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PRIVATIZATION OF SOCIAL
SECURITY: LESSONS FROM CHILE

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ABSTRACT

In Chile, all covered workers must place 10% of monthly earnings in a savings account with a highly regulated intermediary that manages a single fund and provides survivors and disability insurance. Workers pay a commission charge, in addition to the mandatory 10%, to finance this insurance and to cover the costs and profits of the intermediaries. On becoming eligible to receive benefits, a worker can choose between a sequence of phased withdrawals and a real annuity. In addition, there is a sizable guaranteed minimum pension. Unlike the purchased annuities, the minimum pension is not indexed, but adjusted by the government from time to time.

The Chilean reform gets high marks for defending the system from political risk and for its effects on capital accumulation and on the functioning of the capital market. The Chilean reform gets low marks for the provision of insurance and for administrative cost.

Perhaps the most surprising aspect of the Chilean reform is the high cost of running a privatized social security system, higher than the "inefficient" system that it replaced. Valdes-Prieto has estimated that the average administrative charge per effective affiliate while active is U.S. \$89.10 per year (for 1991) which is 2.94% of average taxable earnings. This is close to 30% of the 10% mandatory savings rate. The cost per person is not far from costs observed in other privately-managed pension systems, such as defined-benefit private pensions in the U.S. However, it compares unfavorably with administrative costs in well-run unified government managed systems. The issue here is the administrative efficiency of reliance on the private market, not anything particularly costly about the Chilean system.

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Privatization of Social Security: Lessons from Chile

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The role of government in the provision of retirement income is important for the well-being of its people.¹ It is also a classic example of a problem in institution design that must try to solve both a complex economic problem and a difficult problem of political economy.² That is, the optimal provision of retirement income would be a hard problem for a philosopher king, a problem that would require repeated changes in benefit formulas and tax rules as economic and demographic uncertainties were resolved. It is precisely this need for additional legislation for optimal design that makes the actual behavior of governments such a critical part of this institutional design. That is, governments will not reproduce the evolution of social security that a philosopher king would design. Thus, the optimal design must take into account what

¹ For discussions of the bases for government action on retirement income, see Diamond, 1977, and Valdes-Prieto, 1993a.

² To keep the content of this lecture manageable, I will focus on the provision of retirement income, mostly ignoring both disability insurance and survivors' insurance.

governments are likely to actually do.³ Since political decision processes differ considerably across countries, optimal design is likely to be different in different countries.

In this lecture, I will begin with a brief overview of the privatization of social security in Chile. I will then consider several aspects of the Chilean reform including its impact on the provision of insurance and on the patterns of redistribution, its impact on capital accumulation and on the workings of the capital market, its effect on the insulation of retirement income from political risk, and on the cost of running the retirement income system. In my discussion, I will contrast what has been done in Chile with alternatives that are similar in spirit, but somewhat different in details. I will also contrast the Chilean system, which is fundamentally designed around a contribution rate with the alternative of an overall design basically built around a benefit formula, as is the case with traditional social security systems.

The central concept in a traditional social security system is a benefit formula. In contrast, the central concept in the Chilean system is a contribution rate. This contrast is similar to the contrast between defined benefit and defined contribution private pensions. The conceptual starting place of a social security system has powerful effects in shaping the details that follow. I think that the distinction between contribution and benefit base is more

³ And, since we are considering what governments do now, recognizing what governments might do later, there is a further complication for the policy analyst in the relationship between what analysts recommend and what governments do.

illuminating than the distinction between privatized and government-run systems, for various pieces of either type of system can be privatized.

To jump to my conclusions, the Chilean approach gets high marks for defending the system from political risk. The Chilean approach gets low marks for the provision of insurance and for administrative cost. As implemented in Chile, the approach gets high marks for its effects on capital accumulation and on the functioning of the capital market.

