Volume Title: Privatizing Social Security

Volume Author/Editor: Martin Feldstein, editor

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-24101-7

Volume URL: http://www.nber.org/books/feld98-1

Publication Date: January 1998

Chapter Title: The Transition Path in Privatizing Social Security

Chapter Author: Martin Feldstein, Andrew Samwick

Chapter URL: http://www.nber.org/chapters/c6251

Chapter pages in book: (p. 215 - 264)

6 The Transition Path in Privatizing Social Security

Martin Feldstein and Andrew Samwick

6.1 Background and Overview

There is now substantial experience around the world with partial or complete shifts from government pension systems to private funded plans. Although there are important common features of all such transitions, each country that makes such a transition faces a unique problem, reflecting the demographic and economic situation of that country and the promises and expectations embedded in existing law.[1]

In the United States, the actuarial projection that the social security trust fund will be depleted by the year 2030 has fostered interest in options to shift from the pay-as-you-go system to a funded or privatized system.[2] The very low implicit rate of return earned on contributions in the existing pay-as-you-go system and the adverse effect of the unfunded program on national saving have also encouraged consideration of the possibility of shifting to a partially or fully funded system and, in particular, to a system with individual funded accounts (see, e.g., Feldstein 1996; Kotlikoff 1996).

This paper shows that shifting to a funded system would permit the existing 12.4 percent payroll tax to be replaced in the long run by a payroll tax of about 2 percent because a funded system has so much higher a rate of return than the implicit rate of return in a pay-as-you-go unfunded social security program.

Martin Feldstein is the George F. Baker Professor of Economics at Harvard University and president of the National Bureau of Economic Research. Andrew Samwick is assistant professor of economics at Dartmouth College and a faculty research fellow of the National Bureau of Economic Research.

The authors are grateful to the participants in the preconference and conference meetings for their comments and suggestions. They have extended the analysis of this paper in several ways in Feldstein and Samwick (1997).

1. See, e.g., World Bank (1994) and the papers in this volume describing the experiences in Argentina, Australia, Chile, Great Britain, and Mexico.

2. See the alternative proposals in Advisory Council on Social Security (1997).

This reduction in the payroll tax results in a reduction in the deadweight loss that is itself equal to about 2 percent of payroll. Thus, the long-run gain from shifting to a funded system is almost as large as the entire 12 percent payroll tax. This is equivalent to a permanent increase in real income of about 5 percent of GDP.

A major concern in all discussions of privatizing social security is the transition path. Critics of privatization argue that current and projected conditions in the United States—a population that is growing slowly and aging rapidly, a low rate of economic growth, and a very generous level of promised benefits—make the transition from the existing unfunded system to individual funded accounts too costly to be politically acceptable. Current employees now pay a 12 percent payroll tax to finance the benefits of current retirees. In the transition to a funded system, these employees would have to pay this plus the contributions to fund their own future benefits. Critics argue that this combination would be too onerous to be acceptable, and even those who favor a funded system in principle may fear that they are correct.

The purpose of this paper is to examine the basic issues involved in a transition and to explore alternative feasible transition paths from the existing U.S. pay-as-you-go social security system to a program of funded mandatory individual retirement accounts (MIRAs). The transition plans that we study are constrained to provide the same level of benefits in each future year as retirees would receive from the existing social security system. In addition, the financing leaves the projected path of the social security trust fund unchanged, thus guaranteeing that any additional private saving that results from the mandatory individual retirement accounts is a net addition to the nation's capital stock.

An important finding in our analysis is that the additional payments that are required in the early years of the transition are small relative to the existing payroll tax and to the long-run gains from privatization. These additional payments during the early part of the transition can be anywhere from 1 to 3 percent of payroll. Younger workers at the time of the transition are net beneficiaries over their own lifetimes. Although the gains of the older workers are not large enough to compensate them for the higher costs in the early years of the transition, when we look at nuclear families of parents and their children, we see that a substantial majority of two-generation pairs are likely to be net gainers. More generally, the gains occur quickly enough and are large enough that the present value of the annual net changes over the first fifty years are positive for any reasonable discount rate.

A basic problem in analyzing alternatives to the current system is that the benefits "promised" in current law are inconsistent with the current level of taxes. The social security actuaries predict that the existing trust fund will be exhausted by about the year 2030, a date that has been advanced repeatedly during the past decade. We therefore cannot sensibly compare alternative transition paths to the tax and benefit schedules in current law but must make some assumption about how the system would be kept solvent if it were not privatized. Most of our simulations make the simple assumption that the current

system would keep the existing 12.4 percent tax rate for the old age, survivors, and disability insurance (OASDI) program but would cut benefits when the trust fund is exhausted. We refer to all these feasible benefit paths as the *baseline benefit paths* to distinguish them from the *current law benefit path.* We also simulate a proposal to maintain the benefit rules embodied in current law by raising the tax rate after 2030 to the level required to meet the resulting benefit obligations.

One final introductory comment is needed about our use of the term *privatize.* We are analyzing the transition to a system of mandatory individual retirement accounts, similar to current IRAs and 401(k)s, to which employers and/or employees would be required to make contributions that would then be invested in stocks and bonds. There are two aspects of this that should be emphasized. First, participation is not voluntary. Everyone must participate and thus provide for his or her retirement.[3] Second, while the funds could in principle be collected and invested by the government, we believe that there are many reasons for preferring a decentralized system in which individuals and/or employers choose private fund managers. For this reason, we refer to the proposed alternatives as *privatizing* social security.

To motivate interest in the problem of transition, this paper begins in section 6.2 by indicating in more detail the potential steady-state benefit of substituting a funded mandatory individual retirement account program for the existing U.S. pay-as-you-go social security system. The remaining sections of the paper present our simulations and analyses of a variety of feasible transition paths for the U.S. social security system.

Section 6.3 provides some simple calculations to show the order of magnitude of the extra taxes required during the transition to a funded system that maintains a feasible baseline benefit path. Section 6.4 then describes our social security simulation model (SS-SIM) and discusses the parameter values that we have used. Section 6.5 presents results for the simulation of a gradual transition to a privatized system for all employees. Section 6.6 deals with the distributional issue of the benefits for lower-income individuals in a privatized system. Section 6.7 discusses the problem that the returns on privately invested funds are uncertain and that actuarially fair annuities based on debt and equity returns are not available.

In section 6.8, we analyze an alternative baseline in which the annual infla-

3. The individual's decision to shift from the existing pay-as-you-go social security system to the system of individual investment accounts could be made voluntary. Since our analysis assumes that individuals receive full credit against their payroll tax liability for contributions to the funded retirement accounts, the incentive for individuals to shift voluntarily would be extremely strong. But, although the choice between the current system and the funded alternative could be made voluntary, individuals are required to participate in one of the two.

There are two obvious alternatives to a mandatory system: a voluntary system coupled with either a means-tested benefit or a uniform flat-rate benefit. A means-tested system runs the risk of discouraging savings if the level of benefits is set high enough or of leaving undesirable poverty if it is set too low (see Feldstein 1987). A flat-rate benefit may also discourage private saving and may require a high tax rate with a correspondingly high deadweight loss.

tion adjustment to social security benefits would be reduced by 1 percentage point. In section 6.9, we turn in the opposite direction and consider a transition to a privatized system that maintains the *current law benefit path.* Instead of requiring a rise in the payroll tax from 12.4 to more than 19 percent, the fully funded system can maintain benefits with a long-run contribution rate of only slightly more than 3 percent. We present the corresponding transition path.

A final section summarizes our findings and comments on some issues that remain to be analyzed.

6.2 The Steady-State Advantage of a Funded Retirement Program[4]

In a growing economy with an unchanging age structure, an unfunded pay-as-you-go (PAYGO) social security retirement system that is financed by a constant payroll tax rate provides each cohort of participants with an implicit real rate of return on their tax contributions equal to the aggregate rate of growth of the economy (Samuelson 1958). For the current illustrative calculation, we take this rate of return to be 2.5 percent, the rate of growth of real wage and salary payments between 1960 and 1995 (*Economic Report of the President* 1996).[5]

In contrast, funds that are saved and invested in the nation's capital stock earn a real rate of return for the nation that is equal to the pretax marginal product of capital. For the past thirty-five years, this has averaged slightly more than 9.0 percent.[6] We now assume that the individual can in principle receive the entire 9 percent in a funded account; we defend the reasonableness of this assumption below.

To see the importance of the difference between the 2.5 and the 9 percent rates of return for the required amount of retirement saving, consider the very simple example of an individual who saves at one point during the middle of his working life for consumption during the middle of his retirement years. More specifically, consider an individual who is age forty-five and who "saves" $2,600 (approximately the current average payroll tax payment) to finance retirement consumption at age seventy-five. With the PAYGO real return of 2.5 percent, this $2,600 increases over the thirty-year period to $5,454. If the individual had instead earned a real 9 percent return on his retirement saving, this

4. The steady-state gain of a funded program must be balanced against the costs of transition. Realistic estimates of these costs are the primary focus of this paper. We present calculations that show that the present value of the gains exceeds these costs for any reasonable discount rate, even when the horizon is limited to forty years. For a theoretical discussion of the conditions under which shifting from an unfunded to a funded program has a positive present value, see Feldstein (1995c).

5. Because of the reduced rate of growth during the past two decades, Board of Trustees (1995) assumes that the rate of growth in the future will be only 2 percent.

6. Rippe (1995), following the method described in Feldstein, Dicks-Mireaux, and Poterba (1983), found that the real pretax marginal rate of return on capital in the nonfinancial corporate sector averaged 9.3 percent between 1960 and 1994.

$5,454 retirement amount could have been "purchased" at age forty-five for only $411 instead of $2,600.

If the $2,600 PAYGO contribution is obtained by a 12.4 percent payroll tax, this implies that the tax could be reduced to ([411/2600] × 12.4 percent =) 1.96 percent.

The individual benefits in two quite distinct ways from being in the high-yield funded program rather than the low-yield PAYGO program. First, the individual saves $2,190 in taxes at age forty-five while maintaining the original benefits in retirement. Second, the distortionary payroll tax is reduced from 12.4 to 1.96 percent. Each of these deserves more comment, as does the assumption that the entire 9 percent pretax return is available to the mandatory individual retirement account.

