in which to participate. Both types of funds are subject to the separate relative rate of return guarantee described above.

The 1999 reform addresses the criticisms that the relative rate of return guarantee induces all pension fund managers to maintain similar portfolios and reduces the amount of portfolio choice available to workers. Importantly, the reform allows workers, especially those nearing retirement, to shift to a lower risk portfolio. Without the alternative fixed-income fund (with its own guarantee), a relative rate of return guarantee could force risk averse workers to hold riskier portfolios than they prefer.

The Chilean guarantee has multiple sources of financial backing. Should the rate of return on a pension fund fall below the guaranteed rate, the fund manager is required to make up the difference through the pension fund's reserve fund. If that fund proves inadequate, the pension fund manager must make up the remaining difference from its own reserve fund. The owners of the management company must maintain this reserve fund, using their own capital, equal to one percent of the assets of the pension fund. It is invested in the same portfolio as the pension fund. If this fund should also prove inadequate and the pension fund management company cannot meet the guarantee, then any shortfall is made up from government funds, the pension fund management company is liquidated, and the pension fund accounts are disbursed to other pension fund management companies.

The government, using general tax revenue, serves as guarantor of last resort. It does not charge an insurance premium to pension funds for providing this guarantee. Moreover, it backs the guarantee on a pay-as-you-go basis. Employers play no role in guaranteeing benefits.

Argentina. Argentina also has a mandatory defined contribution system with privately-owned pension funds (AFJPs). The guarantees in its system contain several differences from the guarantees provided in Chile.

The minimum rate of return guarantee is defined in nominal instead of real terms. Private pension funds must pay at least 70 percent of the overall pension industry average nominal rate of return R or no less than 2 percentage points below that average,

whichever is lower.

$$g = \min\{.7R, R-2\} \qquad (2)$$

Maximum returns that can be credited to workers' accounts are set at the higher of either 30 percent above the mean for all pension funds or 2 percentage points above (Mitchell and Barreto 1997).

In addition to pension funds operated by privately-owned pension fund management companies, the state-owned bank-- Banco de la Nacion—also maintains a pension fund management company. This company is required to meet the guarantee that applies to the private pension funds, but is also required to provide a second guarantee not provided by the private funds. When a worker retires, becomes disabled or dies, the balance in the worker's account is guaranteed an amount equal to that which would have accumulated had the contributions, less fees, been deposited in a standard savings account. This cumulative guarantee provides significant protection for workers who start in the system close to retirement. However, for workers who have worked many years under the system, it is unlikely that the guarantee will have much effect because financial market rates of return have been higher on average than rates of return on savings accounts.

Regarding the financial backing of the guarantee, pension fund companies are required to maintain a reserve within the pension fund as in Chile. The reserve fund is credited with investment earnings when the rate of return received is greater than the

maximum level allowed. If the reserve fund remains at a level greater than 5 percent of total fund assets for more than two years, the pension fund must transfer the excess into the individual accounts.

In addition, each pension fund management company must establish a reserve fund equal to 2 percent of the assets it manages, with the capital for that fund supplied by the owners of the company. The Banco de la Nacion pension fund management company must also maintain both of these reserve funds. However, the cumulative rate of return guarantee that is provided exclusively by the Banco de la Nacion pension fund is backed directly by the Banco de la Nacion. As in Chile, the government is the guarantor of last resort for all pension funds and provides this insurance without charge to pension funds.

Poland. The mandatory defined contribution pension funds in Poland form the second tier of the Polish retirement income system. A traditional defined benefit social security system forms the first tier (Chlon, Góra, and Rutkowski 1999). At the end of each quarter, the supervisory agency calculates the average nominal rate of return for all pension funds, weighted by the asset size of fund, for the past 24 months. The longer averaging period in Poland than in Chile or Argentina provides greater flexibility for pension funds. Any pension fund management company that fails to receive a rate of return of at least 50 percent of the average or 4 percentage points below the average return, whichever is lower, must make additional payments to the fund to raise the rate of return to the minimum.

$$g = \min\{.5R, R-4\} \qquad (3)$$

An important difference between the guarantee in Poland versus those operating in Chile or Argentina is that a maximum allowable rate of return is not set. This difference in the guarantee has an important effect on how the guarantee is financed. There is no reserve fund financed by investment returns that would otherwise be received by workers, as in Argentina and Chile. Instead, the guarantee payments are made first from a reserve which the fund manager must finance of between one and three percent of total fund assets, depending on the size of the fund. These assets are invested exactly as the other assets of the fund portfolio. If the reserves become insufficient, then the fund management is obliged to pay from its own assets. If those are also insufficient, the fund manager will be declared bankrupt, and the national guarantee fund will make up the shortfall.

The national guarantee fund is managed by the national securities depository agency. Guarantee fund assets come from mandatory pension fund fees paid to the guarantee fund and the investment income of the guarantee fund . The total value of the guarantee fund cannot exceed 0.1 percent of all pension funds' net assets. If a deficit occurs in the guarantee fund, the state budget covers its liabilities.

