PENSION REFORM AND PRIVATIZATION IN INTERNATIONAL PERSPECTIVE: The Case of Israel*

by
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ABSTRACT

The paper uses functional analysis to examine reform of a country's pension system. The functional approach to financial policymaking begins with the set of functions required, and then looks for changes in the institutional structure that would cause those functions to be performed more efficiently. The specific context for this analysis is the Israeli financial system. As is the case in Israel today, a number of countries have among their major policy objectives pension reform and privatization of state-owned enterprises. In this paper we explore the potential benefits from simultaneously undertaking both.

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PENSION REFORM AND PRIVATIZATION
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1. Introduction

Around the world, policymakers are today working on fundamental changes to their countries' financial systems. As we know, financial system reform in the former Communist countries of Eastern Europe is part of a general restructuring of their entire economic system from one based on central planning and government ownership of business to one based on free markets and private ownership. A number of other countries with well-developed free markets for nonfinancial goods and services still have centralized government control of their financial systems. With total control over both the banking and pension systems and restrictions on cross-border capital flows, these governments collect almost all the savings of the household sector and allocate most of the capital to the business sector. In at least some of these countries, fundamental reforms to privatize large parts of the financial system are under consideration. And even among countries such as the United States, with highly developed private financial markets and institutions, important changes in the way government regulates the system are actively being debated.

In this paper we use functional analysis to examine reform of a country's pension system. The specific context for this analysis is the Israeli financial system. As is the case in Israel today, a number of countries have among their major objectives pension reform and privatization of state-owned enterprises. In this paper we explore the potential benefits from simultaneously undertaking both.

The functional approach to financial policymaking begins with the set of functions required, and then looks for changes in the institutional structure that would cause those functions to be performed more efficiently. In general, such analyses begin with a description of the functions served by the pension system and a determination of how they are currently performed. From this base, the analysis then continues by examining alternative institutional arrangements used at other times and in other countries. There is much, of course, that countries can learn from each other. However, it is unlikely that solutions developed in one country or group of countries cannot be improved upon. Functional analysis seeks new institutional arrangements or new combinations of existing ones that might improve the performance of the functions, given the specific local economic, political, and cultural circumstances.

2. Pension Systems

The functions of a pension system are perhaps best described in the context of a household's life-cycle consumption/savings plan. Institutions of many forms serve to facilitate life-cycle savings. The manifest life-cycle function of the pension system is to provide households with income in the event that earnings stop due to death, disability, or retirement. Before the industrial revolution, the extended family was the main institution to perform this function. Elderly family members lived and worked with younger members of the family on the family-owned farm and all drew a common livelihood from it. In many of today's less-developed countries this is still largely the case. But in much of the industrialized world, urbanization and other fundamental economic and social changes have led to new institutional structures for the care and support of the elderly.

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1For a full development of the rationale and methodology of functional analysis in finance, see Merton and Bodie (1992a).
2Among these we include the legal, social, and technological "infrastructure." We consider infrastructure in greater detail in section 3.
3The material in this section of the paper is based on Bodie (1990a) and Bodie and Merton (1992).
4There are other important functions served by pension plans. Pension plans provide an incentive device in labor contracts, affecting employee turnover, work effort, and the timing of retirement. Major public-finance issues surrounding pension plans are government guarantees of private pension benefits, the use of these plans to reduce or defer taxes, the effect of these plans on aggregate private saving, and the role of these plans as part of the social insurance "safety net." Corporate pension funding and asset allocation policies are also an important element in corporate financial management. For further details, see Bodie (1990a).
An often-used metaphor for describing a country's retirement income system is the three-legged stool. The first leg is government-provided pension and welfare programs for the aged; the second is employer or labor union-provided pensions, and the third is direct individual saving. There is substantial variation, both across households and in different countries, in the mix of the three sources of retirement income.

The distribution of sources of retirement income for employees in private industry—from factory workers to executives—in 20 countries is presented in Table 1. Three major components of retirement income are shown: social security benefits, private pensions, and government-mandated termination indemnities.

The role of the government varies considerably across countries, but in virtually every one that role includes providing a "floor" of income protection through a combination of the national insurance and welfare systems. Often the government-run system provides retirement benefits in the form of cash and medical insurance. This floor (or "safety net") is mandatory and nonassignable. In addition, in a number of countries, the government actively encourages the development of the other two legs of the retirement-income stool. For example, governments often use tax policy to provide incentives for employers and unions to sponsor pension plans that—like the government-run plan—are mandatory and nonassignable. In some of those countries, tax-incentives are also given to self-employed individuals and households (who are not otherwise covered) to create a retirement fund for themselves. Use of such funds for other purposes is discouraged by imposing penalties on early withdrawal of money from the fund.

In the United States, pension plans sponsored by employers or unions are typically integrated with the government-run plan, either explicitly or implicitly. When combined with

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5Data in Table 1 are drawn from a study entitled "Retirement Income Throughout the World," that was released in 1991 by the pension-consulting firm Towers Perrin. The study is summarized in Benefits and Compensation International, March 1991, pp. 27-28. Also see Achdut and Tamir (1985) for a comparison of the various sources of income of the elderly in Canada, Germany, Israel, Norway, Sweden, the U.K., and the U.S. For Japan, see Clark (1990).