First, the individual's gain at age forty-five is not a "future" gain in the form of higher benefits (which might be discounted by the individual at a high personal discount rate) but a tax reduction available immediately for additional consumption. Moreover, valuing this as $2,190 of additional consumption at age forty-five may understate its value to the individual, who may be able to obtain a higher level of utility by saving some of that additional disposable income.

Second, the existing 12.4 percent payroll tax distorts employment and compensation decisions. While 1.96 percentage points can be thought of as the amount needed to purchase a retirement benefit, the remaining 10.44 percentage points represent a pure tax. A deadweight loss results from this tax because of the compensated change in individual labor supply broadly defined (to include not only participation and hours but also choice of job, degree of effort, location, etc.) and in the consumption of such things as fringe benefits and better working conditions that are not part of taxable payroll income. The magnitude of the deadweight loss depends on the combined marginal tax rate that results from the income and payroll taxes. Taking the combined federal and state marginal income and sales tax rates to be 25 percent implies that the net payroll tax of 10.44 percent raises the marginal tax rate from approximately 25 percent to approximately 35.5 percent. The deadweight loss rises from being proportional to the square of 0.25 (i.e., to 0.0625) to being proportional to the square of 0.355 (i.e., 0.126, about twice as large).

Since the deadweight loss reflects changes in both labor supply and the form of compensation, the relevant elasticity is the compensated elasticity of the taxable income with respect to the net-of-tax share of income (Feldstein 1995b). If we write that elasticity as ε, the increased deadweight loss due to the 10.4 percent net payroll tax can be written (following Harberger 1964; and Browning 1987) as $0.5\varepsilon(0.126 - 0.0625)(wL)/(1 - 0.355)$, where wL is the taxable payroll, and the division by $1 - 0.355$ reflects the fact that the elasticity is evaluated empirically at the net-of-tax wage rate (Browning 1987). In the current example, since the 12.4 percent payroll tax produced revenue of $2,600, the value of wL is $20,967. The increased deadweight loss is therefore

$1,032ε. Although estimates of ε for changes in the income tax for high-income individuals suggested values of ε between 1.0 and 1.5 (Feldstein 1995a; Auten and Carroll 1994), we will be conservative and assume ε = 0.5. With this value, the increased deadweight loss associated with a PAYGO tax of 12.4 percent is $516, or 2.5 percent of payroll earnings.

Note that this point is fundamentally different from the reduced payroll tax distortion discussed in Kotlikoff (1996) and in Auerbach and Kotlikoff (1987). Their analyses emphasized the fact that, in the current social security system, some individuals receive substantially higher implicit rates of return on their contributions than others. They note that, because of these differences and the great complexity of the benefit rules, individuals may disregard the link between contributions and benefits completely, treating the entire payroll tax as a pure tax for which nothing is received in return. They then assume that shifting to individualized accounts in which all individuals are treated equally can be used to eliminate the deadweight loss that results from the payroll tax distortions even if the individual accounts remain on a pay-as-you-go basis. They arrive at this conclusion by assuming that the benefits could be paid in a way that eliminates the net tax *at the margin* even though the average benefit represents a very low rate of return on the taxes paid. This is possible in their simulation model because all individuals have the same income. In effect, Auerbach and Kotlikoff require each individual to pay both a proportional payroll tax at a relatively low rate and a large lump sum tax. The revenue from the lump sum tax is used to subsidize the benefits so that the implied return on the payroll tax is equal to a market rate of return, eliminating the distorting effect of the payroll tax. As a practical matter, however, a lump sum tax equal to at least two-thirds of the average social security payroll tax would not be feasible. Although some reductions in deadweight loss could no doubt be achieved within the pay-as-you-go unfunded system by reducing the anomalies in the links between taxes and benefits,[7] those gains would be small in comparison to the gains that would be achieved by shifting from a pay-as-you-go system to a funded system. All the welfare gain from reduced distortion in our current analysis comes about because individuals are investing in higher-yielding assets.

In summary, by being in a funded program rather than the PAYGO system, our forty-five-year-old individual saves 10.4 percent of payroll in contribution and an additional 2.5 percent of payroll in reduced deadweight loss. For the individual, the gain is equivalent to 12.9 percent of payroll. Note that this gain is more than the entire initial level of the payroll tax.

The relative size of the gain depends of course on the age of the individual. For someone at age thirty, the gain is substantially larger, while, for someone on the verge of retirement, it is significantly smaller. A thirty-year-old who now pays a tax of $2,600 to buy benefits at age seventy-five could buy those

7. On the extent of these differences in effective tax rates, see Feldstein and Samwick (1992).

benefits in a funded program (with a 9 percent return) with a payment of only $55.00. A sixty-five-year-old who is buying benefits at age seventy-five can reduce his cost only from $2,600 to $1,406.

To get a very rough sense of the overall aggregate effect, consider a workforce of individuals between age thirty and age sixty-five with each year's cohort 1 percent larger than the cohort born a year earlier. If all individuals earn the same average income and save to receive benefits at age seventy-five, a PAYGO system with a 12.4 percent tax would provide the same benefit as a funded system with a 9 percent rate of return and a contribution rate of 2.2 percent. This is surprisingly close to the example of the forty-five-year-old examined above. The combination of the reduced contribution and the reduced deadweight loss due to the distorting payroll tax is equivalent to about 12.5 percent of payroll up to the social security maximum. Since the payroll covered by social security is about 40 percent of GDP (Board of Trustees 1995, 190), the gain from having a funded system rather than a PAYGO system is equal to about 5 percent of GDP.

This calculation assumes that it is appropriate to attribute the entire real pretax return of 9 percent to the mandatory individual retirement accounts. About 40 percent of the 9 percent pretax return on capital (i.e., an amount equal to a 3.6 percent return on the private capital investment) is now collected by the government in corporate taxes and property taxes. It would be reasonable and fair for this return to be given back to the capital that earned it by crediting the mandatory individual retirement accounts with a government matching contribution that supplements the income earned in the account (just as the Treasury now rebates the tax collected on social security benefits to the social security trust fund). This "government contribution" would not represent a net cost to the government since it would simply be the extra corporate tax collected because of the new funded retirement accounts.[8]

6.3 The Strategy of Privatization

The strategy of privatization that we pursue in this study does not deal with the normative issue of the proper level of social security benefits. Instead, we assume that benefits in each future year will be maintained at the same levels that would prevail in the absence of privatization. We also assume that, by investing the MIRA accounts in the market mixture of debt and equity and receiving rebates of the tax revenues collected from the corporations on the

8. It would clearly be wrong to ignore the approximately 3.6 percent return captured in taxes and credit the mandatory retirement accounts with just the net 5.4 percent. It could, however, be assumed as a matter of political economy that the government would not credit this 3.6 percent of MIRA assets back to the MIRAs but would spend it on current consumption or tax cuts. If so, it would be necessary to recalculate the mandatory retirement contributions on the basis of the lower return and to consider a way to treat the corporate tax collections as an offset to the resulting higher payroll taxes. We present such a calculation based on a 5.4 percent return on MIRA assets in sec. 6.5.5 below.

incremental MIRA capital, the MIRA funds can earn the real pretax return of 9 percent. If these funds are used to purchase annuities (so that there are no bequests to children from MIRA accounts), the full 9 percent can be used to fund retirement and survivor benefits.[9]

As noted above, the future benefits in our baseline case are not at the level implied by the formula in current law since that is not feasible without substantially raising the existing 12.4 percent payroll tax rate. The social security actuaries now project that, under current law, the real value of the trust fund begins declining in 2015 and reaches zero in 2030. Our simulations essentially reproduce this projection. To assume a feasible baseline benefit path, we assume that benefits in each year after 2030 are adjusted to the level that can be financed in that year with a 12.4 percent payroll tax. Thus, the trust fund is zero in each year after 2030.[10]

After the privatization begins, individuals (or their employers or both) are required to contribute to a mandatory individual retirement account. The amount that is contributed for each individual depends on that individual's age and is calculated to be such that, when the privatization process is fully phased in,[11] the contribution would grow at 9 percent to equal the same benefit stream in retirement that the individual would have obtained under the existing unfunded system (as modified to maintain solvency) by contributing 12.4 percent of his or her covered earnings.[12] Each individual's MIRA contribution is credited against that individual's payroll tax obligation. A temporary uniform payroll tax surcharge must therefore be levied on all employees and employers to maintain the social security trust fund on its currently projected path.[13]

In the first year of privatization, individuals and their employers in the aggregate thus pay an amount equal to the full 12.4 percent social security payroll tax plus a surcharge that in the aggregate has the value of the specified MIRA contributions.

It is tempting to say that the MIRA surcharge is unnecessary since the credit given for the MIRA contributions could instead be offset by reducing the ex-

9. We are not explicit in the current analysis about survivors or the treatment of spouses. Similarly, the 12.4 percent tax rate includes social security disability benefits, and these are implicitly incorporated in our system.

10. Section 6.9 presents an alternative analysis in which taxes are raised after 2029 to maintain the level of benefits implied by current law.

11. We discuss a phase-in method of gradually shifting from the current system to the MIRA system in sec. 6.5.

12. If all individuals make MIRA contributions in this way, the transition is similar in spirit to the system of recognition bonds used for social security privatization by Chile and other countries. It differs in defining the value of the individual's claim to be based on the benefits to which he or she is entitled rather than the taxes that he or she paid. The current strategy also has the feature that the existing payroll tax is used to pay principal and interest on the implicit "recognition bonds" and that those "bonds" are completely paid off at the death of the youngest covered worker at the time of privatization.

13. There are of course many alternative transition paths with different distributional consequences for employees of different ages. For example, if MIRA contributions are not credited against payroll tax obligations, the transition is much more favorable to younger employees and less favorable to those nearer to retirement. In principle, payroll tax rates could vary by age.

isting social security trust fund. But reducing the trust fund in this way would defeat the purpose of the MIRA contributions. The reduction in the trust fund would exactly offset the increase in capital formation in the MIRAs that provides the higher return than the current unfunded system.

