## NOTA DE LOS EDITORES

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## NOTE OF THE EDITORS

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# PENSION SYSTEMS AND REFORMS: COUNTRY EXPERIENCES AND RESEARCH ISSUES

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**Abstract:**

*Pension reform is spreading around the globe, ranging from Latin America to OECD countries, with current discussions of major reform projects in many other developing, transition, and OECD economies. This paper surveys current research issues and country experiences related to old-age security arrangements by introducing the papers selected for this special issue of RAE and the July 1994 Conference on Pension Systems and Reforms sponsored by Fundação Getúlio Vargas. It also poses 15 research and policy design issues not addressed by the literature, ranging from macroeconomic effects to political-economy conditions of pension reform, to old-age poverty and the role of government, and design features of fully-funded pension systems.*

## 1. Introduction

Pension reform is a major policy initiative offered by governments to aging populations fed up by failing old-age security arrangements. The spreading of pension reform around the globe is occurring at a growing speed. It ranges from Latin America (Chile 1981, Mexico 1991, Peru 1993, Argentina 1994 and Colombia 1994) to OECD countries (Switzerland 1985, Australia 1992), with current discussions of major reform projects in most other Latin American countries, some OECD economies, and many developing countries in Asia and Eastern Europe. The next few years will witness an exponential growth of pension reform. A conservative estimate is that 30 major country-wide pension reforms will have been started by the year 2000.

These pension reform programs –although initiated in a large variety of countries– have common ingredients. The new brand of mandatory pension proposals typically comprises two elements: a pillar of fully-funded saving based on individual pension

accounts, with investments channeled to a variety of public and private long-term instruments often selected and managed by the private sector, and a complementary state-run distributive pillar in support of the old-age poor. They involve a radical departure from the still dominating conventional pension paradigm in three dimensions: (i) substitution of a pay-as-you-go scheme by a fully-funded arrangement for (at least part) of old-age saving, (ii) more explicit separation of the distributive component from the non-distributive pillar, and (iii) (frequently) private management of collection of contributions, investment of pension fund savings, and/or payment of pension benefits.

Mandatory old-age security systems are indeed among the most multi-dimensional and complex economic arrangements developed by modern societies. They involve macroeconomic and welfare issues resulting from how they affect saving and output by inducing intergenerational transfers, capital and labor market distortions, and public finance effects ranging from tax efficiency questions to deficit financing issues. Pension systems also affect intragenerational equity and old-age poverty –in ways which often differ from those intended by the systems' stated distributive objectives. They also impinge on the role of the private sector, the functioning of capital and insurance markets, and the need for government regulation and insurance. Finally, the political economy of pension systems and reforms is a complex outcome of actions by many interest groups, such as worker and employer organizations, pensioners, public pension institutions, private pension funds, and the government. It is hard to think of economic arrangements other than pension systems that involve simultaneously so many markets and people and such large financial resource flows.

This paper surveys current research issues and country experiences related to old-age security arrangements by introducing the papers refereed and selected for this special issue of *Revista de Análisis Económico* and the July 1994 Conference on Pension Systems sponsored by Fundação Getúlio Vargas in Rio de Janeiro. In a policy field characterized by exponentially growing country experiences it should not surprise that many more analytical and policy questions are raised than answers are provided by researchers –let alone agreements reached on many contentious issues. Hence we also pose in this paper some of the remaining research questions –those which we face more often in policy discussions or think are addressed in a least satisfactory way by the literature known to us.

Section 2 reviews the papers. Section 3 poses questions for future research. The conclusions are left to the reader.

## 2. Answers to Open Questions and Reviews of Country Experiences

### 2.1. *Macroeconomics and Intergenerational Welfare* [1]

The seminal contributions by Samuelson (1958) and Diamond (1965) have introduced the two-cohort overlapping-generations (OLG) model to analyze the main public finance, accumulation, and intergenerational welfare dimensions of public debt and old-age security arrangements. A major extension of Diamond's (1965) two-cohort OLG model is Auerbach and Kotlikoff's (1987) many-generations OLG dynamic model, which provides a realistic number of interacting cohorts and has been successfully applied to analyze issues ranging from pension systems to taxation. It is particularly useful in showing the impact, transition and steady-state effects of mandatory pension systems and reforms. Applications of the Diamond-Auerbach-Kotlikoff (DAK) framework to Mexico (Arrau 1990), Chile (Arrau 1991), and



representative economies (Arrau and Schmidt-Hebbel 1993) have been used to assess the dynamic and macroeconomic effects of pension reforms involving substitution of PAYG systems by FF schemes based on individual accounts.