This lecture draws very heavily (even to the extent of some verbatim repetition) on the paper on the Chilean reform that I have written with Salvador Valdes-Prieto (forthcoming), one that will appear in a Brookings conference volume on various aspects of Chilean economic experience. His coauthorship was essential in the development of that analysis. Naturally, he does not necessarily agree with everything I say today.

1. Overview of Chilean Reform

Chile began its social insurance system in 1924. By the 1970's it had developed a pattern that is not uncommon. There were separate defined benefit systems for different industries and occupations. These were not unified so that benefit structures and benefit levels were different in different sectors. Having multiple bureaucracies was inefficient. The benefit formulas were not well designed for economic incentives. The political determination of

benefit levels had resulted in very high contribution rates, which (including health) were in the range 51-59% in 1975. Government financial support to health, pensions, and contributions for government employees cost 20.5% of total government expenditure. A major problem was the tendency of the political process to raise benefits when short-run financing was available because of immaturity of a particular benefit system. The complementary problem of the vulnerability of benefit levels to short-run or long-run fiscal difficulties would probably also be serious in the future. That is, pensions were excessively dependent on the state of public finance relative to a reasonable standard. In light of these problems, planning on social security reform was begun in the 1970's under the Pinochet government; and, after a significant fiscal surplus had been built, implementation began in 1981.

The heart of the reform is a privatized mandatory savings plan, together with a market for indexed annuities for conversion of accumulations into retirement income streams. It is important to recognize that a mandatory savings system needs a mechanism for converting accumulations into retirement income flows. All covered or "dependent" workers must place 10% of monthly earnings in a savings account with an approved, highly regulated intermediary, an Administradora de Fondos de Pensiones, referred to as an AFP. Each AFP manages a single fund, with the complete return on the fund allocated to the individual accounts. The AFP also provides survivors and disability insurance, according to rules set down by the government. Workers must pay a commission charge to the

AFP, in addition to the mandatory 10%, to finance this disability and survivors' insurance and to cover the costs and profits of the AFP's. The commission charges are set by the competing AFP's, with the government regulating their structure, but not their level. Workers are free to select any AFP and to switch among them. On becoming eligible to receive pension benefits, a worker can choose between a sequence of phased withdrawals or a real annuity. The annuity option involves a switch of financial intermediary, as the annuity must be purchased from an insurance company. The fact that Chile has a long history of using indexed debt has made it easy for the annuity option to be restricted to indexed annuities. It is worth noting that the private providers of social security are closely regulated; there has not been reliance on unregulated market forces. In addition to this privatized system, there is a sizable guaranteed minimum pension. Unlike the purchased annuities, the minimum pension is not indexed, but adjusted by the government from time to time.

2. Cost

We have come to think of privatization as a route to greater efficiency and lower costs. Thus, perhaps the most surprising aspect of the Chilean reform is the high cost of running a privatized social security system, higher than the "inefficient" system that it replaced. Possibly this high cost should not have been surprising, for in his 1942 classic, Beveridge referred to a "markedly lower cost

of administration in most forms of State Insurance" ((page 286) quoted in Atkinson and Hills, 1991, page 5).

Administrative costs of the new system include both those of the AFP's that manage mandatory accumulation and those of the insurance companies that produce disability insurance, life insurance, and annuities. Valdes-Prieto (1993b) has estimated that the average administrative charge per effective affiliate while active are U.S. \$89.10 per year (for 1991) which is 2.94% of average taxable earnings. This is close to 30% of the 10% mandatory savings rate. The cost per person is not far from costs observed in other privately-managed pension systems, such as defined-benefit private pensions in the U.S. However, it compares unfavorably with administrative costs in well-run unified government managed systems. For example, the Social Security Administration in the United States reports a cost of U.S. \$18.70 per person per year on the same basis. However, this includes only a small charge made to the Social Security Administration by the Internal Revenue Service for the collection of payroll taxes, and does not follow good accounting practice for the measurement of capital costs. As a guess that is probably not too far off, the U.S. system probably costs twice what it reports.