To assure that the nation's aggregate capital stock increases by the amount of the MIRA contributions, we assume that the payroll tax plus the surcharge is set in each year to maintain the trust fund at the level that would have prevailed in the absence of privatization. (This is not necessary, but any decision to reduce the trust fund must be reflected in a lower capital stock and a reduction in national income calculated as the product of the reduced capital stock and the marginal product of capital, not the government bond rate.)

The pure pay-as-you-go payroll tax that is required to keep the current trust fund path unchanged declines gradually as more and more of the retirement benefits come to be funded out of the MIRAs. Eventually, the traditional payroll tax is unnecessary, and the only contribution that individuals are required to make is to the mandatory individual retirement account.[14]

Under the current law, social security benefits are based only on the taxes that individuals pay when they are thirty years old or older (technically, on the thirty-five years of highest income). If full privatization began now for all employees between the ages of thirty and sixty-five (we assume that everyone retires at age sixty-five),[15] when the current thirty-year-olds retire, they would not receive any PAYGO benefits but would receive benefits wholly on the basis of their MIRA contributions. Those who are now over the age of thirty would continue to have some vestige of PAYGO benefits as long as they live. The payroll tax could therefore continue for as long as seventy years, but at a very much reduced rate. At some point in the future, long before seventy years from now, the reduction in the PAYGO benefits to retirees would exceed the MIRA contributions. At that point and ever after that, the combination of the payroll tax and the MIRA contribution would be less than the 12.4 percent payroll tax.

The specific timing of this crossover from mandatory contributions (the payroll tax plus the MIRA contributions) that are greater than 12.4 percent to mandatory contributions that are lower than 12.4 percent will depend on such things as (1) whether participation is initially universal or phased in over time and (2) whether the MIRA contributions are immediately set to substitute completely for the 12.4 percent funding of future benefits or for just a fraction of those benefits. We focus on the case in which everyone over age twenty-nine is covered immediately but in which the MIRA contributions begin at a level equal to just one-fourth of the full amount required to fund future benefits and rise gradually until they reach the full amount after twenty-five years.

Before turning to our detailed analysis of the transition options for the U.S.

14. At some point, when the traditional payroll tax is small enough, the system of crediting MIRA contributions would be eliminated. By then, all individuals would be paying a combined MIRA contribution plus payroll tax that is substantially less than the current 12.4 percent.

15. To the extent that those who retire before (after) age sixty-five have an actuarially fair reduction (increase) in their benefits, the age of retirement does not matter for our calculations.

economy, it may be helpful to consider briefly the way that our basic transition would operate in a simple stylized economy. For this purpose, we assume that the economy experiences steady-state growth at 2.5 percent and currently has an unfunded social security program in which benefits rise at 2.5 percent a year at a level that is compatible with a constant 12.4 percent payroll tax rate. We assume also that additions to the capital stock earn a real return of 9 percent. (The key difference from the actual situation in the United States is that the U.S. combination of benefit promises, changing demography, and initial trust fund is not consistent with a 2.5 percent implicit return and is not financially viable.)

The required MIRA contributions in this steady-state economy have already been derived in section 6.2 above. We saw there that a forty-five-year-old who earned 9 percent instead of 2.5 percent could replace a 12.4 percent tax with a 1.96 percent MIRA contribution. More generally, we saw that, if the labor force is growing at 1 percent a year, the real wage rate is rising at 1.5 percent a year and, if all workers earn the same wage, the 12.4 percent tax could be replaced by a 2.2 percent MIRA contribution.

The 2.2 percent is therefore an estimate of the level of MIRA contributions that would be possible in steady state after the last PAYGO retiree had died. It is also a rough estimate of the payment that workers (and/or their employers) would have to make in the first year of the transition (before there is any benefit replacement) in addition to the 12.4 percent PAYGO tax if there is an immediate shift to full MIRA contributions.[16] Thus, the tax rises in the first year to 14.6 percent. In the second year, however, the new retirees receive some of their retirement income from the MIRA saving that they did in the previous year and therefore receive less in PAYGO benefits. Thus, 14.6 percent would be the maximum tax during the privatization period and would fall rapidly over the transition period as the amount of the future PAYGO retiree benefits is replaced by MIRA benefits.

Rather than explore the time path for this hypothetical economy, we return to the simulation analysis of the actual U.S. economy and its current and future demographic structure.

6.4 The SS-SIM Model

This section describes the micro simulation model that we use to analyze alternative privatization paths. The model has four basic components: (1) demographic projections; (2) basic economic assumptions; (3) social security rules; and (4) the response of taxpayers to changes in tax rates and the associated changes in deadweight losses. The model is calibrated so that, with the current social security rules, it reproduces the basic time series of benefits, revenues, and trust fund assets predicted in Board of Trustees (1995).

16. With a 25 percent phase-in in the first year, the corresponding incremental payment would be one-fourth of the 2.2 percent, or 0.55 percent.

6.4.1 Demographics

The unit of analysis in the simulation is the individual. We simplify the social security rules by making no specific adjustments for married couples or survivor benefits. The values of these benefits as well as of the disability benefits are all subsumed in the projected individual retirement benefits.

Our analysis incorporates the actual current age structure of the population and the Census Bureau projections of future births through 2050 and the cohort-specific life tables for individuals born through 2050.[17] To reflect the net inflow of immigrants, we scale up the projected population uniformly at every age to coincide with the aggregate projections of the Social Security Administration.

6.4.2 Economic Assumptions

The simulations assume that individuals enter the labor force at age twenty-one and work until age sixty-five (or death if that occurs sooner). Since not everyone in the population actually works during these years, and since there are workers in covered employment at younger and older ages, we select a labor force participation rate among twenty-one- to sixty-four-year-olds that gives the correct number of covered workers in 1995 (Board of Trustees 1995, 122). This is a 94 percent participation rate among individuals aged twenty-one through sixty-four. The number of workers in future years is also calibrated to the social security projections, implying small fluctuations in future labor force participation rates.

The assumed wage in 1995 is the average earnings in covered employment ($24,825). This reflects the ceiling on taxable wages ($61,200 in 1995) but overstates the taxable payroll because some employees with multiple jobs exceed the maximum taxable wage. Taxable payroll per employee has averaged about 83.5 percent of the average wage in covered employment, a ratio that we assume holds in the future as well.

We use the historic data for average earnings in covered employment in previous years and follow the intermediate assumption in Board of Trustees (1995) that, after 1995, the average real wage rises at 1.0 percent per year. The movements in the average real wage are assumed to reflect changes in the age structure of the labor force and differences among age groups in the rate of increase of wages. More specifically, on the basis of the pattern of covered earnings by age as reported in Social Security Administration (1995), we assume that annual earnings rise at $g + 3$ percent for individuals under age thirty-five, at $g + 1$ percent for individuals between thirty-five and forty-five, and at $g - 1.5$ percent for those above forty-five years old, where the value of g for each year is chosen to make the overall rise in wages equal to the historic record before 1995 and to the projected 1 percent rise after 1995.

17. Our source for the initial population numbers is Bureau of the Census (1996b). The census source of both births and mortality projections is Bureau of the Census (1996a).

The social security trustees assume that the assets in the trust fund will earn a 2.3 percent real interest rate in the future. Since the basic policies that we study leave the path of benefits and taxes (and therefore of the trust fund) unchanged, this rate of interest is not relevant for the analysis of these options.

The real marginal product of capital is assumed to be 9 percent. As noted above, the average pretax rate of return on capital in the nonfinancial corporate sector from 1960 through 1994 has been slightly above 9 percent (Rippe 1995). This figure is derived, following Feldstein, Dicks-Mireaux, and Poterba (1983), by adding corporate profits, net interest payments, and all taxes paid to measure the pretax product of capital and then dividing that by the estimate of the capital stock at replacement cost.[18] Our estimate makes no allowance for the lower return that is earned on capital outside the corporate sector or on the net effect of increased capital accumulation on the marginal product of capital and on the net international capital flow.

6.4.3 Social Security Rules

Each individual is subject to an initial social security payroll tax of 12.4 percent. Since average real wages are projected to rise at 1.0 percent a year, we increase taxable wages at that same rate.

Because we use the individual as the unit of analysis, we do not have separate survivors' benefits. The "return" on contributions to social security (and to the MIRAs) is calculated as if it is all paid in the form of annuities to the retired individuals. We also do not make separate provision for disability benefits. We include the disability tax by using the 12.4 percent tax rate but include the disability benefits with the retirement annuity.

Individuals become eligible for benefits at age sixty-five in the simulation and receive benefits until they die. In actual practice, some individuals retire earlier than sixty-five, and some wait until later to retire. To the extent that social security benefits are adjusted for the retirement age in an actuarially fair way, these differences in retirement age do not change the costs of providing benefits.

Because we do not distinguish income levels or family structures, we cannot apply the actual social security benefit rules. We therefore calculate benefits by attributing a rate of return on the taxes that each individual has paid. We follow current social security rules and assume that only those taxes paid between age thirty and age sixty-five—the highest thirty-five years of earnings—are used in calculating benefits. The cohort-specific real rates of return that we use are modifications of earlier estimates by Boskin et al. (1987); their estimates, which were for single-earner couples, have been adjusted to produce aggregate benefit amounts that coincide with the trustees' projections of the benefits implied by the current law for future years: 7.0 percent for those born before 1915, 4.21 percent for those born in 1915, 2.52 percent for those born in 1930, 1.67 percent for those born in 1945, 1.39 percent for those born in

18. These figures relate profits and interest earned in the United States to the value of the domestic capital stock.

1960, 1.39 percent for those born in 1975, and 1.43 percent for those born in 1990 or after.

Even with the lower rates of return for younger workers implied by this procedure, the projected benefits cannot be financed by the existing 12.4 percent OASDI tax rate because of the changing age structure of the population. The changing demographics cause the trust fund to be exhausted in the year 2030. Our basic simulations assume that, at that point, benefits under the existing system would be reduced to the level that can be financed on a current basis by the taxes collected with a 12.4 percent payroll tax. The calculations presented in the next section show that this requires a benefit reduction that begins at 18 percent and rises to 35 percent. Two alternatives are also examined: the analysis in section 6.8 modifies the existing inflation indexing rule, and the analysis of section 6.9 maintains the current law benefits by increasing the tax or MIRA contributions.