Additional results on intergenerational-transfer and Pareto-efficiency aspects of pension systems and reforms have been obtained during the last decade. Substituting fully-funded (FF) systems for pay-as-you-go (PAYG) schemes implies a transfer toward future generations when part of the transition deficit is financed by taxation on intermediate tax-paying cohorts –a transfer which is only avoided when new explicit government debt is issued (or other government assets like public enterprises are sold) to substitute for the initial and implicit PAYG debt. Tax-financed transfers toward future generations–like any other contractionary fiscal policy in a world of incomplete bequests– raise saving and welfare levels of future cohorts and, in a closed economy, increase capital and output levels. If both general taxation and PAYG contributions are not distortionary, Pareto-efficiency is not affected by the reform (Breyer 1989). The more realistic case is when both forms of taxation are distortionary. Then a PAYG-FF reform raises Pareto-efficiency by eliminating the pure-tax component of PAYG contributions but reduces Pareto-efficiency by increasing general taxation to pay for a tax-financed transition or for the interest payments on the higher explicit government debt[2]. Hence a pension reform has at least in theory ambiguous Pareto-efficiency effects. If PAYG contributions are more distortionary than general taxation, the Pareto-efficiency gain of a reform allows to completely repay the new explicit government debt in finite time (Homburg 1990).

Most of the literature until 1990 has focused on the simple OLG model for the polar cases of closed or small-open economies, and in the absence of voluntary intergenerational transfers (including bequests), myopia, credit constraints, and uncertainty. These assumptions have been lifted by the following work, which has broken new ground recently.

The effects of introducing PAYG in the intermediate case of a large open economy, which affects international interest rates, may be very different from those obtained in the polar cases of closed or small-open economies. Breyer and Wildasin (1993) show that starting PAYG implies an additional terms-of-trade gain (loss) when the economy is a net creditor (debtor) of the rest of the world, derived from an increase in international interest rates. In a multi-country setting with free migration, government debt and pension systems –relevant for the European Union– national PAYG schemes that are not harmonized across countries result in inefficient international allocation of resources (Homburg and Richter 1993).

When some people are more myopic (have higher discount rates) than others within their cohorts and also face credit constraints, introducing a mandatory FF system forces them to save involuntarily, raising long-term capital and output but lowering private welfare levels in a closed economy. Valdés-Prieto and Cifuentes (1993) and Cifuentes and Valdés-Prieto (1994) show that under these conditions the potential effects of a PAYG-FF reform are magnified.

Even when people are uncertain with regard to the cohort they belong to (and hence with regard to their level of future taxation), PAYG is not welfare improving along most growth paths (Richter 1993). But when PAYG is able to spread productivity risk across cohorts it can raise welfare (Enders and Lapan 1993). The opposite result holds when PAYG implies larger political uncertainty affecting PAYG benefits than the financial uncertainty on FF returns; then a reform can be Pareto-welfare improving (Valdés-Prieto 1994a).

In sum, the DAK model for life-cycle saving and mandatory pension regimes has been extremely successful in teaching economists and policy makers the stylized features, dynamics, and intergenerational equity trade-offs of old-age security arrangements. For instance it helps dispel the wide-spread but wrong notion –held by over-enthusiastic pension reformers time and again– that substituting PAYG by FF raises future saving and output levels even in the absence of intergenerational transfers and efficiency gains. It also contributes to dispel the incorrect idea –often held by opponents to pension reform– that pension reform transition deficits contribute to public sector insolvency and macroeconomic instability, even when public debt instruments are available and used for substituting the old implicit PAYG debt by new explicit government debt in a market where fiscal illusion is absent.

In this issue, Rodrigo Cifuentes (1994) uses Arrau's (1991) dynamic simulation model to address an issue that inspires many pension reforms. The financial collapse of many PAYG systems, due to growing benefits and rising dependency ratios, has led policy makers to propose higher retirement ages as a solution to growing pension system deficits. Chile, Germany, Italy and Japan have increased retirement ages to 65 years and the United States has raised it to 67 years. Cifuentes simulates an increase in retirement age and estimates the welfare effect for every cohort during the transition period and the new steady state. He finds that the welfare impact on those cohorts which are close to retirement age can be substantial, reaching between 10 and 15% of their welfare (wealth-equivalent) levels. This result points toward the need to be careful when raising retirement ages in order to minimize disproportionately high welfare costs paid by reform-transition cohorts.

Most research on social security has been conducted in the framework of one-sector OLG models with exogenous long-term growth, where pension reform can only involve level effects on output and welfare but not impinge on stationary growth rates. Can social security reform affect output growth in the context of a two-sector economy with endogenous growth?[3]

This question is addressed by Giancarlo Corsetti (1994, this issue). He develops an endogenous growth model for a two-sector economy, where the difference between the formal and informal sectors is that the former complies with social security legislation and hence pays pension contributions. Using an "AK" technology where capital has an external effect on labor productivity and is the ultimate productive resource, Corsetti assesses the magnitude of labor market distortions associated with different pension regimes and analyzes conditions under which a PAYG-FF reform raises the rate of capital accumulation and output growth allowing for reform-induced changes in the structure of production. In general, because of conflicting income and substitution effects, the change in consumption and growth cannot be determined unambiguously. However, illustrative simulations suggest that the long-run positive effect of a PAYG-FF pension reform on growth may be sizeable. The dominant cause of the growth increase stems from the incentive to shift labor toward the formal sector, while possible intergenerational transfer effects due to a tax-financed transition are secondary.