6The list of countries that encourage this development includes (but is not limited to) the United States, Germany, and Japan. See Dailey and Turner (1992) and Turner and Dailey (1990).
<table>
<thead>
<tr>
<th>Country</th>
<th>Social Security</th>
<th>Private Pension</th>
<th>Termination Indemnity</th>
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<tr>
<td>Italy</td>
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<tr>
<td>Venezuela</td>
<td>4</td>
<td>-</td>
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<td>36</td>
</tr>
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</table>

the government-provided benefit, these plans are usually designed to replace 70 to 100% of preretirement earnings of lower and middle-income employees. The Towers-Perrin study cited above shows that higher-income households typically rely on direct personal savings for a far larger part of their retirement income than do lower-income households.

In the sections to follow, we describe some of the key features of pension plans. In doing so, we focus on the United States experience for concreteness. However, virtually all the features described apply more generally to systems in other countries.7

2.1 Defined-Benefit and Defined-Contribution Pension Plans

Pension plans are defined by the terms specifying the “who,” “when,” and “how much,” for both the plan benefits and the plan contributions used to pay for those benefits. The pension fund of the plan is the cumulation of assets created from contributions and the investment earnings on those contributions, less any payments of benefits from the fund. In the United States, contributions to the fund by either employer or employee are tax-deductible, and investment income of the fund is not taxed. Distributions from the fund, whether to the employer or the employee, are taxed as ordinary income.8 There are two “pure” forms for pension plans: defined contribution and defined benefit.

In a defined-contribution plan, a formula specifies contributions but not benefit payments. Contribution rules usually are specified as a predetermined fraction of salary (e.g., the employer contributes 15% of the employee’s annual wages to the plan), although that fraction need not be constant over the course of an employee’s career. The pension fund consists of a set of individual investment accounts, one for each employee. Pension benefits are not specified, other than that at retirement the employee has the total accumulated value of contributions and earnings on those contributions to purchase an annuity. The employee often has some choice over both the level of contributions and the way the account is invested. In principle, contributions could be invested in any security, although in practice most plans limit investment choices to bond, stock, and money-market funds. The employee bears all the investment risk; the retirement account is, by definition, fully funded by the contributions, and the employer has no legal obligation beyond making its periodic contributions. For defined-contribution plans, investment policy is essentially the same as for a tax-qualified individual retirement account. Indeed, the main providers of investment products for these plans are the same institutions such as mutual funds and insurance companies that serve the general investment needs of individuals. Therefore, in a defined-contribution plan much of the task of setting and achieving the income-replacement goal falls on the employee.

In a defined-benefit plan, a formula specifies benefits, but not the manner, including contributions, in which these benefits are funded. The benefit formula typically takes into account years of service for the employer and level of wages or salary (e.g., the employer pays the employee for life, beginning at age 65, a yearly amount equal to 1% of his final annual wage for each year of service.) The employer (called the “plan sponsor”) or an insurance company hired by the sponsor guarantees the benefits and thus absorbs the investment risk. The obligation of the plan sponsor to pay the promised benefits is similar to a long-term debt liability of the employer.

As measured either by number of plan participants or total assets, the defined-benefit form dominates in most countries around the world. This is so in the United States, although the trend since the mid-1970s is for sponsors to choose the defined-contribution form when starting new plans. But the two plan types are not mutually exclusive. Many sponsors adopt defined-benefit plans as their primary plan, in which participation is mandatory, and supplement them with voluntary defined-contribution plans. Moreover, there are some plan designs that are “hybrids” combining features of both plan types. For example, a “cash-balance” plan is a defined-benefit plan in which each employee has an individual account that accumulates interest. Each year, employees are told how much they have accumulated in their account, and if they leave the firm, they can take that amount with them. If they stay until retirement age, however, they receive an annuity determined by the plan’s benefit formula. A variation on this design is a “floor” plan, which is a defined-contribution plan with a guaranteed minimum retirement annuity

7For further descriptive details about the pension system in the United States, see McGill and Grubbs (1989) or Allen, Melone, Rosenbloom, and VanDerhei (1988).
8Under certain conditions depending on both the age of the beneficiary and the size of the benefit, there is an additional tax surcharge above the ordinary earned-income tax rate. Distributions to the employer as part of a reversion of excess assets are also subject to a surcharge.
determined by a defined-benefit formula. These plan designs usually take into account the benefits provided by the Social Security system.

2.2 Funding

With defined-benefit plans, there is an important distinction between the pension plan and the pension fund. The plan is the contractual arrangement setting out the rights and obligations of all parties; the fund is a separate pool of assets set aside to provide collateral for the promised benefits. In defined-contribution plans, by definition, the value of the benefits equals that of the assets, and so the plan is always exactly fully funded. But in defined-benefit plans, there is a continuum of possibilities. There may be no separate fund, in which case the plan is said to be unfunded. When there is a separate fund with assets worth less than the present value of the promised benefits, the plan is underfunded. And if the plan’s assets have a market value that exceeds the present value of the plan’s liabilities, it is said to be overfunded.

Why and how does funding matter? The assets in a pension fund provide collateral for the benefits promised to the pension-plan beneficiaries. A useful analogy is that of an equipment trust. In an equipment trust, such as one set up by an airline to finance the purchase of airplanes, the trust assets serve as specific collateral for the associated debt obligation. The borrowing firm’s legal liability, however, is not limited to the value of the collateral. By the same token, if the value of the assets serving as collateral exceeds the amount required to settle the debt obligation, any excess reverts to the borrowing firm’s shareholders. So, for instance, if the market value of the equipment were to double, this would greatly increase the security of the promised payments, but it would not increase their size. The residual increase in value accrues to the shareholders of the borrowing firm.