Since the costs of running a pension system are unlikely to be either proportional to average wages or independent of average wages in the economy, it is not obvious exactly how one should compare costs across countries in the absence of an estimated cost function. Comparing the United States and Chile, the answer

probably lies somewhere between the 2.5-to-1 and 12.5-to-1 cost ratios on these two bases. The issue here is the administrative efficiency of reliance on the private market, not anything particularly costly about the Chilean system.

For example, in the U.S., the life insurance industry has costs that run 12-14% of annual benefits.⁴ In contrast, the U.S. Social Security Administration reports administrative costs that are less than 1% of annual benefits, so that even doubling these costs still leaves a number well below the private market cost.

For the annuities market, one can compare the internal rate of return on Chilean annuities (which are reported to the government) with comparable duration indexed bonds issued by a state owned commercial bank. The average spread over the 18 months up to the end of 1991 was 1.27%. These numbers can be compared with those in Friedman and Warshawsky (1990), who compare the rates on 20-year U.S. government bonds and on corporate bonds directly placed with insurance companies with the implicit interest rates on nominal annuities based on using life tables (adjusted for projected mortality improvements) for the population purchasing annuities, as measured by actual company experience. The implicit interest rate on the mean policy from the ten largest insurance companies was 2.43% lower than the rate on government bonds and 4.35% lower than the rate on directly placed corporate debt. Note that the numbers for the U. S. adjust for improvements in the mortality

⁴ American Council of Life Insurance, 1992.

table, while the numbers for Chile do not, and that mortality rates are likely to improve by roughly 1% per year.

The fact that the annuities market in the U.S. does not operate like an idealized competitive market can be seen from the spread in internal rates of return across policies. For the period 1968-1983, on average, the implicit interest rate was 1.65% higher for the least expensive of the ten largest companies than for the most expensive. This gap varied from .75% in 1968 to 3.70% in 1983. The complete sample best deal, including the 50-odd insurers in Best's sample, offered an implicit rate that was 1.58% better than the average of the ten largest. Annuities markets based on individual choice have generally been viewed as markets that do not work well.

Naturally one wants to know what lies behind this cost differential between private insurance markets and compulsory government systems. I believe there are a number of elements. One is the economies of scale that come with a single compulsory system without choice. A second is the costs that arise from competitive attempts to attract more customers - advertising, salespersonnel and the like. And third is the fact that in actual markets demand is much less sensitive to price variation than in idealized competitive markets. This implies that firms will exercise what market power they do have and, in turn, the presence of positive markups allows room for X-inefficiency and serves as an incentive for the greater costs associated with trying to attract more customers. Generally, firms are eager to have more business, so we can conclude that generally prices exceed marginal costs.

These elements apply to many products, not just insurance, although the setting of infrequent purchase of a product that is difficult for consumers to evaluate, and the presence of adverse selection probably contribute to higher costs in this market. Also, the low demand for insurance, which is a basis for having a mandatory program in the first place, probably contributes to higher costs as well.

But, one also needs to consider the conditions affecting the administrative costs of public supply. The collection of contributions and delivery of cash benefits probably represents the kind of well-defined task that lends itself to more efficient public supply than does less well-defined tasks. Moreover, the limited effort to vary products with consumer preferences (associated with limited consumer understanding and demand for insurance) also keeps the task easy for the government.⁵

These high administrative costs of private markets raise two questions. One question is the extent to which one wants a system with many small accounts, since compulsory savings where costs are eating up a large fraction of savings has an unattractive side (even if costs are similarly high for voluntary savings). Thus one may want to go slow in extending a mandatory savings system to include many low earners.⁶ A second question is whether there are

⁵ For a discussion of the variety in bureaucratic responses to both tasks and other dimensions, see Wilson, 1989.

⁶ For example, a reform proposal for Poland applied the Chilean model only to high earners; see Topinski and Wisniewski, 1991.

alternative designs that will keep costs lower, either by directly lowering costs or by increasing competitive pressures, and so lowering markups.