### 2.2. *Income distribution, Poverty and the Role of Government*

Reducing poverty at a rate exceeding output growth should be a policy objective in every society. Public policy should aim to reach this goal at the lowest possible efficiency cost. Solidarity and income redistribution have been raised as central objectives by advocates of PAYG systems devised for providing both retirement



income (and other social benefits) and income redistribution toward the old-age poor. However, defined-benefit PAYG pensions are typically not income tested and PAYG resource transfers often redistribute income among contributors and beneficiaries in ways which do not benefit the truly needy but serve interest groups successful in lobbying legislatures and state pension system administrations.

Salvador Valdés-Prieto (1994b, this issue) provides an innovative review of the rationale of using the pension system as a tool for redistribution. He compares the pros and cons of the redistributive objective of a universal PAYG system with its main competitor, a targeted program benefitting the old-age poor. He argues that the latter approach should be adopted by pension reform proposals in developing countries. Substituting PAYG by FF requires replacing the distributive function implicit in the PAYG system –the political feasibility of such a reform often depends on finding an effective redistributive substitute. Valdés-Prieto also performs steady-state simulations based on the DAK framework, concluding that substitution of a redistributive PAYG scheme by a non-redistributive FF system (even without putting in place a separate minimum-pension pillar financed by general taxation) can raise income and welfare levels of the poor in the long run when part of the transition deficit is tax-financed. For the transition period a support program for the poor is needed, for which the paper recommends a targeted transfer and shows that this program can be financed with public debt without jeopardizing the long run gains.

One of the main distributive instruments available to the government for targeting the old-age poor is the guarantee of a minimum pension to all contributors to the pension system. In a PAYG system, the government can raise contributions paid by all currently active workers when current contribution levels are insufficient to finance minimum-pension benefits. In a defined-contribution individual-capitalization system the government must resort to general tax revenue to pay for this program. In the latter case the government bears the risk of workers ending up with insufficient funds to cover a minimum-pension equivalent at the end of their active lives. Therefore the contingent minimum-pension liability of the government depends on the riskiness of the assets in which pension funds are invested. We know little about the value of this contingent liability or even how to approach this issue analytically. The government liability depends on several variables, including the level of the minimum pension, the rate of contribution, the administrative costs of the system, and the riskiness of the assets in which the funds are invested, etc. The latter is perhaps the most difficult aspect to assess and the one that requires most sophisticated modelling.

Salvador Zurita (1994, this issue) takes a very important first step to address this issue for the case of Chile. Previous work on estimating the minimum pension liability for the government has used deterministic methods (Wagner, 1991), and therefore ignore the risk factor. Zurita estimates the riskiness (volatility) of pension fund assets and introduces this information in a continuous time option-based model in order to compute the insurance cost to the government. He uses numerical solutions of the model to find this cost by gender, age and income level. After aggregating the different groups, he obtains a total cost to the government that amounts to 3% of GDP. This figure is considerably higher than previous figures obtained with deterministic methods, which stresses the need to incorporate the risk factor into consideration. Zuritas' approach is an excelent framework to encourage further work in this important area.

## 2.3. *Social Insurance Policy, Private Pension Systems, and Public Pension Funds*

Social insurance policy –encompassing pension, health and social welfare programs– is a central component of government action but seldom subject to close scrutiny based on first principles. Lawrence J. Kotlikoff (1994, this issue) lays out a framework for evaluating social insurance policies enacted by governments and supported by multilateral financial institutions. He proposes that intra and inter-generational accounting, complemented by consideration of effective marginal tax rates facing different households, should be the main tool to evaluate sustainability, incentive effects, and intra/intergenerational distribution effects of fiscal policy in general and social insurance arrangements in particular[4]. Then he analyzes the rationale for government risk pooling to be provided in addition to the insurance acquired privately by households. Here the focus is on potential market imperfections and the need to conduct careful household studies to assess the effectiveness of private risk sharing and hence the rationale for complementary government insurance policy. Finally Kotlikoff analyzes the U.S. as a basket case of inefficient social insurance policy in OECD countries, concluding that U.S. PAYG social insurance has three main perverse effects: the PAYG transfer to the elderly that accounts –in combination with the modality of pension annuity payments– for most of the decline in national saving; excessively high effective marginal labor income taxation that provides strong disincentives to work in the formal sector; and intragenerational redistribution that occurs in capricious ways.