What Do They Accomplish?

To examine how the guarantees work over time under different economic conditions, the level of protection provided to workers by the rate of return guarantees is compared for Chile, Argentina and Poland. Table 1 compares the nominal and real levels of the guaranteed rate of return under three different sets of scenarios. Table 2, which is

derived from Table 1, evaluates the guarantees against four criteria. The scenarios vary the average nominal and real rates of return assumed to be received by all pension funds and the inflation rate. In each scenario, one of the variables is held constant while the other two vary. In the first set of scenarios, the real rate of return remains constant while the other two parameters vary. In the second set, the nominal rate of return is constant, and in the third set the inflation rate is constant. These scenarios were selected for the purpose of demonstrating how the guarantees function with respect to changes in the real and nominal rates of return and the rate of inflation. The scenarios were not chosen to mimic a historical period.

The guarantee for Chile, which is based on real rates of return, is obtained in Table 1 in nominal terms by first calculating the guaranteed real rate of return (equation 1) and then adding to that the inflation rate. For example, in scenario 1.a the real rate of return r is 2 percent, the inflation rate i is 4 percent, and the nominal rate of return R is thus 6 percent (R=r+i). To calculate the guarantee level, using equation 1, we compare one-half of the real rate of return (1 percent) versus 2 percent below the real rate of return (0 percent). Since the latter is lower, 0 percent is the real guarantee rate of return. By adding the four percent inflation rate to that guarantee level, we calculate a nominal guaranteed rate of return equal to 4 percent. Other guarantees are similarly determined in nominal terms, with their real value determined by subtracting the inflation rate.

## Four Criteria to Assess the Rate of Return Effects of the Guarantees

The effects of the guarantees across different economic scenarios are assessed against four criteria.

1. Does the guarantee reduce the variability across scenarios in the real rates of return received by workers?

Regarding Chile, a comparison across the three scenarios indicates that the guaranteed rate of return varies less than or equal to the range of real portfolio rates of return specified. Thus, the guarantee in Chile is capable of reducing the variability in the real rate of return received by workers.

For the other two countries, which have nominal rate of return guarantees, the real rate of return guarantee implied by their nominal rate of return guarantee varies, even though the real rate of return itself is constant. Thus, the real value of the guarantees in the other two countries changes in some circumstances by more than does the real rate of return received on the pension portfolio.

Across the three countries, the range of guaranteed real rates of return in Chile is less than or equal to that for the other countries in all scenarios. Thus, according to this criterion, the guarantee in Chile provides better protection for workers than do the other two guarantees, because it provides a smaller, and thus less variable, range of guaranteed rates of return.

A closer examination, however, indicates this effect depends on the variety of rates of return actually received. For all three countries, over a range of rates of return centered around zero the guarantee has no effect on the variability of rates of return received. For rates of return outside that range, however, the guarantee reduces the variability in rates received. For Chile, lying between the real rates of return of –4.0 percent and 4.0 percent, the guarantee level is always 2 percentage points below the real rate of return. Over this range--the "flat" segment of the guarantee function—changes in

the guarantee level correspond exactly to changes in the real rate of return, and the guarantee has no effect on reducing rate of return variability. For real rates of return above 4.0 percent or below –4.0 percent, however, the guarantee level increases half as fast as does the benchmark average rate of return. Thus, the guarantee rate has less variability than the average rate of return only for average rates of return in those ranges.

In Argentina, the range over which the guarantee level varies exactly in line with variations in the benchmark rate of return is from –6.67 to 6.67 percent nominal, while for Poland the range is from negative to –8.0 to 8.0 percent nominal. These two ranges do not directly compare with the range for Chile, which is for real rates of return.

2. How do the guarantees compare across countries at different levels of the real rate of return?

The real rate of return is allowed to change in the second scenario, where the nominal rate of return is fixed, and in the third scenario, where the inflation rate is fixed. In comparing outcomes across the three countries, the level of protection against changes in the real rate of return varies depending on the level of return. When the pension industry average real rate of return rate is high, the guaranteed real rate of return is highest in Argentina (scenarios 2.c and 3.c). When the average real rate of return is low (scenario 2.a), the guaranteed real rate of return is highest in Chile. Under "normal" conditions with moderate real rates of return (scenarios 1.a, 1.b, 1.c), the guarantee provided by Chile is generally the highest, followed by Argentina, and then Poland.

3. How do the guarantees compare in terms of protection against inflation?

At low inflation rates, the guaranteed rates of return using the guarantees in Argentina and Chile are equal in most scenarios, with Argentina providing a higher guarantee in some scenario (scenarios 2.c, 3.c). At higher inflation rates, the Argentinian guaranteed rate, which is based on a guarantee of a nominal interest rate, is generally lower than for Chile and thus the Argentinian guarantee generally provides less protection against inflation than does the one in Chile (scenarios 1.c, 2.a). At all levels of inflation, the guaranteed rate is lower in Poland than in Chile, and generally lower than in Argentina.