The Chilean approach of limiting the role of government (without eliminating it) has left a vacuum where there is a natural monopoly - that of collection of monthly payments and record keeping. Thus one can consider the creation of a clearinghouse to serve these functions. The AFP's could collectively own the clearinghouse to prevent monopoly pricing on its part. Also, the clearinghouse could be restricted not to make a profit, to prevent its being used as a collusion device to raise industry profits.

The Chilean approach focuses on individual choice. As a general proposition, group choice is considerably cheaper than individual choice. For example, in the U.S., measured relative to assets, mutual funds aimed at individuals are roughly three times as expensive (on average) as mutual funds handling large accounts (and so aimed at groups). Thus allowing employers to select a single AFP for all their workers (perhaps with discounted commissions, but with a maximum discount size set by government in order to spread the benefits to others) would be an approach that seems likely to generate cost savings. Of course, this raises the issue of possibly corrupt behavior by employers, a behavior that would need supervision and would no doubt be a problem somewhat. Nevertheless, the net balance seems likely to be a gain. The organization of group choice for the annuity market is more difficult since it lacks employers as a natural organizer, but is another place

where savings could be made. The government could organize groups for the purpose of insurance purchase.⁷

3. Capital Market

Before turning to the capital market, let us note that a compulsory savings system also has effects on the labor market. Insofar as people would not choose to save, they may view part of compulsory savings as a tax on work in the covered sector. Moreover, the financing and availability of the redistributive minimum pension also affects incentives. Given the high degree of movement between covered and uncovered sectors in Chile, these explicit and implicit taxes have an efficiency effect. However, the Chilean approach does not raise unfamiliar issues in labor market inefficiency, so I will not spend time on it. The use of individual accounts is likely to make workers more aware of the return part of the system as well as the tax part of the system, and that should reduce disincentives somewhat. The increase in workers' confidence that the social security institutions will provide them with significant pensions in the future also affects the evaluation of the net tax on work. Labor market efficiency is also affected by how well the law balances redistribution, insurance, and disincentives. Some disincentives are a necessary part of redistribution and insurance.

⁷ Such a proposal has been made by Diamond, 1992, in the context of health insurance.

It is worth noting that it is common for benefit-based systems to have poorly designed labor market incentives.

I turn now to the capital market. The combination of a steady flow of contributions together with very high real rates of return (an average of 14.5% from July, 1981 to July, 1992) has meant a large accumulation of funds invested in the Chilean economy. As of June, 1992, the total accumulations were U.S. \$12.44 billion, equal to 35% of 1992 GDP; equity holdings by pension funds were 9.6% of the value of the Santiago Stock Exchange (with life insurance companies holding another 1%); and pension funds held 61.1% of registered corporate bond issues outstanding (with life insurance companies holding close to another 30%). On the other hand, at present, close to 40% of the assets of pension funds are in public debt. The high rates of return, and implied rapid accumulation, are the result of generally high rates of return in the Chilean economy, not particularly astute investment choices by private fund management. No doubt, these high rates of return have contributed to the popularity of the reform with Chilean workers.

Together with this accumulation has been an evolution of regulation of the markets in which these funds are invested, resulting in a set of capital markets that function far better than they did before the reform. The Chilean regulators went slowly, with a gradual expansion in the set of allowable assets as the regulatory oversight was developed.⁸ The issue of trying to regulate conflicts

⁸ For a discussion of the different elements of oversight, see Merton and Bodie, 1992.

of interest among various players in these markets is a major one. Both the importance of conflicts of interest and the difficulty of regulating them should not be overlooked. Obviously, one needs to have protection against outright embezzlement of funds. Beyond that, there will be intermediaries that will be simultaneously trading on many accounts, and there will be intermediaries with voting shares in some firms and with interests in other firms as well. Regulation of capital markets is not easy and requires continuous adjustment to the development of new ways of causing difficulties. Thus careful regulation of capital markets is both a critical part of a successful privatization of social security and a significant benefit of successfully doing such a privatization.