Private pension systems are more frequently proposed as alternatives to state-run social security. To qualify as a viable alternative, private social security requires to provide pension and social insurance benefits efficiently. But the design of an optimal market structure and its competitive nature is far from trivial. A private social security system comprises workers (required to save funds for retirement and acquire insurance for covering invalidity and survivorship risks), pensioners, and two groups of private providers (pension fund management companies –PFMCs– and insurance companies). In addition, strong and effective government regulation is required. If governments already regulate voluntary financial transactions in response to externalities, perverse incentives and monopolistic market structures often found in financial markets, the rationale for government regulation and supervision is even stronger for mandatory retirement saving and invalidity/survivorship insurance where government guarantees on savings and insurance funds are significant while serious conflicts of interests may arise between fund owners and managers[5]. Chile's 13-year experience of a particular private social security system provides various lessons. A privatized mandatory pension system based on defined contributions saved in individual accounts protected by private property rights, like the Chilean system, appears to provide protection against many sources of political and budgetary risk embedded in public defined-benefit systems (Diamond 1994a).

Peter Diamond (1994b) focuses in this issue on some worrying features of the Chilean system. While he underscores the advantages in protecting social security from political interference and the indirect benefit of deepening the financial sector, he raises tough questions regarding administrative costs and the low insurance protection of defined-contribution systems. Reliance on choice of PFMCs by individual workers has contributed to high administrative and sales costs in Chile[6]. PFMCs have raised significantly their sales forces to attract new affiliations in response to competitive pressures. In order to reduce excessive sales costs, Diamond suggests to regulate the demand for private fund management by forcing people to purchase pension services



on a group basis. Another issue raised by Diamond is the low insurance protection provided by the Chilean system of defined contributions. The risk of the length of working life, of arriving at retirement age with a long expected life and of dying before retirement, which cannot be translated into higher consumption in case of surviving, are all problems of defined contribution plans which according to Diamond are better solved by defined-benefit plans.

Not only private pension funds are subject to current inquiry. Mitchell and associates have researched the behavior of public pension funds covering state and local employees in the United States, showing that pension funding and returns are linked to fund board composition and regulatory constraints (Mitchell and Smith, forthcoming; Mitchell and Hsin 1994). In this issue, Ping-Lung Hsin and Olivia Mitchell (1994) provide statistical evidence on the determinants of actuarial assumptions and contribution rates in a sample of 325 U.S. state and local government plans in 1992. They show that economic determinants (such as unemployment rates, unionization of plan participants, and pension plan reserves) and measures of pension plan governance and management practices (such as the fraction of board members elected by plan participants, plan issuance of financial reports, and frequency of independent audits) have statistical influence on the plans' assumed interest rates, assumed spread rates, amortization periods, required contributions, and actual contributions. An implication of the paper is that public pension funding may become more sensitive to strategic selection of interest rates and other key assumptions with rising fiscal pressure and when they are managed by participant-run boards.

## 2.4. *Regional and Country Experiences*

Pension systems are and will be reformed on a world-wide scale. As social security systems and reforms tend to share certain features within regions, it is appropriate to assess them at a regional level. Due to the magnitude of their pension system problem, their reform intensity, or their innovative value for future experiences, we have chosen three developing regions for selective surveys of social security arrangements: East Asia, Eastern Europe, and Latin America.

The survey by Frederick Ribe (1994, this issue) of pension systems in Indonesia, Malaysia, Singapore, and Thailand identifies structural features and policy problems in these countries[7]. The four pension systems share a basic feature: they are fully-funded defined-contribution schemes managed by centralized provident funds with a heavy concentration of fund portfolios in public-sector and housing mortgage liabilities. However, the degree of centralization and labor force coverage differs in the four countries, ranging from central funds for all workers in Malaysia and Singapore to decentralized provident funds in Indonesia and Thailand, and from comprehensive coverage in Malaysia to very little coverage in Thailand. Defined-contribution systems in East Asia have avoided the labor market distortions of PAYG schemes but have failed in providing adequate replacement rates and, with the exception of Singapore, adequate population coverage. The paper recommends to diversify portfolio investment toward private sector liabilities (to minimize the risk of misuse of pension funds and raise the risk-return benefits to contributors) and to limit the frequent demands for PAYG plans (motivated by lower replacement rates) to minimum-benefit programs, complementing existing funded defined-contribution schemes which should continue to dominate pension systems.

In the countries of Eastern Europe and the former Soviet Union (FSU) pension systems are just one of all economic institutions subject to deep systemic change. Post-socialist transition provides the opportunity to reform pension systems in Eastern Europe and the FSU along the lines followed today in Latin America. However it seems that many of these countries are adopting state-run PAYG schemes prevalent in Western Europe, under the pressure to conform to European Union institutions and foreign advisors[8].