4. Do the guarantees reduce the variability in the nominal rates of return received by workers?

The guarantees in Argentina and Poland tend to reduce the variability in the nominal rate of return received by workers over time. The real rate of return guarantee in Chile reduces the variability in the nominal rate of return in some scenarios but increases it in one scenario set (scenario 2, real return varying but nominal return constant). However, arguably the reduction in variability in nominal rates of return is not as important a consideration as reducing the variability in real rates of return.

In sum, the features of the rate of return guarantee do matter. These comparisons indicate that the guarantee in Chile generally provides a higher guaranteed real rate of return, less variability in the real rate of return, better protection against inflation, and better protection in "worst case" scenarios than do the guarantees in Argentina and Poland.

## Conclusions

Perhaps the most important criticism of mandatory defined contribution systems, though one not accepted by many pension analysts, is that they place too much financial market risk on risk averse workers. This criticism takes on greater weight when a mandatory defined contribution system provides a large part of retirement income. Because of this concern, the majority of mandatory defined contribution systems provide rate of return guarantees. The guarantees provided are nearly always relative rate of return guarantees.

While these guarantees are similar in some respects to the requirement of investing in an index fund, they have been structured so as to serve three functions. First, they reduce the variability in real rates of return guaranteed compared to the variability in real rates of return received on the pension portfolio, at least over some range of rates of return. Second, they assure a degree of equity across workers, in that they limit the range of rates of return that can be received across workers at a point in time, limiting the inequality in account balances across workers. Third, they are a way of monitoring and regulating pension fund providers.

A comparison for Argentina, Chile and Poland demonstrates that the structure of the guarantees does matter in terms of the degree of protection they provide. This comparison indicates that the guarantee in Chile generally provides a higher guaranteed real rate of return, less variability in the real rate of return, and better protection against inflation than do the guarantees in Argentina and Poland.

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Table 1. Level of Guarantees in Country-Specific Mandatory Defined Contribution Systems Under Three Different Economic Scenarios

(rates in percent)

| ASSUMPTIONS | | | COUNTRY-SPECIFIC LEVEL OF NOMINAL GUARANTEE RATE (real rate in parentheses) | | |
|---|---|---|---|---|---|
| Inflation Rate | Average Rate of Return nominal | real | Chile | Argentina | Poland |
| *Scenario 1: Varied inflation rate with average real rate of return constant* | | | | | |
| (a) 4 | 6 | 2 | 4(0) | 4(0) | 2(-2) |
| (b) 6 | 8 | 2 | 6(0) | 5.6(-0.4) | 4(-2) |
| (c) 8 | 10 | 2 | 8(0) | 7(-1) | 5(-3) |
| Range* 4 | 4 | 0 | 4(0) | 3(1) | 3(1) |
| *Scenario 2: Varied average real rate of return with average nominal rate of return constant* | | | | | |
| (a) 12 | 10 | - 2 | 8(-4) | 7 (-5) | 5 (-7) |
| (b) 4 | 10 | 6 | 7(3) | 7 (3) | 5 (1) |
| (c) 2 | 10 | 8 | 6(4) | 7 (5) | 5 (3) |
| Range* 10 | 0 | 10 | 2(8) | 0(10) | 0(10) |
| *Scenario 3: Varied average real rate of return with inflation rate constant* | | | | | |
| (a) 4 | 5 | 1 | 3(-1) | 3(-1) | 1(-3) |
| (b) 4 | 10 | 6 | 7(3) | 7(3) | 5(1) |
| (c) 4 | 12 | 8 | 8(4) | 8.4(4.4) | 6(2) |
| Range* 0 | 7 | 7 | 5(5) | 5.4(5.4) | 7(5) |
| Overall Range** 10 | 7 | 10 | 5(8) | 5.4(10) | 5(10) |

Note: Guarantee rates correspond to the result from equations 1 – 3 in the text.

* The "Range" is the difference between the highest and lowest number in the column for that set of scenarios.

**The "Overall Range" is the difference between the highest and lowest in the entire column.

Note: the average nominal rate of return is the average across pension funds, which is used as the benchmark for the guarantee.

Source: authors' calculations.

Table 2. Evaluation of Guarantees Against Four Criteria

| Criteria | Parameter Before Guarantee | Chile | Argentina | Poland |
|---|---|---|---|---|
| 1. Real variability (percentage point range) | 10 | 8 | 10 | 10 |
| 2. Protection against low real rate (real level of guarantee in percent) | -2 | -4 | -5 | -7 |
| 3. Protection against inflation (nominal rate of inflation and guarantee) | 12 | 8 | 7 | 5 |
| 4. Reduced nominal variability (nominal percentage point range) | 10 | 5 | 5.4 | 5 |

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Source: Table 1

**1.The opinions expressed here do not represent the position of AARP or EBRI. We have received valuable comments from Raul Rofman, Salvador Valdés-Prieto, participants of the PRIG and epensions Internet groups, and participants at seminars at the Public Policy Institute of AARP, the US Bureau of Labor Statistics, the US Social Security Administration, and a conference organized by Birbeck College and the National Institute of Economic and Social Research.**