The relation among the shareholders of the firm sponsoring a pension plan, the pension fund, and the plan beneficiaries is similar to the relation among the shareholders of the borrowing firm in an equipment trust, the equipment serving as collateral, and the equipment-trust lenders. In both cases, the assets serving as collateral are “encumbered,” (i.e., the firm is not free to use them for any other purpose as long as that liability remains outstanding), and the liability of the firm is not limited to the specific collateral. Any residual or “excess” of assets over promised payments belongs to the shareholders of the sponsoring firm. Thus the greater the funding, the more secure the promised benefits. However, whether the plan is underfunded, fully-funded, or overfunded, the size of the promised benefits does not change.

In a strictly unfunded pay-as-you-go government-operated pension system, benefits are theoretically paid entirely from the stream of revenue generated by the payroll tax levied on currently active workers. If such were the case, benefits would fluctuate up and down with changes in collections. In most such systems, however, there is a benefit formula, and benefits accrued under that formula are viewed as a form of government debt. Without funding, however, a rising ratio of retired to active workers and/or large government deficits can lead to a concern that the level of future benefits will be reduced.

As a case in point, consider the 1983 reform of the United States Social Security system. A changing demographic structure for workers led many to become concerned that there could be dramatically reduced benefits in the future in a pure pay-as-you-go system. Hence, a key provision of that reform was to require substantial prefunding of future benefits. To do this, the Social Security payroll tax rate was raised and the excess of current revenues over current benefit payments is invested in government bonds held in a trust fund. While this apparently funds the plan, some are less sure about the purpose. In a private plan, funding is used to insure against default by the plan sponsor. Here, the promise to pay benefits has the same level of full-faith and credit of the government as the bonds used to fund the plan. Yet there seems to be a belief that this change may help to ensure that when they reach retirement, workers will indeed receive benefits approximating those promised under the current benefit formula (i.e., the one in effect in 1992).

Even with the 1983 prefunding provisions, there is some question about whether current Social Security benefit levels will be maintained in the United States. Such questions highlight the political risk endemic to the government-provided leg of the three-legged retirement income stool and offer an explanation and additional role for the other two legs. The political risk associated with Social Security arises from a basic paradox of power: the government is too powerful to bind itself credibly to any set of

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9For further details, see Bodie (1989).
10For a survey of pension funding practices in various countries, see Bodie (1990b).
11The base to support the system was expanded by requiring more employees to join. The present value of benefits were reduced by gradually raising the age at which full benefits are payable. See Robert J. Myers (1991).
existing rules. The current Social Security benefit formula or the method of financing those benefits can be changed. The United States Congress has changed both in the past, and it can surely do so again in the future. Even if those currently running the government are committed to maintaining the current schedule of promised Social Security benefits, they cannot fully bind future governments to do so.

This brings out an important difference between government and private-sector obligations. A private-sector plan sponsor cannot unilaterally repudiate its legal liability to make promised payments. It can default because of inability to pay, but it cannot repudiate its legal obligations without penalty. On the other hand, the government—because it has the power to legislate changes in the law—can sometimes find ways to repudiate such obligations without penalty. Indeed, an integrated system in which private plan sponsors supplement government-provided pension benefits to achieve a promised “replacement ratio” of preretirement earnings can be seen as a type of private-sector insurance against the political risks of the government-run system.

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One can therefore view a mixed public-private system of retirement income provision as a way of reducing the risks of each separate component through diversification across providers. Public-sector pension plans can change the law to reduce promised benefit levels. Private-sector pension plan sponsors are committed by law (and perhaps reputation) to pay promised benefits, but they may default. As an additional linkage reinforcing the first two legs of the retirement income stool, there may be government insurance of private pension benefits.

### 2.3 Pension Insurance

In some countries, the government provides insurance against default risk on private-sector defined-benefit pension promises. In the United States, for example, the federal government requires private-sector plan sponsors to fund their defined-benefit plans either by insuring them through an insurance company or by making contributions to a special pension trust. There are no such requirements, however, for pension plans sponsored by state and local governments. Germany and Japan also have government pension-insurance schemes, although the rules are somewhat different.

All private-sector defined-benefit plan sponsors in the United States must participate in the federal program of pension insurance by paying premiums to the Pension Benefit Guaranty Corporation (PBGC). The PBGC was created under Title IV of the Employee Retirement Income Security Act of 1974 to guarantee only basic retirement benefits. The current maximum on guaranteed benefits is $2,352 per month. The PBGC has two different pension guarantee programs: one for single-employer plans and another for multi-employer plans. While it is not a profit-oriented insurance company, the PBGC is intended to be self-financing. It is expected to cover its operating expenses and annuity payments to beneficiaries from the annual premiums set by the Congress and paid by sponsors of defined-benefit plans, the investment earnings on its asset portfolio, and recoveries from terminated underfunded plans.

US firms sponsoring single-employer defined-benefit plans have the option under the law to contract with a qualifying insurance company to assume all or part of their pension obligations. The sponsor then pays premiums to the insurance company, and the insurance company becomes the private-sector guarantor of the pension benefits. Since almost all 50 states in the United States have state-sponsored insurance company guaranty funds, these state funds are the final guarantor of the pension benefits. Under current law, the federal government does not assume any responsibility for guaranteeing these benefits.