Robert Holzmann (1994, this issue) points out the main deficiencies of pension systems in Eastern Europe and the FSU, characterized by low retirement ages and old populations, high contributions unrelated to pension benefits causing severe labor market distortions, output reductions reflected by increasing pension system losses which burden fragile government budgets, and ineffective poverty alleviation of poor pensioners. The paper recommends pension reform two proceed on two tracks: (i) reforming coverage criteria, raising retirement ages, and revising benefits of the current PAYG scheme, and (ii) adopting defined-contribution fully-funded privately-managed systems. The design of pension reform should allow for Pareto-efficient transition features and growth externalities derived from full funding. Holzmann concludes that there is limited scope for swapping existing government assets for the huge implicit social security debt[9] –hence transition deficits will require financing by other means– and suggests that financial sectors are still insufficiently developed to provide the minimum conditions for starting fully-funded schemes now.

State-run defined-benefit pension systems in Latin America were often started as fully-funded schemes but evolved into de facto PAYG schemes due to misuse of fund reserves during their first decades of existence. The maturation of both pension systems and country populations has made apparent the failures of conventional state PAYG schemes in Latin America: rising deficits spilling into fiscal balances or leading to ever-increasing payroll taxation and labor-market distortions and informalization; perverse redistribution toward powerful interest groups while old-age poor remain insufficiently protected; and underdeveloped capital markets. These failures of unreformed pension systems are largely similar to those observed in Eastern Europe and the FSU, although the size of fiscal losses and market distortions is smaller in Latin America due to its earlier stages of demographic transition and system maturity, as well as lower population coverage. However, the weaknesses of conventional state PAYG systems in Latin America have led to an explosion of pension reforms, started by Chile in 1981 and continued since 1991 by a host of other countries[10].

Andras Uthoff (1994, this issue) diagnoses the features of selected Latin American economies and their pension systems, and presents a comparative evaluation of the 1981 Chilean pension reform and the reform projects started in Argentina and Colombia during 1994. There are strong common elements in these reforms, reflected by two co-existing pension system components: a FF defined-contribution pillar based on individual accounts, typically managed by the private sector, and a complementary distributive pillar financed and run by the government. Uthoff concludes that these features address many of the shortcomings of pre-reform state PAYG schemes by promoting: isolation of pension funds from demographic and system maturation trends, deepening of emerging capital markets, protection of the fully-funded privately-managed pillar from political pressures by separating it from the state-run pillar, and reaping efficiency gains in pension fund administration and investment.

At the other end of the spectrum of pension reform in Latin America are many countries, like Brazil, where the discussion of alternative reform proposals is just



starting. Two reform proposals for Brazil's pension system are included in this issue. While they share a common diagnose of the shortcomings of Brazil's current state PAYG scheme, their prescriptions differ.

José L. Carvalho and Clovis de Faro (1994, this issue) make a radical reform proposal for Brazil, inspired by the Chilean experience, which combines raising retirement ages to 65 years and substituting a FF system based on individual accounts for the current PAYG scheme. The paper develops an actuarial estimation of the corresponding reform transition deficit, abstracting from general-equilibrium feedback effects arising from reform-induced changes in wages, real interest rates and output levels. Estimates of the reform deficits start at 5.3% of GDP for the first year of the reform, falling gradually to 2.5% of GDP in the 10th year and to 1% of GDP and below in the 30th year and beyond[11]. Due to the significant reduction in pension benefits of the old system as a result of higher retirement ages, the authors estimate that these moderate transition deficits could be paid by maintaining current employer contributions (while employee contributions are channeled to the new FF system), phasing them out in tandem with declining deficits.

Renato Fragelli, Uriel de Magalhães, Helio Portocarrero, and Luiz Guilherme Schymura (1994, this issue) underscore that Brazil's current PAYG system remained roughly balanced in the 1980s as a result of high inflation. Their proposal for pension reform also raises retirement ages (to a range of 60-65 years) but differs from the preceding Chilean-type reform proposal by suggesting substitution of Brazil's current system by a scheme comprised by four pension pillars. The mixed system would include a first tier of a minimum-pension benefit paid universally and financed by general taxation, a second defined-benefit state-run PAYG tier financed by mandatory contributions from all workers, a third defined-contribution privately-run FF tier financed by mandatory contributions from all workers, and a final tier of voluntary complementary retirement savings accounts favored by tax deductions. The rationale for the second PAYG pillar –which is absent from the preceding reform proposal– is that it allows to reduce the fiscal cost of the transition, at the cost of preserving a partial PAYG scheme.

## 3. Remaining Issues for Future Research and Policy Design

After introducing the contributions published in this issue, we raise now 15 remaining research and policy design issues which still have not been addressed conclusively by these papers or the existing literature on pension systems and reforms.

### 3.1. *Factor Markets, Growth, Intergenerational Welfare, and Mandatory Saving*

It is often argued that a PAYG system inhibits the deepening of financial and capital markets (and the development of appropriate financial regulation) which would be observed when pension funds demanding long-term debt instruments were allowed to operate in a FF scheme. There is tentative evidence linking Chile's 13-year experience with a growing FF and privately-managed system to its financial development, private saving surge, improved financial regulation, and high growth (Corsetti and Schmidt-Hebbel 1994). But more systematic evidence in support of this notion is still lacking.