6.4.4 Taxpayers' Responses, Tax Rates, and Deadweight Losses

The projections of taxable earnings described in section 6.4.2 must be modified to incorporate the changes in taxpayer behavior that would result from changes in the payroll tax rates. This is important to estimate both the required payroll tax rates and the associated changes in deadweight losses. Traditional estimates of the effects of tax rates on labor supply indicate that participation rates and average hours are quite insensitive to net-of-tax wages among prime-age males and single women but much more sensitive among married women. However, this is too narrow a measure of taxpayers' responses for the current purpose. The change in revenue and therefore the required revenue neutral change in tax rates reflects not only changes in working hours but also a broader definition of *labor supply* (one that includes choice of job, degree of effort, location, etc.) as well as any shift between cash compensation and fringe benefits, improved working conditions, and other things that are not subject to the payroll tax. Feldstein (1995b) showed that the deadweight loss associated with the tax rate depends on the compensated elasticity of taxable income with respect to the net-of-tax share.

There is, unfortunately, no good evidence on this elasticity for changes in the payroll tax rate. The estimated elasticities of between 1.0 and 1.5 for the income tax (Feldstein 1995a; Auten and Carroll, 1994) are not directly relevant because they include changes in deductibles and are for higher-income individuals. In what follows, we assume that the uncompensated elasticity of labor earnings with respect to the relevant net-of-tax rate is only 0.5. Although the compensated elasticity would be larger, we also use an elasticity of 0.5 for the deadweight loss calculations. The calculation of the earnings response and the associated adjustment in the tax rate, as well as the implications for the deadweight losses, are developed in section 6.5.3.

Our analysis does not take into account the broader general equilibrium effects of the shift to a funded system. The primary general equilibrium effect is the effect of the increased national capital stock on the rate of return and on

real wages. Although the higher real wages reinforce the effect of lower tax rates to increase labor supply, the effect is smaller than the tax effect because the higher marginal product of labor does not affect the choice between taxable wages and other forms of compensation.[19]

6.5 Simulation Results for Gradual Privatization

This section begins by presenting the values of key variables under current law and then shows the "solvency adjustment" to benefits needed to avoid a tax increase when the trust fund is exhausted. It then goes on to consider the effect of a gradual privatization on tax rates and on the deadweight loss of the tax system.

6.5.1 Current Law and Baseline Simulations

Table 6.1 shows the projected values of the numbers of covered workers and of beneficiaries in each year from 1995 through 2071. (The number of beneficiaries is the number of persons who are supported by social security. For a married couple, this is two persons regardless of whether each would claim benefits as a retired worker or one would claim as a dependent spouse.)

The ratio of covered workers per beneficiary declines from the current value of 3.27 to 2.03 in the year 2031 and then continues to decline to 1.80 at the end of the period.

Table 6.2 shows our simulation of the projected values of payroll tax receipts and of retirement benefits under current law. The payroll tax revenue is the result of a constant 12.4 percent rate applied to the projected labor force with real wages per employee growing at 1.0 percent per year. The initial payroll tax per worker is $2,570. All dollar amounts are reported in constant 1995 dollars.

The retirement benefits reflect the projected numbers of retirees and the assumption that benefits are calculated by giving a return to each cohort as described above.

Table 6.3 shows how the trust fund evolves under current law. The fund is increased by the payroll taxes received, receipts from the Treasury, and interest on the fund balance, and it is reduced by the benefits paid and administrative expenses.[20] In addition, the trust fund is assumed to spend 0.8 percent of benefits on administrative costs.[21]

19. For examples of the general equilibrium analysis of the effects of social security reforms, see Auerbach and Kotlikoff (1987) and Kotlikoff (1996, chap. 7 in this volume).

20. Under current law, the Treasury adds to the social security trust fund the income tax that it collects on benefits. This starts with a very small amount ($5.13 billion in 1995) but grows rapidly because the income tax is applied to 85 percent of benefits above an *unindexed* amount of $32,000 per couple and $25,000 per single individual. The calculations of the cohort-specific rates of return are based on benefits net of the income tax so that this is already taken into account.

21. The administrative cost of the funded program is assumed to come from the difference between the assumed 9 percent rate of return and the total return of 9.30 percent that Rippe (1995) actually reported.

Table 6.1 Demographic Projections

	A. Covered Workers (millions)						
1995	141.21	142.49	143.77	145.04	146.32	147.60	148.77
2002	149.95	151.12	152.29	153.47	154.47	155.47	156.48
2009	157.48	158.49	159.06	159.63	160.20	160.78	161.35
2016	161.60	161.84	162.09	162.34	162.59	162.79	162.99
2023	163.19	163.39	163.59	163.87	164.15	164.43	164.71
2030	164.99	165.38	165.77	166.16	166.55	166.94	167.32
2037	167.70	168.09	168.47	168.85	169.11	169.38	169.65
2044	169.91	170.18	170.37	170.55	170.74	170.92	171.11
2051	171.25	171.39	171.53	171.67	171.81	171.95	172.09
2058	172.23	172.37	172.52	172.67	172.83	172.98	173.14
2065	173.30	173.44	173.58	173.72	173.87	174.01	174.15
	B. Beneficiaries (millions)						
1995	43.22	43.86	44.50	45.15	45.79	46.43	47.11
2002	47.79	48.47	49.15	49.83	50.73	51.64	52.55
2009	53.46	54.37	55.62	56.88	58.14	59.40	60.65
2016	62.15	63.65	65.14	66.64	68.14	69.59	71.04
2023	72.50	73.95	75.41	76.49	77.58	78.67	79.76
2030	80.85	81.50	82.15	82.80	83.44	84.09	84.32
2037	84.56	84.79	85.02	85.25	85.48	85.70	85.93
2044	86.16	86.38	86.70	87.01	87.32	87.63	87.94
2051	88.42	88.90	89.38	89.86	90.34	90.82	91.30
2058	91.78	92.26	92.73	93.13	93.52	93.92	94.31
2065	94.70	95.05	95.39	95.73	96.08	96.42	96.76
	C. Support Ratio						
1995	3.27	3.25	3.23	3.21	3.20	3.18	3.16
2002	3.14	3.12	3.10	3.08	3.04	3.01	2.98
2009	2.95	2.92	2.86	2.81	2.76	2.71	2.66
2016	2.60	2.54	2.49	2.44	2.39	2.34	2.29
2023	2.25	2.21	2.17	2.14	2.12	2.09	2.06
2030	2.04	2.03	2.02	2.01	2.00	1.99	1.98
2037	1.98	1.98	1.98	1.98	1.98	1.98	1.97
2044	1.97	1.97	1.97	1.96	1.96	1.95	1.95
2051	1.94	1.93	1.92	1.91	1.90	1.89	1.88
2058	1.88	1.87	1.86	1.85	1.85	1.84	1.84
2065	1.83	1.82	1.82	1.81	1.81	1.80	1.80

The simulations show that the net additions to the trust fund continue to be positive until 2012 and then turn negative. Even after net additions to the trust fund (from taxes and Treasury transfers minus benefits and administrative costs) become negative, the trust fund continues to grow because of the interest earned on the government bonds in which the funds are invested and the Treasury tax collections on benefits that are transferred to the trust fund. At its peak in the year 2015, the trust fund has $1,482 billion (at the 1995 price level). The

Table 6.2 **Current Law: Taxes and Benefits**

	A. Payroll Taxes ($billions)						
1995	362.96	369.91	376.96	384.12	391.38	398.75	405.93
2002	413.23	420.63	428.13	435.75	442.98	450.32	457.76
2009	465.30	472.95	479.40	485.94	492.56	499.26	506.05
2016	511.90	517.81	523.79	529.84	535.95	541.98	548.07
2023	554.23	560.47	566.76	573.41	580.13	586.93	593.81
2030	600.76	608.21	615.74	623.37	631.08	638.89	646.75
2037	654.70	662.75	670.89	679.13	687.01	694.97	703.03
2044	711.17	719.41	727.40	735.48	743.64	751.90	760.24
2051	768.47	776.79	785.19	793.69	802.27	810.97	819.75
2058	828.63	837.61	846.68	855.92	865.26	874.70	884.25
2065	893.90	903.58	913.37	923.26	933.26	943.37	953.59
	B. Payroll Taxes per Worker ($thousands)						
1995	2.57	2.60	2.62	2.65	2.67	2.70	2.73
2002	2.76	2.78	2.81	2.84	2.87	2.90	2.93
2009	2.95	2.98	3.01	3.04	3.07	3.11	3.14
2016	3.17	3.20	3.23	3.26	3.30	3.33	3.36
2023	3.40	3.43	3.46	3.50	3.53	3.57	3.61
2030	3.64	3.68	3.71	3.75	3.79	3.83	3.87
2037	3.90	3.94	3.98	4.02	4.06	4.10	4.14
2044	4.19	4.23	4.27	4.31	4.36	4.40	4.44
2051	4.49	4.53	4.58	4.62	4.67	4.72	4.76
2058	4.81	4.86	4.91	4.96	5.01	5.06	5.11
2065	5.16	5.21	5.26	5.31	5.37	5.42	5.48
	C. Retirement Benefits ($billions)						
1995	324.72	331.44	338.02	344.77	351.65	358.83	366.48
2002	374.17	382.29	390.56	398.92	409.38	420.00	430.97
2009	441.79	452.67	466.87	482.00	497.25	512.61	528.26
2016	546.18	564.51	582.85	601.17	619.56	637.58	655.33
2023	673.18	690.91	708.69	723.30	738.02	752.92	767.96
2030	783.16	794.17	804.99	816.10	827.44	839.10	846.86
2037	854.47	862.13	870.04	878.36	887.20	896.59	906.75
2044	917.61	929.38	942.67	956.75	971.47	986.70	1,002.99
2051	1,021.89	1,040.90	1,061.14	1,082.29	1,104.54	1,127.39	1,150.55
2058	1,174.02	1,197.94	1,222.39	1,245.46	1,268.22	1,290.68	1,312.88
2065	1,334.81	1,355.78	1,376.50	1,396.95	1,417.22	1,437.30	1,457.25
	D. Benefits per Retiree ($thousands)						
1995	7.51	7.56	7.60	7.64	7.68	7.73	7.78
2002	7.83	7.89	7.95	8.01	8.07	8.13	8.20
2009	8.26	8.33	8.39	8.47	8.55	8.63	8.71
2016	8.79	8.87	8.95	9.02	9.09	9.16	9.22
2023	9.29	9.34	9.40	9.46	9.51	9.57	9.63
2030	9.69	9.74	9.80	9.86	9.92	9.98	10.04
2037	10.11	10.17	10.23	10.30	10.38	10.46	10.55
2044	10.65	10.76	10.87	11.00	11.13	11.26	11.41
2051	11.56	11.71	11.87	12.04	12.23	12.41	12.60
2058	12.79	12.99	13.18	13.37	13.56	13.74	13.92
2065	14.09	14.26	14.43	14.59	14.75	14.91	15.06