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12 Prior to the passage of the Employee Retirement Income Security Act (ERISA) in 1974, private defined-benefit obligations in the United States had a somewhat ambiguous legal status. ERISA, however, clearly established them as corporate liabilities.
13 See Merton, Bodie, and Marcus (1987) for a more complete development of this idea. Myers (1977) presents a similar argument.
14 For a more complete discussion of pension insurance, see Bodie and Merton (1992). For a more general discussion of the role of the government and private sectors in provided guarantees against default risk, see Merton and Bodie (1992b).
15 In Germany and Japan, employers are legally required to only partially fund their pension liabilities. They must, however, record accrued pension benefits as a liability of the firm. The pension liabilities are thus collateralized by the sponsoring firm’s assets.
16 In order to avoid paying insurance premiums to the PBGC for employees whose benefits are insured by an insurance company, the plan sponsor must technically terminate the participation of such employees in the sponsor’s plan. Under U.S. pension law, the Department of Labor sets the standards that determine which insurance companies qualify to offer these annuities.
benefits. Thus the system of guarantees of private-sector pension benefits in the United States is a mixed
government-private system.

3. The Role of Government

We see several broad potential roles for regulation and other government activities in improving
economic performance of the financial system in all countries.\(^7\) Perhaps the most important of these is to
facilitate major innovations that require concurrent changes in "infrastructure." We include in
infrastructure the institutions, regulatory practices, organization of trading facilities, and the
communication and information processing systems for transactions. We also include such things as the
tradition of private property rights, and the practices of government and other institutions with regard to
protecting those rights, even-handedness and honesty of the regulatory mechanisms.\(^18\)

In any country, major changes in important elements of the institutional structure of the financial
system, such as the pension system, are complicated, with many potential conflicts. There is much that
government can do to either mitigate or aggravate their disruptive effects. By analogy, hurricanes are
inevitable, but government policy can either reduce their devastation by establishing early warning systems
or it can aggravate the damage by encouraging the building of homes in locations that are especially
vulnerable to such storms.

As an analogy of supreme simplicity, consider the creation of a high-speed passenger train, surely a
beneficial product innovation.\(^19\) Suppose however, that the tracks of the current rail system are inadequate
to handle such high speeds. In the absence of policy rules, the innovator, either through ignorance or a
willingness to take risk, could choose to fully implement his product and run the train at high speed. If the
train subsequently crashes, it is, of course, true that the innovator and his passenger-clients will pay a dear
price. But, if in the process the track is also destroyed, then those, such as freight operators, who use the
system for a different purpose will also be greatly damaged. Hence the need for policy to safeguard the
system. A simple policy that fulfills that objective is to permanently fix a safe, but low speed limit. But,
of course, this narrowly focused policy has the rather unfortunate consequence that the benefits of
innovation will never be realized. An obviously better, if more complex, policy solution is to facilitate the
needed upgrading of the track and, at the same time, to set transient limits on speed, while there is a
technological imbalance between the product and its infrastructure.

As in this hypothetical rail system, the financial system is used by many for a variety of purposes.
When treated atomistically, financial innovations in products and services can be implemented unilaterally
and rather quickly. Hence, those innovations take place in an entrepreneurial and opportunistic manner.
In contrast, innovations in financial infrastructure must be more coordinated and therefore, take longer to
implement. Major changes, including outright elimination of obsolete institutions and their surrounding
regulatory structure, take place exceedingly slowly. It is thus wholly unrealistic to expect financial
innovation to proceed along a balanced path of development for all elements in the system. It is indeed
possible that at times, the imbalance between product innovation and infrastructure could become large
enough to jeopardize the functioning of the system. Hence, the need for policy to protect against such
breakdown. But, a single-minded policy focused exclusively on this concern could derail the engine of
innovation and bring to a halt the financial system's trip to greater efficiency.

The government, therefore, has an important and ever-present role to play as coordinator of product
innovations and changes in infrastructure. This coordinating role becomes even more important when
major changes in the system, such as pension reform and privatization, are being undertaken.

In its most general sense, privatization means transferring responsibility for performing some
economic function from the government to the private sector. In the context of pension reform,
privatization has come to mean less reliance on the government-run part of the pension system, which is
typically a pay-as-you-go system, and greater reliance on employer-provided pensions and specially-
designated private retirement accounts. A prime example of privatization of this type is Chile's 1981
reform of its entire social security system.

\(^7\)These include promoting competition, ensuring market integrity including macro credit risk protections, and managing
"public-good" type externalities. For further details see Merton and Bodie (1992a, section 7).

\(^18\)Modigliani and Perotti (1990) point out that in some national contexts an increase in government regulation may be
necessary for private institutions to function effectively.

\(^19\)This section is drawn from Merton (1990, 14; 1992).
But, privatization also means the transfer of the ownership and control of state-owned enterprises to the private sector. In many countries, privatization in this sense is under consideration as a mechanism for improving the way business firms are managed and scarce capital resources are allocated among those firms. It is believed that by encouraging the creation of competitive securities markets and by finding structures that make managers more accountable to the owners of these securities, the most competent managers will rise to the top and resources will be allocated more efficiently.20

Reform of a country's pension system and privatization of state-owned enterprises are quite separate matters. Nonetheless, under certain circumstances, combining the two may make it easier to resolve problems that arise in trying to implement each separately. Chile's pension reform efforts since 1981 provide an opportunity to examine one country's explicit attempt to achieve such synergies.