In Chile, privatization of fund management has been combined with individual choice of fund. This is not a necessary combination. One could have a system where individual accounts are kept by the government, with shares earning their return from their proportion of a single fund that was privately invested; that is, privatization of fund management can be done without individual choice of fund. This combination would have lower costs. Insofar as people do not understand risk-return tradeoffs, the removal of choice of fund may have little or no welfare significance. However, such a structure would require a new institution that had the independence that one wants to see for a central bank, and would also require transparent transactions between the institution picking the private fund managers and those managers. This combination may not be possible in many places, but it may be useful to recognize that many

of the pieces of the Chilean model can be combined with alternative designs of other pieces.

If individuals held shares in a single, privately managed fund, it would be straightforward to expand the system to have two or more funds, with individuals choosing the proportions of their accounts going into the different funds. Thus younger people might choose proportions giving higher risk, while older people, closer to retirement, chose proportions with lower risk. At present, in Chile, each AFP has a single fund. Thus, while workers can choose AFP, they are restricted in the range of funds from the incentives for different AFP's to have similar funds.

In the absence of regulation, the pattern of risk-expected return points offered would be limited in a setting where each AFP had a single fund, resembling the choice of commodity characteristics in a setting where a limited set of firms choose a single set of product characteristics each. In addition, there is regulation guaranteeing that no fund will do too much worse than the average of all funds.⁹ This creates an incentive for fund portfolios not to differ too much from the average fund, since the AFP bears some of the down risk and receives none of the up risk (except through increased enrollments).

Thus, allowing AFP's to offer a choice of funds in a way that significantly expanded the range of alternatives available would require a change in the guarantee structure. There might be a

⁹ The guarantee is the lower of half the average return and the average return less 2%.

guaranteed fund and nonguaranteed funds; there might be separate guarantees for high and low risk funds, relating to returns on other high and low risk funds. If the guarantee is viewed as a guarantee of management ability, rather than rates of return, the guarantee could be on a weighted average total return on all funds handled by an AFP, allowing different returns on different individual funds. The inexperience of many small investors suggests that some form of guarantee is important, especially in the early stages of such a reform.

4. Financing the Transition

During the transition, mandatory savings flow into new individual accounts rather than directly to pay pensions owed by the existing, mature, old pay-as-you-go social insurance system. This leaves a large fiscal cost on the government budget. In Chile, there has been little issue of new (explicit) public debt to finance the benefits being paid under the old system; although active workers who switched to the new system have received explicit government debt, called recognition bonds, on account of past contributions. This financing decision has implied an increase in fiscal saving, with the decision to avoid debt financing implying an improvement in the primary fiscal balance of 3.5 - 4% of GDP each year in the 1980's. It is anticipated that the level of needed fiscal saving will remain about this level for the 1990's, with a gradual decrease thereafter. Before the start of the pension reform, the government built a

primary surplus of 5.5% of GDP with a view to avoiding debt financing of the reform. Thus, most of the transition deficit - the deficit in the old pension system - has been financed out of a primary surplus. In addition, a simultaneous increase in the age of retirement under the old system significantly decreased the implicit liabilities of the government.¹⁰

The Chilean privatization could have been done without the buildup of a surplus to finance the transition. Such a course would not have the same level of additional capital accumulation as is associated with a simultaneous improvement in the government fiscal balance. It is sometimes suggested that privatization is a tool that will help press a government that has a chronic deficit into doing something about the deficit. It seems to me that there is serious political risk associated with such an approach. With a sizable government deficit, there will be considerable political incentive to channel the privatized mandatory savings into government debt. With large government debt holdings by the intermediaries and a large continuing deficit, there is a strong incentive to pay low interest rates on this debt in order to lower the deficit. Indeed, in the Philippines, there have been below-market interest rates paid on government debt held by pension funds. The combination of primarily government debt and politically set interest rates defeats much of the purpose of privatization. Rather than privatization

¹⁰ Minor portions of this deficit were financed by the sale of shares in formerly state-owned utilities, with pension funds purchasing some of these shares, and, over the business cycle by the issue of debt.

being a cure for a chronic deficit, it may be the case that a surplus is an important condition for a successful privatization.