Table 6.3 **Current Law: Trust Fund**

	A. Net Addition to Trust Fund ($billions)						
1995	35.65	35.82	36.24	36.59	36.92	37.05	36.53
2002	36.06	35.28	34.45	33.63	30.33	26.95	23.34
2009	19.97	16.65	8.79	.08	−8.67	−17.44	−26.43
2016	−38.65	−51.22	−63.72	−76.14	−88.57	−100.71	−112.50
2023	−124.33	−135.97	−147.60	−155.68	−163.79	−172.01	−180.29
2030	−188.66	−192.32	−195.69	−199.26	−202.97	−206.92	−206.88
2037	−206.60	−206.27	−206.11	−206.26	−207.29	−208.79	−210.98
2044	−213.77	−217.41	−222.81	−228.92	−235.60	−242.70	−250.77
2051	−261.60	−272.44	−284.43	−297.26	−311.10	−325.44	−340.00
2058	−354.78	−369.92	−385.49	−399.50	−413.10	−426.30	−439.13
2065	−451.60	−463.05	−474.15	−484.86	−495.29	−505.43	−515.32
	B. Total Amount in Trust Fund ($billions)						
1995	501.70	559.60	619.90	681.29	743.41	805.73	867.24
2002	928.45	988.80	1,047.97	1,105.71	1,161.47	1,215.13	1,266.42
2009	1,315.52	1,362.43	1,402.56	1,434.90	1,459.23	1,475.34	1,482.84
2016	1,478.30	1,461.08	1,430.97	1,387.74	1,331.09	1,261.00	1,177.50
2023	1,080.26	969.14	843.83	707.56	560.05	400.91	229.84
2030	46.46	−144.79	−343.81	−550.98	−766.62	−991.17	−1,220.85
2037	−1,455.54	−1,695.29	−1,940.39	−2,191.27	−2,448.96	−2,714.08	−2,987.48
2044	−3,269.97	−3,562.58	−3,867.33	−4,185.20	−4,517.06	−4,863.65	−5,226.28
2051	−5,608.09	−6,009.51	−6,432.17	−6,877.36	−7,346.64	−7,841.05	−8,361.40
2058	−8,908.49	−9,483.30	−10,086.91	−10,718.41	−11,378.03	−12,066.03	−12,782.68
2065	−13,528.28	−14,302.48	−15,105.58	−15,937.88	−16,799.74	−17,691.56	−18,613.79

decline in the trust fund after that date causes the fund to be exhausted in the year 2030, a date that also coincides with the social security actuaries' projection.

Since a negative trust fund is not feasible, for the rest of our calculations in this section we assume that the current system shifts to a pay-as-you-go basis after 2030, with benefits reduced to keep outlays equal to the funds raised by a combination of the 12.4 percent payroll tax and the Treasury tax collections on existing benefits, all net of the small administrative charge. Table 6.4 shows the percentage by which benefits must be reduced beginning in 2031. The reduction goes from about 18 percent in that year to 24 percent in the next and then rises steadily. These simulation results provide the basis for the alternative privatization paths that we now consider.

6.5.2 Phase-In from Partial to Total Privatization

Table 6.5 shows the effect of starting with a partial privatization for everyone and then expanding the privatized share until it completely substitutes for the unfunded program. More specifically, in the first year individuals are required to contribute to the MIRA an amount that at a 9 percent rate of return will accumulate enough by age sixty-five to replace one-fourth of the correspond-

Table 6.4 **Current Law: Solvency Adjustment**

	A. Fraction by Which Benefits Must Be Reduced (%)						
1995	.00	.00	.00	.00	.00	.00	.00
2002	.00	.00	.00	.00	.00	.00	.00
2009	.00	.00	.00	.00	.00	.00	.00
2016	.00	.00	.00	.00	.00	.00	.00
2023	.00	.00	.00	.00	.00	.00	.00
2030	.00	18.09	24.12	24.22	24.34	24.46	24.24
2037	23.99	23.74	23.50	23.30	23.18	23.10	23.08
2044	23.11	23.21	23.45	23.74	24.06	24.40	24.80
2051	25.40	25.97	26.59	27.25	27.94	28.64	29.32
2058	29.98	30.63	31.29	31.82	32.32	32.77	33.18
2065	33.56	33.88	34.17	34.43	34.67	34.89	35.08
	B. New Path of Retirement Benefits ($billions)						
1995	324.72	331.44	338.02	344.77	351.65	358.83	366.48
2002	374.17	382.29	390.56	398.92	409.38	420.00	430.97
2009	441.79	452.67	466.87	482.00	497.25	512.61	528.26
2016	546.18	564.51	582.85	601.17	619.56	637.58	655.33
2023	673.18	690.91	708.69	723.30	738.02	752.92	767.96
2030	783.16	650.54	610.86	618.42	626.08	633.82	641.62
2037	649.51	657.49	665.57	673.74	681.55	689.46	697.45
2044	705.53	713.70	721.63	729.64	737.74	745.93	754.21
2051	762.37	770.62	778.96	787.39	795.91	804.53	813.25
2058	822.06	830.96	839.96	849.13	858.40	867.76	877.23
2065	886.80	896.41	906.12	915.93	925.85	935.88	946.02

Table 6.5 **Phase-In from Partial to Total Privatization**

	A. Mandatory Individual Contributions ($billions)						
1995	20.25	23.12	26.18	29.44	32.88	36.43	40.11
2002	44.07	48.04	52.22	56.67	61.11	65.70	70.25
2009	75.07	79.99	84.82	88.94	93.25	97.70	102.05
2016	106.10	110.13	114.06	117.82	121.27	120.74	120.64
2023	120.09	119.59	118.81	118.04	117.53	117.14	116.90
2030	116.82	117.11	118.10	118.88	119.58	120.03	120.34
2037	121.17	122.29	123.42	124.33	125.21	126.20	127.08
2044	127.96	128.60	129.28	129.89	130.58	131.44	132.06
2051	132.69	133.78	134.61	135.35	135.87	136.38	137.07
2058	137.91	138.89	139.94	141.10	142.35	143.70	145.14
2065	146.67	148.27	149.94	151.68	153.49	155.35	157.25
	B. Mandatory Individual Contributions (% of Payroll)						
1995	.69	.78	.86	.95	1.04	1.13	1.23
2002	1.32	1.42	1.51	1.61	1.71	1.81	1.90
2009	2.00	2.10	2.19	2.27	2.35	2.43	2.50
2016	2.57	2.64	2.70	2.76	2.81	2.76	2.73
2023	2.69	2.65	2.60	2.55	2.51	2.47	2.44
2030	2.41	2.39	2.38	2.36	2.35	2.33	2.31
2037	2.29	2.29	2.28	2.27	2.26	2.25	2.24
2044	2.23	2.22	2.20	2.19	2.18	2.17	2.15
2051	2.14	2.14	2.13	2.11	2.10	2.09	2.07
2058	2.06	2.06	2.05	2.04	2.04	2.04	2.04
2065	2.03	2.03	2.04	2.04	2.04	2.04	2.04
	C. Benefits Replaced Owing to Privatization ($billions)						
1995	.00	.13	.38	.78	1.35	2.18	3.25
2002	4.52	6.22	8.25	10.62	13.57	17.03	21.32
2009	25.93	31.17	37.29	45.26	53.82	63.07	73.44
2016	85.18	97.86	111.70	126.74	143.23	160.99	178.93
2023	198.55	218.93	240.74	262.44	284.59	307.56	331.29
2030	355.89	310.24	303.98	320.95	338.42	356.61	375.26
2037	393.42	411.53	430.08	449.32	468.52	487.90	507.68
2044	527.69	548.06	568.03	587.98	607.72	627.03	646.30
2051	664.97	682.81	700.46	717.66	734.44	750.59	766.05
2058	780.86	795.15	808.95	822.37	835.40	848.07	860.44
2065	872.55	884.37	896.00	907.47	918.83	930.10	941.30
	D. Payroll Tax Needed to Maintain Trust Fund Trajectory (% of Payroll)						
1995	12.40	12.40	12.39	12.37	12.36	12.33	12.30
2002	12.26	12.22	12.16	12.10	12.02	11.93	11.82
2009	11.70	11.58	11.43	11.24	11.03	10.82	10.59
2016	10.32	10.04	9.73	9.41	9.06	8.69	8.32
2023	7.92	7.52	7.09	6.68	6.27	5.85	5.43
2030	5.00	6.02	6.23	5.96	5.70	5.42	5.15
2037	4.89	4.64	4.39	4.13	3.88	3.63	3.37
2044	3.13	2.88	2.64	2.41	2.19	1.98	1.77

(*continued*)

Table 6.5 (continued)

	D. Payroll Tax Needed to Maintain Trust Fund Trajectory (% of Payroll)						
2051	1.58	1.41	1.25	1.10	.96	.83	.72
2058	.62	.53	.46	.39	.33	.28	.24
2065	.20	.17	.14	.11	.09	.08	.06
	E. Total Payroll Tax Plus Mandatory Contribution (% of Payroll)						
1995	13.09	13.17	13.25	13.32	13.40	13.46	13.53
2002	13.59	13.63	13.67	13.71	13.73	13.74	13.72
2009	13.70	13.67	13.62	13.51	13.38	13.25	13.09
2016	12.89	12.68	12.43	12.17	11.87	11.45	11.05
2023	10.61	10.16	9.69	9.23	8.78	8.32	7.87
2030	7.41	8.41	8.61	8.33	8.05	7.75	7.45
2037	7.18	6.93	6.67	6.40	6.14	5.88	5.62
2044	5.36	5.09	4.84	4.60	4.36	4.14	3.93
2051	3.73	3.55	3.38	3.21	3.06	2.92	2.79
2058	2.69	2.59	2.51	2.43	2.37	2.32	2.27
2065	2.23	2.20	2.17	2.15	2.13	2.12	2.11

ing unfunded social security benefits. In the second year, the share of retirement benefits that is to be prefunded (by that year's contributions) rises from 25 to 28 percent. The privatized share increases in this way by 3 percentage points a year for twenty-five years until MIRA contributions are enough to prefund 100 percent of the benefits associated with that year's contributions. (These figures ignore the effect of changes in tax rates on pretax earnings, a restriction that we correct in sec. 6.5.3.)