4. Combining Reform of the Pension System and Privatization of Enterprise: Chile's Experience21

In 1981, the government of Chile privatized its pay-as-you-go social security system and replaced it with a mandatory defined-contribution plan, financed entirely by employee contributions and administered by private institutions. Workers who had participated in the old government system were given the option of remaining or switching to the new one, and more than 90% opted to switch. All new entrants into the labor market, except for members of the armed forces, are required to participate in the private system. Self-employed persons are covered on a voluntary basis.

For old-age pensions, the new system requires workers to make a minimum monthly tax-deductible contribution equal to 10% of wages to a specially-designated individual account. They can also voluntarily add up to another 10% of their wages. Contributions are invested in authorized investment funds, called AFPs, which by law can only engage in pension fund management according to prescribed government rules.22 Workers can switch their accounts among them. In addition, workers pay anywhere from 2.5% to 5% of wages (depending on their AFP and their wage) for disability and preretirement survivor benefits and administrative expenses of their fund.

Under the new system, employers no longer pay payroll taxes. However, at the time of the transition from the old to the new system, employers were required to grant all workers an across-the-board 18% wage increase to ensure that the reduction in social security taxes paid by employers was immediately passed on to workers. For workers who switched from the old to the new system, the government issued special nontransferable bonds to compensate for the benefits they had accrued under the old system. These bonds earn interest until a worker retires, at which time their accumulated value is added to the worker's individual retirement account.

Normal retirement age is 65 for men and 60 for women. Workers can then withdraw the accumulated funds either as an inflation-indexed lifetime annuity or in a phased withdrawal similar to a lifetime annuity. Lump-sum distributions are not permitted. The "target" benefit for someone contributing the minimum 10% of wages is a 70% ratio of annual retirement benefits to final salary. This assumes that the real rate of return on the investment portfolio is 6% per year.23 Workers are allowed to retire early if the accumulated funds in their accounts are sufficient to fund an annuity that pays a specified minimum amount. The government guarantees a minimum or "floor" pension benefit to all, regardless of the accumulation in their account. For workers at the low end of the income distribution, the guaranteed minimum benefit exceeds considerably the benefit expected to be earned by means of contributions and investment experience of the fund.24

As a consequence of the pension reform, AFPs have become a very significant factor in the flow of investment funds in Chile. In recent years, the growth in the funds has equaled almost 50% of the growth in total private savings. The existence of individual retirement accounts is said to have fostered heightened awareness of property rights and asset allocation choices.25

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20See, for example, Hanke (1988).
21The material in this section is based on Diamond (1992), Hanke (1991), and Myers (1991, 1992).
22AFP stands for Administradoras de Fondos de Pensiones. In 1991 there were 14 of these authorized investment companies.
23From 1981 to 1991, the real rate of return for all AFPs averaged 13% per year.
24The minimum benefit for those covered for at least 20 years is 40% of the average wage in Chile. Myers (1991, p. 9) notes that this is high. If applied to the United States Social Security program, the minimum benefit would be $725 per month rather than the actual average retirement benefit of only $600.
25Participants are furnished statements of their accounts three times per year.
However, to date only a small portion of the funds have been invested in private-sector firms. In part, this reflects government regulation. The Chilean government had to rescue its banking system from failure during the early 1980s and did not want the newly formed pension funds to take significant investment risk. Most of the pension money has therefore been invested in government bonds, bank deposits, and mortgage bonds. The proportion invested in stocks reached 11.3% in 1990. Therefore the Chilean experience provides no material observations about the role of pension funds in either providing capital to private-sector firms or in improving the efficiency of their management. We know, however, that by creating individual retirement accounts with a choice among competing investment companies, an institutional foundation has been laid for investment in alternatives other than government bonds.

The Chilean experience suggests that a transition from a government-run pay-as-you-go pension system to a mandatory private defined-contribution pension system is feasible. The government budget absorbed virtually all of the cost of the transition. By converting the benefits accrued by active workers under the old pay-as-you-go system into government bonds, workers have experienced an increase in their perceived wealth. Perhaps because no other group has been singled out to pay more in taxes, there have been no organized complaints about the reform. It remains to be seen how much of the money in the pension funds will ultimately be invested directly in the private sector. Experience in the United States suggests that employees participating in defined-contribution plans voluntarily choose to invest a large fraction of their accumulating funds in the stock market. For example, in TIAA-CREF, the largest private defined-contribution plan in the United States, with over $100 billion in assets, about 50% are held in common stocks and another significant fraction in real-estate-related investments.

5. Issues for Pension Reform in Israel

As noted at the outset, the basic function of a pension system is to provide households with income in the event that earnings stop due to death, disability, or retirement. Israel can learn much about how to perform this function more efficiently from the experience of Chile and other countries, but it should not limit the range of institutional possibilities to either its own past or to what others have tried. In the last twenty years there have been revolutionary changes in the structure of the world's financial markets and institutions and in our understanding of how to use them to provide individuals and firms with new investment opportunities and more efficient ways to insure against risk. The driving forces explaining these extraordinary changes in the global financial system are an abundance of newly designed securities, the creation of new trading strategies that would have been impossible without concurrent advances in computer and telecommunications technology, and important advances in the theory of finance that have come out of the academic community. Thus, Israel can make use of its past experiences and those of other countries as well as the latest finance technology to create its own efficient institutional structure, given the specific Israeli economic, political, and cultural circumstances.