5. Redistribution and Political Risk

Redistribution, both intra and intergenerational, is always a source of political tension. While economists often push to confine redistribution to a limited set of policy tools, with efficiency as the guiding principle for other decisions, the political process recognizes distributional issues in almost every action it takes. Social security is no exception. Moreover, intergenerational redistribution is particularly focused on social security since, other than the overall level of government debt, it is the most visible setting for this political struggle. Different institutions seem to lend themselves to different political outcomes. This is not surprising in light of the fact that agenda control can often be outcome control and the further fact that many in the voting public have limited understanding of the issues involved. Democratic procedures can lead to inconsistencies. Moreover, it is often hard to judge whether more redistribution to the current elderly is better or worse.

Some economists approach intergenerational redistribution from the perspective of capital accumulation, arguing against much redistribution to the current elderly since it results in less capital accumulation. But it needs to be recognized that the capital stock is not itself a variable of primary (as opposed to derived) interest. Rather, the correct capital stock is the efficient one for the pattern

of consumption that society wants. If it is desired to redistribute more to people who consume more earlier, than it is appropriate to have a smaller capital stock. There are several complications here. One arises if there are externalities associated with capital accumulation, as is assumed in some of the new growth theory. If so, this is relevant for the optimal redistribution pattern or, equivalently, concern for the capital stock is part of the primary concerns. Second, we have to recognize that politics may have resulted in inappropriate aggregate savings, and social security may represent a place where the politics can be worked out differently. Conversely, the ability of the government to affect capital accumulation by other tools, such as the government budget surplus/deficit implies that there is not necessarily an issue in capital accumulation.

I find it hard to make a general normative judgment about the fact that benefit-based systems seem to lend themselves more to redistribution to the current elderly than do contribution-based systems. One does need to be concerned about the extent to which the well-off elderly receive a disproportionate share of redistribution. A country with multiple systems, rather than a single unified system, is particularly prone to this problem. This difference in outcomes in response to different bases of design is interesting since there is little in one system that (on average) couldn't be accomplished by the other. Yet adding amounts to individual accounts seems politically a much more difficult action to

take than choosing a benefit formula that results in much higher returns on taxes for some workers.

Similarly, intragenerational redistribution appears to be easier to accomplish with a benefit-based approach than with a contribution-based approach, although, again, one could do redistribution on an annual basis for the amounts going into accounts.¹¹ Such redistribution is not part of the Chilean system. It is interesting to note that political suggestions that something would be done to improve the pension benefits for Chilean coal miners have foundered on the politics of how to finance them, in a way that would probably not have happened with a benefit-based system. Individual accounts seem to call for identifying the source of funds to be added to individual accounts. This is different from redistribution to the current elderly from a benefit structure that leaves the cost vaguely on the future. Such legislation can easily lead to a program that is not viable in the long run, which is clearly unsatisfactory. Thus there is real appeal in individual accounts as insulation of the pension system from political actions to increase benefits without direct financing. The Chilean system gets high marks on this dimension, although it is not clear how much of the Chilean reforms, beyond individual accounts, is needed to hold down this sort of political action.

While some argue for the superiority of a political institution that is more transparent in its depiction of redistribution, it is not

¹¹ For example, Boskin, Kotlikoff and Shoven (1988) have proposed a system with individual accounts and annual redistributions.

clear that this is superior to an institution that is more transparent in its depiction of outcomes. There is a deep tension between political views that concentrate on outcomes and political views that concentrate on changes in outcomes. At its extreme, the tension is reflected in the alternative slogans that "all property is theft" and "all taxation is theft." Benefit-based formulas make consumption patterns clearer than do contribution based systems. Contribution based systems make redistributions clearer. The sensitivity of political outcomes to the relative visibility of different aspects of the system may reflect the limited understanding of voters of a complex issue. Moreover, the different basic designs involve different structures carried over into the future, which then form the basis for future legislative actions.