The well-known labor-market distortion associated to PAYG contributions in the one-sector exogenous-growth DAK model leads to a reduction in output and welfare levels. Corsetti (1994, this issue) shows that potentially much more significant growth losses arise when taking account of the incentives provided by PAYG taxation to shift employment and production from formal to informal sectors in an economy with endogenous growth. A natural extension of this work is to allow for varying both the sectoral composition and the aggregate level of employment and to test for the empirical weight of employment shifts relative to overall employment reductions as a result of PAYG taxes.

While we know the qualitative long-term effects of pension reform, we still do not know much about their size. Conventional exogenous-growth DAK models show little long-run effects of PAYG systems and PAYG-FF reforms. Auerbach and Kotlikoff (1987) estimate that introducing PAYG in the U.S. reduces stationary GDP by 5% and Arrau and Schmidt-Hebbel (1993) estimate that a fully taxed-financed PAYG-FF reform raises stationary GDP by 3-5% in representative closed economies. Cifuentes and Valdés-Prieto (1994) estimate that the long-term GDP increase caused by a mostly tax-financed reform in a representative closed economy ranges from 5% without credit constraints to 16% with credit constraints. While the latter result is a clear indication of how important it is to lift certain restrictive assumptions (in this case the absence of credit constraints), we are still far from realistic estimates of short and long-term macroeconomic effects of pension reform, taking into account accurately the extent of bequests, myopia, credit constraints, uncertainty, financial openness, and endogenous growth response in real-world economies.

While most reform simulation results based on exogenous-growth studies show little steady-state effects of a PAYG-FF pension reform, they report massive intergenerational welfare redistributions among cohorts during the first decades after the pension reform is started. These intergenerational redistributions are very sensitive to life lengths, dependency ratios, and the way transition deficits are financed –and, most of all, to the lack of offsetting voluntary intergenerational transfers in standard OLG models. Therefore the question arises about the empirical relevance of the OLG model compared to the representative-consumer or optimal-growth model –the two "distinct dialects of the broad language we call 'neoclassical growth theory' " (Azariadis 1993, p. xiii)– in assessing macroeconomic and distributional consequences of pension reform.

Is a mandatory FF pension system an optimal long-term arrangement or should it be outphased once its main objectives have been achieved? Two possible benefits of mandatory FF in comparison to both mandatory PAYG and voluntary saving systems are that the former could make people more aware of the need to save for retirement (reducing the extent of myopia) and contribute to capital market deepening and the removal of market imperfections (possibly reducing the incidence of borrowing constraints, informational deficiencies, and moral hazard). However, among the costs of a mandatory FF scheme in comparison to a voluntary scheme are the government guarantees on mandatory pension funds and the welfare reduction of those groups which are forced to save in excess of what they would save voluntarily. A comparison of FF costs and benefits raises the issue of the optimal size of FF saving and its gradual downsizing over time toward a level of mandatory saving required to finance a socially-acceptable minimum pension.



### 3.2. *Intragenerational Distribution, Poverty, the Role of Government, and Political Economy*

For economists it comes natural to advocate direct programs targeted at the old-age poor, financed by general taxation, to embody the distributive function of a pension system. However, in practice it is often hard to separate the distributive function from the dominating pension pillar, for reasons which include political constraints to the reform, administrative costs and stigma effects of targeting effectively the poor through means testing, and fiscal constraints to raise general tax revenue to finance a separate minimum-pension program. The proposals by Ribe (1994, this issue) for East Asian countries and Fragelli *et al.* (1994, this issue) for Brazil include a small-scale distributive PAYG pillar to cover minimum pension benefits. complementing a dominating FF system, while Valdés-Prieto (1994, this issue) argues against this alternative. These divergent positions reflect how far we still are from reaching a consensus on this important design issue.

Other distributive issues arise within a private FF system. In the Chilean system (as opposed to the Colombian case), contributors are charged both a variable and a fixed commission by PFMCs. Such a structure can reflect efficiently the costs of individual account management and portfolio investment but the fixed commission has a regressive impact on the poor. Should the government subsidy the fixed commission, financing the subsidy by using general tax revenue? Another group affected by replacing a PAYG system by a FF system are women who loose the subsidy they enjoy in PAYG systems due to their longer life expectancy.

Zurita (1994, this issue) initiates a promising line of research on an important design issue: governments should know the cost of the minimum-pension insurance they extend to workers, especially when this benefit is financed by general tax revenue. He has shown that it is important to consider the volatility of asset returns in addressing this question correctly. Future research based on this framework is important to quantify the cost of these contingent liabilities incurred by governments as part of their pension system reforms.