In Israel, most employees are currently covered by defined-benefit pension plans, in which benefits are based on final pay and linked to the cost of living. About half of Israel's labor force belong to a partially-funded defined-benefit plan run by the Histadrut, the country's labor union association. Another 15% work in the public-sector and belong to a completely unfunded government pension system. People not covered by these plans, typically have defined-contribution plans managed by banks or insurance companies. Taken together, the claims of plan participants in all three types of retirement plans constitute more than half of the financial assets of the household sector.

Pension benefits accrued by workers under the public-sector plans constitute a substantial debt of the government, although there is no official accounting for it. Few in Israel believe that the government will repudiate any of this debt through an ex post reduction in benefits. Indeed, there is an opposite concern—

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26As Miller (1992) has written, "No 20-year period in financial history has witnessed an even remotely comparable burst of innovative activity." Finnerty (1988, 1992) provides an extensive listing and classification of the financial products and services developed during this period.
27For a description of the interplay between finance theory and practice in bringing about some of the innovations of the last few decades, see Bernstein (1992).
28For a more detailed description of Israel's pension system, see Habib and Factor (1979). For readers of Hebrew, a more updated treatment is Kahane (1988).
29There are no official estimates of the present value of the accumulated benefits of workers in the unfunded public-sector plans. Unofficial estimates, however, are in a range that makes them a significant part of the financial assets of the private sector (and therefore, a sizable part of the internal national debt).
that the absence of funding leads to excessive pension payments to government employees. Primarily for this reason, some have suggested that the government be required to fully fund these pension benefits.

In the Histadrut plan, employees and employers make contributions that are managed by several Histadrut funds. The assets are invested almost entirely in special index-linked bonds issued by the government only to pension funds. These bonds pay a government-guaranteed real interest rate that is considerably higher than the rate available in the free market.\(^{30}\) It is not surprising, therefore, that they choose to invest about 95% of their asset portfolio in these special bonds. Despite the implicit subsidy provided through these special bonds, however, there is a sizable gap between the present value of promised benefits and the value of the assets in the funds.\(^{31}\) There is concern on the part of currently active employees that this gap will lead to less-than-promised benefits in the future. Some labor leaders have argued for increasing employee and employer contributions to gradually eliminate the gap. This solution, however, could conflict with other national policy objectives. For instance, there may be some concern that these proposed actions to close the gap might result in increased labor costs and thereby aggravate the country's problems of unemployment and inflation.

The defined-contribution plans in Israel were at one time allowed to invest in the same special government index-linked bonds still offered to defined-benefit plans at above-market interest rates. But in 1985, as part of a program to privatize the capital market, the government stopped issuing those bonds to the defined-contribution plans. The funds have continued to invest primarily in government index-linked bonds and in privately placed bonds at market interest rates. At the end of 1991, less than 5% of their assets were invested in equities.

The government has also expressed its intention to eventually stop issuing special bonds at above-market interest rates to defined-benefit plans. For several years both the Histadrut pension funds and the bank and insurance company defined-contribution plans have been permitted to invest in equity securities. But they have been slow to do so. Their reluctance can be attributed in part to the attractive real interest rate offered on the special government bonds and in part to the scarcity of securities issued by Israeli firms. Some of the largest firms in Israel are state-owned. The current government of Israel is committed to privatizing state-owned enterprises. This raises the prospect of a serendipitous synergy. Pension funds could switch their investments from government bonds to shares in newly-privatized state enterprises, and the government could exchange its equity interest in state-owned enterprises for outstanding government bonds. Under ordinary circumstances it might be difficult for the stock market to absorb large blocks of new stock. By coordinating the issuance of equity shares with the retirement of government bonds, it may be possible to minimize disruptions otherwise caused by large-scale privatization. This potential linking of pension reform and privatization of state-owned enterprises is similar to the one envisioned under Chile's privatization of its social security system. Circumstances in Israel, however, might permit a more rapid implementation than in Chile.

To address the many detailed issues surrounding the plan for reforming Israel's pension system is surely beyond the scope of this paper. Instead, we try our hand at framing a few questions that will have to be answered in any such reform. In that spirit, we sketch just one scenario of possible solutions instead of attempting an exhaustive listing of the alternatives. We nevertheless harbor the hope that these remarks will help set the stage for more detailed discussions.

**Issue #1:**

If Israel's pension funds invest exclusively in the securities issued by Israeli firms, won't they be inadequately diversified?

**Possible Solution:**

One of us (Merton, 1992) has proposed using equity "swaps" as a means for allowing small countries such as Israel to diversify internationally without exposing themselves to the problem of "capital flight." In the proposed swap, the total return per dollar on the small-country's domestic stock market is exchanged annually for the total return per dollar on a market-value weighted-average of the major world stock markets. This exchange of returns could be in a common currency, such as dollars, or adjusted to different currencies along similar lines to standard currency-swap agreements. The magnitudes of the

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\(^{30}\) The special bonds for pension funds currently offer a real interest rate of 5.5% per year, while the free-market rate is around 2% per year.