There are further issues coming from the choice of basic design. For example, in Chile, the minimum pension financed out of general revenues is not indexed for inflation, while purchased annuities in the mandatory savings system must be indexed. At a quick glance, this combination does not seem to have a good normative basis and appears to be an example of the aphorism that "a program for poor people is a poor program." Consider a political process that adjusts pensions for inflation from time to time, rather than having automatic indexing. This might affect the trend line of pension benefits. On the other hand, if, on average, the trend in pensions is the same, the question becomes one of whether the pension recipients are good people to bear the risks of a political process that results in fluctuations in real benefits. Many

retirees will have difficulty doing the kind of intertemporal substitution needed to bear this risk well. A system designed to be automatic, and not subject to the choice of party in power, would seem superior.

In addition to this purely political risk, there is the issue of fluctuations in the balance in the government budget. Government expenditures on various activities tend to move together with the state of fiscal balance. At first blush it seems appropriate to have government payments for pensions fluctuate along with other government expenditures. However, there is an alternative viewpoint that asks whether there is any reason to have pensions that flow through the government budget fluctuate more than pensions that do not flow through the government budget (and are subject only to tax changes). It seems to me that there is no more reason for fluctuations of one sort of pension than of the other. Therefore, the political insulation inherent in the Chilean system seems to me very attractive. It is interesting to note that Chile did freeze the COLA for pensions received under the continuation of the old system in 1985. Since COLA's paid by private insurance companies do not directly affect the government budget, one would not expect to see the government freeze pensions paid under the new system at the time of some future budget squeeze. That is, the lumping together of many sources of income subject to taxation or implicit taxation, so that they are treated similarly, may lead to lower tax fluctuations on a broader base, which should result in greater efficiency.

6. Social risk and aggregate change

Examining the actuarial forecasts of social security systems, it is clear that they are subject to large aggregate risks. These include the rate of growth of real wages, the real rate of return, mortality factors, and, in PAYG systems, the growth of the labor force. In addition to considerable uncertainties about these factors, some economies, including Chile, are projecting significant aging of their populations.

Different pension systems have different degrees of need for adaptation to changes in basic economic and demographic parameters. The Chilean system is sensitive to interest rate and mortality changes since these affect the adequacy of retirement income relative to prior earnings. Pay-as-you-go systems have more concern with population factors. Commonly, social security systems are subject to political gridlock as they attempt to adapt to significantly changed circumstances. The Chilean system can be on automatic pilot in the sense that there is no necessity of correction and the magnitude of cost from nonoptimal parameters is probably not too large. This is in contrast with systems that become nonviable if circumstances change and the system is not adapted. While PAYG systems can be put on automatic pilot (with taxes or benefits or a combination adjusting automatically), in practice they are not. This affects worker expectations as well as affecting outcomes when the future becomes the present.

7. Insurance

One could have a compulsory savings system that handed over the entire accumulated fund in a lump sum on reaching retirement age. However, the same lack of foresight that lies behind the institution of a mandatory savings program suggests that people would consume too rapidly out of such a lump sum. Moreover, if the minimum pension continued in its current form, people would have a powerful incentive to consume rapidly in order to tap into the minimum pension. Thus the Chilean system has a maximum allowable rate of withdrawal from accumulated funds not used to purchase an indexed annuity. The rate varies with age and recent interest earnings on the funds. Eligibility to tap retirement funds in either form is unrelated to whether individuals stop working. Only sufficient age (or for early withdrawal, sufficient accumulation) are necessary to begin withdrawals.