The contribution to the mandatory individual retirement account is $20.3 billion in 1995. This implies that the MIRA contributions are equivalent to 0.69 percent of taxable payroll, an amount shown in panel B of table 6.5. This measures the extent to which the existing generation of employees is required in the first year of the transition to pay for their own retirement as well as for the existing retiree benefits. It is clearly very much less than having to pay twice the existing payroll tax (i.e., an additional 12.4 percent), as some critics of privatization imply will happen.

Since there are no MIRA benefits paid in 1995, panel C of table 6.5 shows no benefits replaced owing to privatization for 1995. The basic payroll tax needed to meet the existing benefit requirements and to keep the trust fund on its original trajectory therefore remains 12.40 percent of payroll, the amount shown for 1995 in panel D of the table.

Combining the 0.69 percent of payroll MIRA contribution with the 12.4 percent payroll tax needed to maintain the trust fund trajectory implies total contributions of 13.09 percent of payroll, the amount shown in panel E of the table.[22]

22. It would of course be possible to keep the combined MIRA contributions and payroll tax unchanged while meeting existing benefit obligations by reducing the trust fund or by explicit

As the privatization program moves forward through time, two major changes occur. First, the amount of MIRA contributions rises (1) as the privatization share rises from 25 to 100 percent over a twenty-five-year phase-in period and (2) as the labor force grows and wages increase. This increase in MIRA contributions is shown in panel A of table 6.5. The changing age structure of the workforce and the changes in relative benefit levels projected for the future also cause the mandatory individual contributions as a percentage of payroll to vary in a moderate way; panel B of table 6.5 shows that the contribution per dollar of payroll reaches a high of 2.81 percent of payroll in 2011 and then declines to a long-run level of 2.04 percent.

The second major change is the gradual replacement of the unfunded social security benefits with the MIRA benefits. In 1996, those who were sixty-four years old in 1995 retire and receive some benefits on the basis of their MIRA contributions in the previous year. These benefits are just $0.13 billion (as shown in panel C of table 6.5). By the year 2000, these benefits are $1.35 billion; this reduces the pay-as-you-go tax rate required to maintain the trust fund trajectory from 12.40 to 12.36 percent.

Over time, this benefit replacement becomes much more important. After twenty years (in 2014), MIRA benefits reach $63.07 billion and therefore permit the payroll tax needed to maintain the trust fund trajectory to decline from the initial 12.40 percent to 10.82 percent, as shown in panel D of table 6.5. Seven years later, in 2021, the required pay-as-you-go tax is down to 8.69 percent.

Those individuals who are thirty years old or younger in 2020 (when the MIRA system is fully phased in) eventually finance their retirement solely with MIRA withdrawals. Unlike earlier cohorts, they receive no PAYGO benefits. Since we assume that no one lives beyond age one hundred, this means that the PAYGO system is completely finished by the seventieth year after privatization begins (i.e., in 2090). The results in panel D of table 6.5 show that, as a practical matter, the required pay-as-you-go payroll tax is essentially zero (i.e., less than 0.5 percent) in 2059 and beyond.

Combining the MIRA contribution (panel B) and the required payroll tax (panel D) produces the combined payroll tax and MIRA contribution shown in panel E of table 6.5. This combination remains higher than the existing 12.4 percent payroll tax for twenty-four years. After that, the combined cost falls rapidly. In the thirtieth year, the combined ratio is down to 10.16 percent, and by the fortieth year it is down to only 8.02 percent, less than two-thirds of the original 12.4 percent payroll tax that would otherwise be required to finance

borrowing from the public by the social security program. Either of these would increase the unified budget deficit and reduce national saving by an amount that offsets the increased national saving in the MIRAs. Of course, if additional actions were taken to keep the budget deficit unchanged, the national saving rate would still increase by the amount of the MIRA accumulations. The possibility of these additional changes in government spending or taxes lies beyond the scope of the current paper.

the same benefits. These figures imply that an individual who is a young employee at the start of privatization pays slightly higher taxes plus contributions in the early years but then sharply lower total taxes and contributions during later years. Before looking at the implication of such individual time paths for the present value of such payments, we consider the effect of the plan on taxpayers' behavior and the implications of that response for tax rates and deadweight losses.

6.5.3 Behavioral Response, Required Tax Rates, and Deadweight Losses

The existing payroll tax causes employees to reduce their labor supply (broadly defined to include effort, occupational choice, and location as well as the number of hours worked) and to substitute untaxed fringe benefits and nicer working conditions for taxable cash compensation. We model the reduction in taxable payroll earnings as the product of an elasticity and the change in the marginal net-of-tax share of wages, that is, as the product of an elasticity and "one minus the effective marginal tax rate." The effective marginal tax rate includes the federal and state personal income tax rate, the effective state and local sales tax rates, and the *net* payroll tax rate. We assume (quite conservatively) a rate of 20 percent for the taxes other than the payroll tax. The *net* payroll tax rate is the difference between the payroll tax payment (12.4 percent of payroll) and the amount that the individual would have to pay to purchase the same benefit at the higher rate of return available in the market.

The cost of purchasing that benefit is calculated in the following way. If the implicit rate of return that the individual earns on social security payroll taxes[23] is denoted γ, a dollar of payroll tax paid at age a could provide a cash benefit of $(1 + \gamma)^{65-a}$ at age sixty-five. If ANN65(γ) is the actuarial present value of a dollar a year from age sixty-five to death based on a return of γ, the dollar of payroll tax paid at age a earns an annuity starting at age sixty-five of $(1 + \gamma)^{65-a}/\text{ANN65}(\gamma)$. To purchase that same annuity in a private pension plan, an employer would have to spend only $[(1 + \mu)^{65-a}/\text{ANN65}(\mu)]^{-1}$, where μ is the rate of return earned in the private pension alternative. Because pension funds do not pay tax on their income, a plausible value for μ is the return on capital net of corporate and property taxes but before all personal income taxes. A pretax real return of 9 percent and a corporate tax rate (including state taxes and property taxes) of 40 percent imply $\mu = 5.4$ percent. Since μ is substantially greater than γ, there is a substantial effective tax implied by the payroll tax. For example, since someone born in 1960 would receive a return on social security taxes of only ($\gamma =$) 1.39 percent, each dollar of payroll tax could be replaced by only 9.7 cents of contribution to a private pension fund at age thirty. This implies that 90.3 percent of the 12.4 percent payroll tax is a pure tax since the same benefits could be bought for a private pension contribu-

23. Recall that this implicit return has declined from 7.0 percent among individuals born before 1915 to less than 1.5 percent among individuals born after 1960.

tion of only 1.2 percent of the individual's payroll. More generally, we define the effective payroll tax rate as

$$\{1 - [(1 + \gamma)/(1 + \mu)]^{65-a}[\text{ANN65}(\mu)/\text{ANN65}(\gamma)]\}\tau_p$$

where τ_p is the payroll tax rate (currently 0.124). Alternatively, we can write the individual's effective payroll tax rate as $\tau_p - \beta$, where

$$\beta = [(1 + \gamma)/(1 + \mu)]^{65-a}[\text{ANN65}(\mu)/\text{ANN65}(\gamma)]\tau_p$$

is the value of the benefit that the individual receives per dollar of incremental earnings.[24]

Combining this with the marginal personal income tax rate (θ) implies a net-of-tax share under existing social security rules of $1 - \theta - \tau_p + \beta$. We denote this net-of-tax share by N_0. For example, with $\theta = 0.20$, $\gamma = 0.0139$, and $\mu = 0.054$, the net-of-tax share for a current thirty-five-year-old is $N_0 = 0.688$.

In the MIRA system, the individual would continue to pay a payroll tax to meet the remaining pay-as-you-go benefit obligations plus a surcharge to offset the revenue lost because individuals reduce their regular payroll tax obligations by the amount of their MIRA contributions. If we denote this combined tax plus surcharge (shown in panel E of table 6.5 as "total payroll tax plus mandatory contribution") by τ_p^*, we can write the individual's net-of-tax share under the MIRA system as $N_1 = 1 - \theta - \tau_p^* + \beta$ (where β is the same as in the current system since the value of the benefits is unchanged by switching to the MIRA system).

At first, the net-of-tax share declines because τ_p^* is greater than the τ_p under the existing system. After a while, however, the net-of-tax rate rises, and the corresponding effective marginal tax rate falls.

Our assumed elasticity of 0.5 implies that taxable income rises by a factor of $[N_1/N_0]^{0.5}$. This in turn means that the payroll tax revenue collected by tax rate τ_p with the initial labor supply can be collected at a lower tax rate $\tau_p' = \tau_p[N_1/N_0]^{-0.5}$. Similarly, the personal income tax rate that collects the same revenue falls to $\theta' = \theta[N_1/N_0]^{-0.5}$.