\(^{31}\) In Israel, the gap between the present value of promised benefits and the value of the pension fund assets is called the *actuarial deficit*. In the United States, it is called the *unfunded pension obligation*. 
dollar exchanges are determined by the “notional” or principal amount of the swap to which per dollar return differences apply. As is the usual case with swaps, there is no initial payment by either party to the other for entering the agreement. The swap agreement effectively transfers the risk of the small-country stock market to foreign investors and provides the domestic investors with the risk-return pattern of a well-diversified world portfolio. Since there are no initial payments between parties, there are no initial capital flows in or out of the country. Subsequent payments which may be either inflows or outflows involve only the difference between the returns on the two stock market indices, and no “principal” amounts flow.

For example, imagine such a swap contract between an Israeli pension fund and a foreign institution on a notional or principal amount of $1 billion. If, ex post, the world stock market earns 10 percent and the Israeli market earns 12 percent, there is only a flow of $(0.12 - 0.10) \times 1$ billion or $20$ million out of Israel. Note further that the Israeli pension fund makes net payments out precisely when it can “best” afford it: namely, when the Israeli stock market has outperformed the world markets. In those years in which the Israeli market underperforms the world stock markets, the swap generates net cash flows into Israel. Hence, in our example, if the Israeli market earns 8 percent and the world stock market earns 11 percent, then the Israeli fund receives $(0.11 - 0.08) \times 1$ billion = $30$ million, a net cash inflow for Israel. Moreover, with this swap arrangement, trading and ownership of actual shares remain with Israeli investors.

Foreign investors also benefit from the swap by avoiding the costs of trading in individual securities in the Israeli market and by avoiding some potential tax complications which often arise with cross-border investments. Furthermore, they avoid the problems of corporate governance issues that arise when foreigners acquire large ownership positions in domestic companies. Unlike standard cash investments in equities, debt or real property, the custodial-default risk or expropriation exposure of foreign investors is limited to the difference in returns instead of the total gross return plus principal (in our example, $20$ million versus $1.12$ billion in exposure). The risks of default are further reduced when the Israeli party to the swap is a pension fund with its assets invested in the Israeli stock market as a hedge. The foreign counterparty to the swap could, of course, also be a pension fund with its assets invested in the world stock-market portfolio.

There exists today a very large and active world-wide swap market, that is primarily run through international commercial and investment banking firms. Equity-return swaps based on the returns of major stock markets are common. Although we are unaware of their application to stock markets in countries with capital controls, given the current rate of innovation, we would not be surprised to see such a development soon.

More generally, customized private financial contracting is now available in world capital markets on a large enough scale to accommodate the needs of national governments. As illustrated by our hypothetical swap example, such contracting often makes possible low cost elimination (or at least reduction) of unintended and undesirable “side effects” of public financial policies without interfering with the intended objectives of these policies.

**Issue #2:**

How much freedom of choice should individuals have regarding their pensions? Should participation be mandatory or should individuals have the right to opt out of the system? Should they be allowed to make their own investment choices?

**Possible Solution:**

In virtually every country that has a national pension system, participation at some minimum level is mandatory. Some observers of government see such provisions for intervention as pure paternalism. But an alternative purpose for a government-mandated universal retirement-income system is to address the free-rider problem. That is, the citizenry may collectively feel an obligation to offer a “safety net” for everyone living in their midst. Thus, de facto there will be a safety net, even though no formal provision is made for one. But if this collective commitment were well understood by all, the existence of the de facto safety net would cause individuals to modify their saving behavior. For some, at least, there would be a tendency to not make full provision for their own retirement. Similarly, some may also take more risk in investing their retirement savings than they would in the absence of a safety net. Mandating participation by everyone, forces people to pay for what they ultimately will receive from the system. Thus according to this view, the function of the mandatory system is to protect society against free-riders. While this reasoning supports a mandatory minimum level of universal participation, it says nothing about what that level should be. Whatever the mandated minimum level of retirement benefits is and
whoever provides it, it should probably be guaranteed by government. If the direct provider of retirement benefits is a private-sector sponsor and if government is guaranteeing the benefits, then a system must be put in place to efficiently manage the pension-guarantee operation. The recent experience of the United States demonstrates that a poorly designed and managed system of government guarantees can be very socially wasteful. One element in the efficient management of such a system of guarantees is the imposition of limits on investment choices.

But it would seem that in the voluntary part of the retirement income system, individuals should be provided with at least some investment choices. The defined-contribution type of pension plan is most suited to accommodating choice. While the government can limit the set of choices in ways that protect uninformed or imprudent individuals, it can also encourage the development of new types of retirement annuities that improve the risk-return tradeoffs available.

Issue #3:

How can the risk-return tradeoffs available to individuals through their retirement accounts be improved?

Possible Solution:

The basic instrument that accomplishes the twin purposes of providing a lifetime stream of retirement income and allowing individual choice regarding the risk-return tradeoff is the variable annuity. Variable annuities are structured so that the investment risk of the underlying asset portfolio is passed through to the recipient, much as shareholders bear the risk of a mutual fund. There are two stages in a variable annuity contract: an accumulation phase and a payout phase. During the accumulation phase, the investor contributes money periodically to one or more open-end mutual funds and accumulates shares. The second, or payout, stage usually starts at retirement, when the investor typically has several options including:

1. Taking the market value of the shares in a lump-sum payment.
2. Receiving a fixed annuity until death.
3. Receiving a variable amount of money each period that is computed according to a procedure explained in the appendix.