A reform which substitutes a privately-managed FF system for a state-run PAYG scheme implies reform losers and winners. The big losers are the initial state social-security institutions which are phased out (as in Chile) or reduced in size (as in Colombia), while the big winner is the private sector. Not surprisingly, state pension funds often tend to oppose social security reform in Latin America. In the meantime, the private sectors –keen to win significant shares in the new market of PFMCs early on– lobby governments hard to accelerate reforms and approval of private PFMCs. Should management and workers of losing state social security institutions be coopted through early retirement or other subsidy schemes? While this political-economy question has hardly a general response, it requires to be addressed by any country launching a pension reform.

### 3.3. *Private Pension Funds: Consumer Selection, Insurance, Portfolio Composition, and Starting-Up Conditions*

Consumer selection of PFMCs can be taken: (a) by the government on behalf of individuals (as in state-run PAYG schemes or by forcing affiliation to a single fully-funded pension fund as proposed by Kotlikoff 1994, this issue, for Bolivia); (b) on a strictly individual basis (as in Chile); or (c) through a close representative, such as the

employer (as in Switzerland), the union (as in Australia) or an employee of the county of residence (to represent independent and small-firm workers). Effective consumer choice is typically broadened (either at the individual level or delegated to a close representative) when a competitive privately-managed system is introduced in order to put the necessary competitive pressures on private providers. Is delegation to a representative superior to individual choice? Diamond (1994b, this issue) and Arrau, Valdés-Prieto and Schmidt-Hebbel (1993) argue that the international experience, with delegated choice in Australia and Switzerland, and individual consumer choice in Chile, strongly favors the former alternative. Substantial economies of scale in contracting providers and lower marketing costs seem to justify delegated consumer choice. However, the challenge is to design a collective contracting arrangement that promotes competition by fund managers without introducing principal-agent problems between the representative and the workers.

Something similar happens when a worker reaches retirement and decides between buying a pension annuity or a programmed (or lump-sum) withdrawal. Chile's experience suggests that this decision is costly to workers, as reflected by high brokerage fees and low implicit interest rates paid by insurance companies. Among alternative institutional arrangements is a centralized auctioning mechanism that would replace brokers and force insurance companies to compete more strongly to provide pension services.

A closely related design issue raised by Kotlikoff (1994, this issue) is how pension benefits should be made. Should the pension system make lump-sum distributions (or allow for programmed withdrawals) or, alternatively, should it provide pension annuities? While the latter option hedges the risk of the date of death, it implies higher old-age consumption, smaller bequests, and a lower demand for children, hence leading to lower national saving and fertility.

Another design issue is related to Diamond's (1994b, this issue) concern about the low insurance protection provided by defined-contribution systems to older workers. In fact, when a worker is close to retirement his pension wealth is at great risk because it is invested in a portfolio exposed to strong short-term fluctuations. In order to hedge against this risk, options along the line of defined-benefit programs could be considered for workers close to retirement. For instance, PFMCs could be required to offer (or contract out in the marketplace) pension floors three to five years before retirement age. On the other hand, lump-sum or programmed withdrawal has the potential moral-hazard effect of over-consumption by pensioners supported by the government's minimum pension floor. Adverse selection problems are also associated to this option.

International diversification of pension fund portfolios is desirable because it allows pensioners to improve their combination between risks and returns. Investing abroad also precludes pension funds (and PFMCs) from acquiring excessive market power in local capital markets. However, international portfolio diversification comes at the potential cost of higher international financial volatility (including sharpened equity price and exchange rate fluctuations in response to rapid international portfolio reallocations) and loss of monetary policy autonomy (Davis 1994, Fontaine 1994, Reisen and Williamson 1994). This issue is particularly relevant for fully-funded private pension systems in small countries (like Bolivia) where the risk-return gains from investing abroad are huge relative to those in larger countries and in medium-sized economies (like Chile) where outstanding pension assets have reached large shares of domestic equity or GDP. Kotlikoff's (1994, this issue) proposal for Bolivia favors complete international risk diversification by instructing simply the Bolivian



pension fund to hold the world portfolio. The need to strike a balance between the microeconomic benefits of open capital accounts and its macroeconomic costs is urgent for the growing number of countries regaining access to foreign capital flows and starting privately-managed funded pension systems.

Which financial and capital-market requirements should be met before a privately-managed FF scheme can be started? One view on this is to wait until domestic financial and capital markets are fully developed and effective government regulation and supervision of banking, insurance, equity, and bonds markets are in place, in order to minimize the risk of pension reform failure. An alternative view is that only a minimum set of financial markets –banks and a primary market for government debt– is required at the start of a private FF system[12]. Further development of financial instruments, capital markets and adequate regulatory and supervisory institutions would be an endogenous consequence of the growth of private pension funds. This issue is of central importance to Eastern Europe and the FSU, where property rights are still being defined, banks are burdened by large bad debts, and capital markets are almost non-existent. The great challenge faced by pension reformers in that region is to put a minimum set of legal and market conditions into place without forfeiting the opportunity of introducing a privately-managed FF pension system. However, "what the minimum conditions for the financial sector are and how they can be introduced rapidly is still open for discussion" (Holzmann, 1994, this issue).