The path of the adjusted tax rates is shown in panels B and C of table 6.6. In the first year, the combination of the MIRA surcharge and the unchanged payroll tax causes the net-of-tax share to fall and therefore the aggregate labor supply to decline. The effect is small and is offset by raising the payroll tax rate from 12.40 to 12.46 percent. Similarly, the personal income tax rate must be raised only from 20 to 20.10 percent. But, by the eighth year, the payroll tax rate is lower than the initial 12.4 percent, and, by year 25, the increased taxable labor income causes the payroll tax rate to be lower than it would be with no allowance for the change in labor income (i.e., by year 25, the payroll

24. Our analysis does not classify individuals by income level and therefore does not distinguish between the average and the marginal benefits per dollar of earnings.

Table 6.6 **Effect of Phase-In Partial Privatization on Tax Base and DWL**

	A. Payroll Tax Needed to Maintain Trust Fund with No Behavioral Response[a]						
1995	12.40	12.40	12.39	12.37	12.36	12.33	12.30
2002	12.26	12.22	12.16	12.10	12.02	11.93	11.82
2009	11.70	11.58	11.43	11.24	11.03	10.82	10.59
2016	10.32	10.04	9.73	9.41	9.06	8.69	8.32
2023	7.92	7.52	7.09	6.68	6.27	5.85	5.43
2030	5.00	6.02	6.23	5.96	5.70	5.42	5.15
2037	4.89	4.64	4.39	4.13	3.88	3.63	3.37
2044	3.13	2.88	2.64	2.41	2.19	1.98	1.77
2051	1.58	1.41	1.25	1.10	.96	.83	.72
2058	.62	.53	.46	.39	.33	.28	.24
2065	.20	.17	.14	.11	.09	.08	.06
	B. New Payroll Tax Rate Allowing for Labor Supply Response						
1995	12.46	12.46	12.46	12.46	12.44	12.43	12.40
2002	12.37	12.32	12.27	12.21	12.13	12.04	11.93
2009	11.81	11.68	11.53	11.32	11.11	10.89	10.64
2016	10.36	10.06	9.74	9.39	9.03	8.63	8.24
2023	7.82	7.40	6.96	6.53	6.11	5.69	5.26
2030	4.83	5.86	6.07	5.80	5.53	5.25	4.98
2037	4.72	4.47	4.22	3.96	3.71	3.47	3.22
2044	2.98	2.74	2.51	2.28	2.07	1.87	1.67
2051	1.49	1.33	1.17	1.03	.90	.78	.67
2958	.58	.50	.43	.36	.31	.26	.22
2065	.18	.15	.13	.10	.08	.07	.05
	C. New Personal Income Tax Allowing for Labor Supply Response						
1995	20.10	20.11	20.12	20.13	20.14	20.15	20.16
2002	20.17	20.18	20.18	20.19	20.19	20.19	20.19
2009	20.19	20.18	20.17	20.16	20.14	20.12	20.10
2016	20.07	20.04	20.00	19.97	19.93	19.87	19.81
2023	19.75	19.69	19.63	19.57	19.51	19.45	19.39
2030	19.33	19.46	19.49	19.45	19.42	19.38	19.34
2037	19.31	19.27	19.24	19.21	19.17	19.14	19.11
2044	19.08	19.05	19.02	18.99	18.96	18.93	18.91
2051	18.88	18.86	18.84	18.82	18.80	18.79	18.77
2058	18.76	18.75	18.74	18.73	18.72	18.72	18.71
2065	18.71	18.70	18.70	18.70	18.70	18.69	18.69
	D. Change in Deadweight Loss Owing to Privatization ($billions)						
1995	3.78	4.49	5.22	6.00	6.77	7.50	8.18
2002	8.87	9.39	9.87	10.36	10.64	10.80	10.72
2009	10.60	10.32	9.75	8.37	6.90	5.29	3.36
2016	1.00	−1.63	−4.56	−7.81	−11.46	−16.30	−20.96
2023	−26.07	−31.24	−36.69	−42.04	−47.31	−52.60	−57.90
2030	−63.22	−56.17	−55.84	−59.86	−63.99	−68.30	−71.35
2037	−74.04	−76.53	−79.01	−81.58	−84.04	−86.41	−88.79
2044	−91.12	−93.53	−95.78	−97.96	−100.01	−101.88	−103.77

Table 6.6 (continued)

	D. Change in Deadweight Loss Owing to Privatization ($billions)						
2051	−105.52	−107.00	−108.49	−109.92	−111.31	−112.59	−113.69
2058	−114.63	−115.43	−116.16	−116.82	−117.40	−117.91	−118.37
2065	−118.77	−119.12	−119.42	−119.68	−119.92	−120.13	−120.32
	E. Change in Deadweight Loss as % of Covered Wages						
1995	.13	.15	.17	.19	.21	.23	.25
2002	.27	.28	.29	.29	.30	.30	.29
2009	.28	.27	.25	.21	.17	.13	.08
2016	.02	−.04	−.11	−.18	−.27	−.37	−.47
2023	−.58	−.69	−.80	−.91	−1.01	−1.11	−1.21
2030	−1.30	−1.15	−1.12	−1.19	−1.26	−1.33	−1.37
2037	−1.40	−1.43	−1.46	−1.49	−1.52	−1.54	−1.57
2044	−1.59	−1.61	−1.63	−1.65	−1.67	−1.68	−1.69
2051	−1.70	−1.71	−1.71	−1.72	−1.72	−1.72	−1.72
2058	−1.72	−1.71	−1.70	−1.69	−1.68	−1.67	−1.66
2065	−1.65	−1.63	−1.62	−1.61	−1.59	−1.58	−1.56

[a]Panel D of table 6.5.

tax rate in panel B of table 6.6 is less than the payroll tax rate in panel D of table 6.5). The personal income tax rate in that year is also lower than its no-behavioral-response value.

By year 52, the personal income tax rate is reduced from 20 to 19 percent. The payroll tax rate is also reduced by one-twentieth, from 2.61 to 2.48 percent.

The changes in the rates of payroll tax and income tax cause corresponding changes in the deadweight loss of the tax system. Using the traditional Harberger-Browning approximation for the deadweight loss, the change in the deadweight loss can be written

$$\Delta \text{DWL} = 0.5\varepsilon[t_1^2 - t_0^2](1 - t_0)^{-1}wL,$$

where wL is the current payroll tax base, $t_0 = 1 - N_0$, and $t_1 = 1 - N_1$.

Panel D of table 6.6 shows the annual changes in the deadweight loss that result from the changes in net-of-tax shares. The annual deadweight loss of the tax system initially rises by about $3.8 billion, an amount equivalent to 0.13 percent of covered wages (as shown in panel E of table 6.6). At its maximum, the increased deadweight loss is 0.30 percent of payroll (in years 11 and 12). By year 23 (2017), the shift to an MIRA system is reducing the deadweight. The decline in the overall deadweight loss of the tax system rises rapidly to $53 billion in 2028, $100 billion in 2048, etc. In the final year of the simulations, the reduced deadweight loss is 1.56 percent of covered wages.

Putting the pieces together, the analysis in table 6.5 and 6.6 shows that, in the long run, privatization reduces the burden on employees from a 12.4 per-

cent payroll tax in the current pay-as-you-go system to a mandatory MIRA contribution of 2.04 percent of payroll (panel B of table 6.5)[25] and reduces the deadweight loss of the income and payroll taxes by 1.57 percent of payroll (panel E of table 6.6). The combined gain to individuals is the sum of the reduction in the cash contributions (12.4 percent − 2.04 percent = 10.36 percent of payroll) and the reduction in the deadweight loss of the tax system (1.56 percent of payroll) for a combined gain of 11.92 percent of payroll. The long-run gain is thus equal to almost the entire current tax paid by employers and employees and is achieved without any reduction in the retirement benefits below what could be purchased with the current 12.4 percent payroll tax.

In the earlier years of the transition, the net effect on real disposable income (adjusted for the change in the deadweight loss) is at first negative and then becomes a positive gain. Thus, in the first year, there is (1) no effect on the payroll tax rate,[26] (2) an MIRA surcharge of 0.69 percent, and (3) an increased deadweight loss of 0.13 percent of payroll. The total burden rises by 0.82 percent of payroll to 13.22 percent. By year 15, (1) the payroll tax rate is down to 11.7 percent, a decline of 0.7 percent of payroll, (2) the MIRA surcharge is 2.00 percent of payroll, and (3) the deadweight loss of the tax system is increased by 0.28 percent of payroll. The total burden rises by only 1.58 percent of payroll. But, by year 25, the real disposable income is higher under the MIRA system: the payroll tax is only 9.41 percent, the MIRA surcharge 2.76 percent; the combined 12.17 percent rate implies that the deadweight loss is reduced (a reduction of 0.18 percent of payroll), implying a net burden of 11.99 percent of payroll. After that, the net burden falls rapidly. By year 35, the combination of the payroll tax and the MIRA surcharge is only 7.87 percent of payroll, and the deadweight loss reduction is 1.21 percent of payroll, implying a net burden of 6.66 percent of payroll and therefore a net gain of 5.74 percent of payroll.

Looking at the aggregate gains and losses (i.e., multiplying these percentage of payroll changes by the aggregate payroll) shows that the present value of the changes during the first forty-one years is positive at any real discount rate of 5 percent or less. As the horizon extends beyond forty-one years, the present value of the changes becomes increasingly positive. Even with a very high real discount rate of 7 percent, the present value of the changes is positive for any horizon of fifty-one years or more. The shift to a privatized plan with MIRA accounts using the transition path analyzed in this section thus has a positive aggregate present value for all plausible discount rates and does so even if the horizon is limited to only fifty-one years.

25. The actual long-run MIRA contribution is reduced from 2.04 to 1.94 percent of payroll because the lower marginal tax rates cause an increase in payroll income. The correct way to compare the reduced cash tax burden (i.e., the effect on net income) is, however, to use the payroll tax rate on the initial base.

26. To calculate the change in real disposable income, it is appropriate to use the tax rate that would be applied to the original tax base (12.40 percent) rather than the tax rate that would be applied to the slightly reduced tax base (12.46 percent). Of course, the deadweight loss calculation does use the higher tax rate.