By selecting an appropriate mix of underlying assets, such as stocks, bonds, and cash, an investor can create a stream of variable annuity payments with a wide variety of risk-return combinations. Naturally, the investor wants to select a combination that offers the highest expected level of payments for any specified level of risk. Since inflation-indexed bonds are available in Israel, a variable annuity invested in such bonds is feasible, and it would provide a relatively stable stream of inflation-protected benefits.

One of us (Merton, 1983) has proposed that a superior alternative to indexing retirement annuities to the cost of living is to index them to aggregate per capita consumption. The idea motivating this proposal is that it is standard-of-living protection rather than cost-of-living protection which is of prime concern to most individuals. With a cost-of-living-linked annuity, the benefit is fixed in real terms regardless of what happens to the standard of living in the economy. Individuals receiving a cost-of-living annuity over a long period of retirement may experience a substantial decline in their relative standard of living compared to the rest of the population. According to the proposal, however, pensioners would receive a benefit that changes with per capita consumption, thus maintaining their relative standard of living.

Note that with indexation to aggregate per capita consumption, there is no need to distinguish between the inflation and the real-per-capita-consumption components of the change. The benefits are simultaneously protected against both. By linking the benefits to per capita consumption rather than the consumer price index, the pension scheme is made more consistent both with finance theory and common sense. One way to describe the per capita consumption annuity proposal is as a defined-contribution plan offering variable annuity contracts based on an underlying portfolio of bonds that are indexed to aggregate per capita consumption. Merton (1983) envisions a major role for the government as a financial innovator in making this type of product possible by issuing consumption-indexed bonds that are free of default risk.

6. Conclusion

33See Merton and Bodie (1992b).
34For an elaboration on possible combinations, see Bodie and Pesando (1983).
We have sketched but one scenario addressing three issues arising in Israel's pension reform effort. We have also discussed the potential for using pension reform as the occasion to accomplish privatization of state-owned enterprises in Israel. While this combining of pension reform and privatization has been suggested by Hanke (1991) as a potential efficient path to follow in Eastern Europe, others such as Diamond (1992) have questioned whether the former communist countries have the necessary infrastructure to support such changes.

Whatever the appropriateness of the proposal for other countries, it appears to us that in Israel the necessary infrastructure is in place. There is a well-developed financial system. The population is fairly sophisticated in financial matters, having experienced a long period of private ownership of real estate and a variety of financial choices for their private saving. The government of Israel also has a long tradition of issuing innovative financial instruments, such as bonds linked to the domestic consumer price index, to the US dollar, or to both. We therefore have cause to hope that the improvements we have proposed have a reasonable chance of success in Israel even if they are not relevant in other countries.

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3We have not, however, addressed several major macroeconomic issues that arise in connection with pension reform, such as its impact on national saving or on the labor market.
56Indeed, Diamond even challenges the notion that Chile's experience has been a success.
References


Appendix: Explanation of a Variable Annuity

Assume that at retirement you have $100,000 accumulated in a variable annuity contract. The initial annuity payment is determined by setting an assumed investment return (AIR), 4% per year in this example, and making additional assumptions about mortality probabilities. Assume further that you will live for only three years after retirement and will receive three annual payments starting one year from now.

The benefit payment in each year, $B_t$, is given by the recursive formula:

$$ B_t = B_{t-1} \times \frac{(1 + R_t)}{(1 + AIR)} $$

where $R_t$ is the actual holding period return on the underlying portfolio in year $t$.

In words, each year the amount you receive equals the previous year's benefit times a factor that reflects the actual compared to the assumed investment return. In this example, if the actual return equals 4%, the factor will be one, and this year's benefit will equal last year's. If $R_t$ is greater than 4%, the benefit will increase, and if $R_t$ is less than 4%, the benefit will decrease. The starting benefit is found by computing a hypothetical constant payment with a present value of $100,000 using the 4% AIR to discount future values and multiplying it by the first year's performance factor.

Table 1 summarizes the computation and shows what the payment will be in each of three years if $R_t$ is 6%, then 2%, then 4%. The last column shows the balance in the fund after each payment. This method guarantees that the initial $100,000 is sufficient to pay all benefits due, independent of the holding-period returns realized.

<table>
<thead>
<tr>
<th>Year $t$</th>
<th>Rate of Return $R_t$</th>
<th>Benefit $B_t$</th>
<th>Remaining Balance $A_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$100,000</td>
<td>$36,035</td>
<td>$100,000</td>
</tr>
<tr>
<td>1</td>
<td>6%</td>
<td>$36,728</td>
<td>69,272</td>
</tr>
<tr>
<td>2</td>
<td>2%</td>
<td>$36,022</td>
<td>34,635</td>
</tr>
<tr>
<td>3</td>
<td>4%</td>
<td>$36,022</td>
<td>0</td>
</tr>
</tbody>
</table>

Starting accumulation = $100,000;
Assumed investment return (AIR) = 4% per year;
$B_0 = 36,035$. This is the hypothetical constant payment, which has a present value of $100,000, using a discount rate of 4% per year.

$R_t$ = Rate or return on underlying portfolio in year $t$.
$B_t$ = Benefit received at end of year $t$.
$A_t$ = Remaining balance after $B_t$ is withdrawn.

$$ B_t = B_{t-1} \times \frac{(1 + R_t)}{(1 + AIR)} $$

$$ A_t = A_{t-1} \times (1 + R_t) - B_t $$