## Notes

1 Arrau and Schmidt-Hebbel (1993), Felderer (1993) and Corsetti and Schmidt-Hebbel (1994) survey the theoretical and empirical literature on macroeconomic and intergenerational welfare effects of pension systems and reforms.

2 On the relative efficiency of income taxation (which is the general tax considered by the simulations discussed in this paper below), Auerbach, Kotlikoff and Skinner (1983) conclude from second-best theory that income taxation will not always be more efficient than wage or payroll taxation; "rather, the relative efficiency of the two taxes will depend on the particular structure of preferences" (Auerbach and Kotlikoff, 1987, p. 80). Auerbach and Kotlikoff's (1987, Table 5.7, p. 77) simulation results for a switch from income to wage taxation in the U.S. show efficiency losses for six and efficiency gains for one of their parameter combinations. This could suggest that efficiency gains are more likely than efficiency losses when substituting payroll by income taxation in real economies.

3 The recent endogenous-growth literature is providing underpinnings for the notion that changes in capital and labor market efficiency have permanent effects on growth rates (St. Paul 1992). Recent work on two-sector (formal-informal) models with endogenous growth suggest that sectoral shifts are important (Laoyza 1993). Therefore the question arises about the growth effects of a PAYG-FF pension reform which reduces distortions in formal labor markets, promoting a shift of employment and production from informal to formal markets.

4 Previous work on generational accounting methods and applications include Auerbach, Ghokale and Kotlikoff (1994), Auerbach, Ghokale, Kotlikoff and Steigum (1993), Franco *et al.* (1991), Ghokale, Kotlikoff and Sabelhaus (1994), and Kotlikoff (1992).

5 See Arrau, Valdés-Prieto and Schmidt-Hebbel (1993) and Valdés-Prieto (1993a) for surveys of alternative market structures and private fund governance arrangements.

6 See Valdés-Prieto (1993b) for a comparative analysis of administrative costs of the Chilean pension system in an international context.

7 Among other studies of East Asian pension systems and reforms are Shome and Saito (1979), Kalijaran and Wiboonchutikula (1986), Lim (1986), Queisser (1991), Mesa-Lago (1992), Hirtz (1992), Tjabyi (1993), and Vittas (1993.

8 Among recent studies of pension systems and reforms in Eastern Europe and the FSU are Hobbs *et al.* (1991), Diamond (1992), Jenkins (1992), Holzmann (1993), Fox (1993), Johnson (1993), and World Bank (1994).

[9] A recent study for OECD countries (Van den Noord and Herd 1993) reports calculations of net implicit public pension liabilities (the present value of accrued pension rights as a ratio to 1990 GDP0, which range from 113% in the U.S. to 259% in Italy.

[10] On pension systems and reforms in Latin America see Mesa-Lago (1978, 1990, 1992, 1993), Mc Greevey (1990), Uthoff and Szalachman (1991, 1992, 1994), and Fundación Friedrich Ebert de Colombia (FESCOL) (1992). Among the country studies are the following. For Chile: Wallich (1983), Baeza and Manubens (1988), Cheyre (1988), Arrau (1991, 1992, 1994), Iglesias and Acuña (1991), Piñera (1991), Marcel and Arenas (1992), Vittas and Iglesias (1992), CIEDESS (1992), Gillion and Bonilla (1992), and Diamond and Valdés Prieto (1994). For Argentina: Feldman (1992), Schulthess and Demarco (1993),and Bour and Urbiztondo (1994). For Colombia: C. López (1992), H. López (1992), Contraloría General de la República (1992), Ocampo (1992), Ramírez (1992), Zuleta (1992), Lora, Zuleta and Helmsdorff (1993), and Ministerio de Trabajo y Seguridad Social de Colombia (1993). For Brazil: Schymura (1992), Faro (1993), Médici, Oliveira and Beltrao (1993), Williamson and Pampel (1993, ch. 7). For Peru: Canales-Kriljenko (1991, 1992) and Marcos Rueda (1992). For Paraguay: Arrau and Bitrán (1992). For Mexico: Arrau (1990).

[11] These figures are similar to Chile's pension reform transition deficits, which started at 3.2% of GDP in 1982, reached a peak of 4.8% of GDP in 1992, after which they are projected to decline gradually, reaching 1.5% of GDP in 2015 (Arrau 1992).

[12] This was proposed by Arrau and Bitrán (1992) for Paraguay. Arrau, Valdés-Prieto and Schmidt-Hebbel (1993) discuss in more detail both the capital market and institutional requirements for starting a privately-managed FF system.

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