A system such as this is missing many elements of insurance that could have been built into the system. I want to briefly contrast a system of accumulation followed by annuity purchase with a traditional system that is built around a benefit formula. To keep the comparison close, we can consider a benefit-based system where the benefit varies with accumulated taxes paid. Thus the central contrast between the systems is whether or not the same conversion factor is used for everyone in converting accumulated funds into an annuity. That is, a benefit-based system can pay benefits to workers that are proportional to the accumulated taxes paid, with

accumulation calculated using an interest rate. A private market will use different conversion factors for different people, reflecting estimates of different life expectancies for different people, and reflecting different markups by different firms. In practice, the formulas in benefit-based systems tend to accumulate wages, not taxes, with different accumulation factors, including ignoring (zero weight) some years, often, unfortunately, many years. A system that accumulated wages using an average wage index as the indexing factor probably does not differ very much from one that is using an interest rate.

In the Chilean system, funds are accumulated until retirement age is reached. Thus an individual with no interest in an estate has no way of converting funds if he should die before retirement into higher consumption if he survives. A traditional benefit-based system does this automatically. Second, an individual contemplating a future purchase of an annuity has no way to insure the rate at which the annuity will be quoted to him. Thus, arriving at retirement age with a long expected life (in the eyes of insurance companies) results in a lower consumption per year than arriving at retirement age with a short expected life (in their eyes). Again, a benefit-based system provides this insurance automatically.

The two types of systems also distribute differently across groups with different life expectancy, such as men and women. Women, with longer life expectancy, would have lower consumption levels (and presumably higher marginal utilities of consumption) for the same earnings levels in an accumulation based system.

These results follow from the use of different life tables for different individuals by the private market. Conversely, insurance companies do not measure life expectancy fully accurately. This leads to selection problems. One of the problems is that the insurance companies compete to attract the groups who will be profitable. This probably adds to the costs of competition. Secondly, individuals who do not like the rates quoted to them have the alternative of a phased withdrawal. Removal of this option would remove this dimension of selection. However it would cut against the sense that people have of controlling these funds. Moreover, reducing the set of alternatives would probably decrease the price sensitivity of demand, resulting in higher markups by insurance companies. Thus the lack of annuity purchase can be viewed as an insurance failing of the system.

Individuals do have a choice between a larger estate and more lifetime consumption. For this choice, accurately priced annuities (as opposed to uniformly priced annuities) are an appropriate part of the incentive structure. With a benefit-based system, individuals can increase their estates by the purchase of life insurance from the private market.

Another dimension of risk that the Chileans system did not attempt to address is risk about length of working life. A benefit based-system that pays benefits only after actual retirement and that adjusts benefits less than actuarially redistributes from those with long working lives to those with short working lives. Such a system has both insurance and redistributive elements.

8. Concluding Remarks

Governments seem prone to a variety of actions that undercut the optimal provision of retirement income. Redistribution often goes to the well off, not the poor. Redistribution to the poor is often less than some would want, and designed in a way so that it tends to erode over time. Programs are sometimes designed so they are unlikely to be sustainable. Incentives associated with programs are often ill designed. Variation with the state of the government budget is often excessive. The array of potential different social security institutions is large. Different alternative basic approaches lend themselves to different ways of solving the design problems and of resisting the different susceptibilities to poor government actions. Chile has given us a fascinating example to observe. Countries can do worse than imitating Chile (and many have). I have argued that countries choosing to privatize can do better by recognizing that the private market is an expensive institution and so trying to hold down the cost of using the private market. Group choice rather than individual choice often represents a good tradeoff of lower costs against fewer options.

I think it is also important to recognize that it is not easy to imitate Chile - it requires hard work at regulation and political discipline so that such a reform doesn't unravel in either private or public raiding of accumulated funds. The insulation from political risk and the development of capital markets, which are the major benefits of the Chilean approach, do not come automatically - they

require skill and discipline. Thus whether to go the Chilean route and how closely to imitate the Chilean details are questions best answered separately on a country-by-country basis.

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