The next section discusses what happens to the individual initial age cohorts during this transition.

6.5.4 The Effects of the Transition on Different Age Cohorts

The transition option that we have been analyzing is more favorable to younger employees (and, of course, to future generations) than to those who are currently in middle age or near retirement. An analysis of the distribution of gains by the current age cohorts is interesting in itself and shows that the gains and losses cannot be redistributed among the initial generation of employees in a way that makes everyone better off. It also shows that the present value of the losses to those in the initial generation of employees who do lose are relatively very small.

To study this, we calculate the lifetime path of the payroll taxes, MIRA surcharges, and deadweight loss changes for a representative individual in each age cohort from age five to age sixty.[27] For each individual, the net gain in each year is the difference between the payroll tax (in constant 1995 dollars) that the individual would pay at the 12.4 percent rate in the current pay-as-you-go system and the sum of the payroll tax, the MIRA surcharge, and the deadweight loss change under the MIRA system.

Table 6.7 shows the resulting paths of net gains for individuals who are twenty-five, forty, and fifty-five years old in 1995, the assumed first year of the program. Note that the twenty-five-year-olds are affected for forty years while the forty- and fifty-five-year-olds are affected for shorter periods until they retire at age sixty-five.

During the first two decades, each of these representative individuals incurs a small loss, exceeding 2 percent of payroll only for the oldest age group. When the current twenty-five-year-olds reach age fifty, they begin to have positive annual benefits.

Table 6.8 summarizes the actuarial present values of these annual effects of privatization on representative individuals in each initial age cohort from five through sixty years old. Estimates are presented for three different real discount rates. The common feature among all these figures is that they are quite small for existing employees (aged twenty through sixty), indicating that the transition generations do not pay a large price for the benefits that will accrue to future generations.

With a real discount rate of 3 percent, the initial cohort of fifty-year-olds incurs lifetime losses with an actuarial present value of $4,680. The lifetime gains to those who are twenty years old when privatization begins are worth

27. The representative individual is someone with mean earnings for that age cohort. The issues associated with income distribution and the redistribution of the current social security program to individuals with low lifetime covered earnings are discussed in sec. 6.6.

The changes in the deadweight losses involve the approximating assumption that all the change in the deadweight loss that results from the changes in the marginal tax rates faced by the individual accrues to that individual. While this is true when there is no preexisting tax rate, part of the gain that results from a change in an existing tax rate accrues to the government in the form of additional revenue. Our calculation implicitly assumes that this is returned to the individual.

Table 6.7 **Net Gains (% of payroll) from Phase-In Partial Privatization (by cohort)**

	Age in 1995 = 25						
1995	−.08	−.18	−.28	−.37	−.47	−1.06	−1.15
2002	−1.25	−1.33	−1.40	−1.47	−1.51	−1.55	−1.55
2009	−1.55	−1.54	−1.50	−1.38	−1.25	−1.11	−.94
2016	−.72	−.48	−.21	.08	.42	.90	1.35
2023	1.85	2.34	2.87	3.38	3.87	4.36	4.86
2030	5.35	4.12	3.83	4.11	4.39	.00	.00
	Age in 1995 = 40						
1995	−.82	−.94	−1.07	−1.19	−1.31	−1.42	−1.53
2002	−1.64	−1.73	−1.81	−1.89	−1.95	−1.99	−2.01
2009	−2.02	−2.02	−1.99	−1.89	−1.77	−1.65	−1.49
2016	−1.29	−1.07	−.82	−.54	.00	.00	.00
	Age in 1995 = 55						
1995	−1.39	−1.53	−1.66	−1.79	−1.92	−2.04	−2.16
2002	−2.27	−2.36	−2.45	−.00	−.00	−.00	−.00

Table 6.8 **Actuarial Present Values of Net Gains from Phase-In Partial Privatization**

	Thousands of Dollars per Worker			% of Future Wages		
Age (1995)	$r = 3\%$	$r = 5\%$	$r = 8\%$	$r = 3\%$	$r = 5\%$	$r = 8\%$
5	19.24	8.61	2.81	4.52	3.84	2.96
10	14.39	6.55	2.10	3.06	2.41	1.58
15	9.34	4.11	1.08	1.81	1.25	.58
20	4.39	1.44	−.20	.77	.36	−.08
25	.20	−.99	−1.48	.04	−.24	−.51
30	−3.14	−3.11	−2.74	−.59	−.75	−.92
35	−5.40	−4.50	−3.50	−1.12	−1.17	−1.20
40	−6.24	−5.12	−3.93	−1.50	−1.49	−1.45
45	−5.84	−4.91	−3.88	−1.74	−1.70	−1.64
50	−4.68	−4.09	−3.40	−1.86	−1.83	−1.78
55	−3.24	−2.96	−2.62	−1.91	−1.90	−1.87
60	−1.63	−1.57	−1.48	−1.89	−1.88	−1.87

$4,420 in present value. But those who have not yet joined the labor force can look forward to substantially larger gains: $9,380 for fifteen-year-olds and $14,440 for ten-year-olds.

Although different phase-in schedules or age-related payroll taxes could change this pattern, there is no way in which all age cohorts in the labor force at the time of privatization can be made better off. The cumulative present

value for all those age twenty to sixty-five at the time of privatization is clearly negative.[28]

The result would, however, look quite different if we took the nuclear family as the unit of observation for our analysis. Consider a couple of which the husband and wife are both aged forty-five with two children aged ten and fifteen. Although the forty-five-year-olds have a combined net present value loss of $11,680 (at a 3 percent discount rate), this is outweighed by the children's gains of more than $23,000. Younger families would tend to be even bigger gainers.

6.5.5 Effect of a Lower Return on MIRA Contributions

Throughout this section, the analysis has assumed that MIRA contributions earn a real return equal to the full 9 percent pretax marginal product of capital. To achieve this, the federal and state governments would have to contribute to each MIRA account an amount estimated to be the corporate taxes collected on the incremental capital represented by that account. In the current analysis, which has ignored fluctuations in stock and bond prices, this would be about 3.6 percent of the assets in each account.

Although a proper accounting of the effects of the MIRA contributions does require attributing the additional corporate tax collections to the MIRA accounts, in practice the government may not be willing to make such a transfer and may use the increased corporate tax revenue to fund other government spending or tax reductions. It is worthwhile therefore to ask what the MIRA contributions would have to be if the real return earned by the MIRA accounts is limited to the 5.4 percent that is net of corporate tax payments (and therefore that could be earned directly by investing in the market mixture of equity and debt).

The long-run effect is to raise the required MIRA contribution from 2.04 percent of payroll to 3.31 percent of payroll, that is, slightly less than in inverse proportion to the decline in the rate of return. Panel B of table 6.9 shows that this same almost exact inverse proportion relation holds for each year in the transition. Thus, even with this much-reduced return, the long-run mandatory contribution is reduced by almost three-fourths of the current 12.4 percent tax rate. Moreover, during the transition, the combination of the payroll tax plus mandatory contribution rises only from the current 12.4 percent to a maximum of 14.8 percent after fourteen years (panel E of table 6.9) and is permanently down below 12.4 percent after twenty-eight years.

We reiterate, however, that this is looking at the pension contributions in

28. It would of course be possible to create what appears to be a Pareto-improving privatization by combining social security privatization with another fundamental reform (e.g., the shift from an income tax to a consumption tax) and distributing the gains from that reform in a way that causes the combination of the two reforms to make everyone better off. Since the tax reform could be done separately, the Pareto improvement cannot properly be attributed to the privatization of social security.

Table 6.9 **Phase-In from Partial to Total Privatization at $\rho = 5.4\%$**

	A. Mandatory Individual Contributions ($billions)						
1995	34.10	38.88	43.85	49.05	54.47	60.05	65.76
2002	71.71	77.67	83.84	90.30	96.70	103.21	109.78
2009	116.57	123.46	130.07	136.09	142.28	148.59	154.89
2016	160.81	166.64	172.45	178.19	183.76	183.56	183.72
2023	183.52	183.38	183.06	182.83	182.85	183.00	183.33
2030	183.80	184.68	186.13	187.38	188.55	189.52	190.38
2037	191.67	193.21	194.76	196.16	197.49	198.93	200.31
2044	201.72	202.97	204.24	205.49	206.86	208.39	209.76
2051	211.15	212.94	214.55	216.11	217.52	218.97	220.59
2058	222.37	224.28	226.28	228.39	230.61	232.93	235.34
2065	237.84	240.41	243.06	245.78	248.58	251.44	254.34
	B. Mandatory Individual Contributions (% of Payroll)						
1995	1.17	1.30	1.44	1.58	1.73	1.87	2.01
2002	2.15	2.29	2.43	2.57	2.71	2.84	2.97
2009	3.11	3.24	3.36	3.47	3.58	3.69	3.80
2016	3.90	3.99	4.08	4.17	4.25	4.20	4.16
2023	4.11	4.06	4.01	3.95	3.91	3.87	3.83
2030	3.79	3.77	3.75	3.73	3.70	3.68	3.65
2037	3.63	3.61	3.60	3.58	3.56	3.55	3.53
2044	3.52	3.50	3.48	3.46	3.45	3.44	3.42
2051	3.41	3.40	3.39	3.38	3.36	3.35	3.34
2058	3.33	3.32	3.31	3.31	3.30	3.30	3.30
2065	3.30	3.30	3.30	3.30	3.30	3.30	3.31
	C. Benefits Replaced Owing to Privatization ($billions)						
1995	.00	.13	.38	.78	1.35	2.18	3.25
2002	4.52	6.22	8.25	10.62	13.57	17.03	21.32
2009	25.93	31.17	37.29	45.26	53.82	63.07	73.44
2016	85.18	97.86	111.70	126.74	143.23	160.99	178.93
2023	198.55	218.93	240.74	262.44	284.59	307.56	331.29
2030	355.89	310.24	303.98	320.95	338.42	356.61	375.26
2037	393.42	411.53	430.08	449.32	468.52	487.90	507.68
2044	527.69	548.06	568.03	587.98	607.72	627.03	646.30
2051	664.97	682.81	700.46	717.66	734.44	750.59	766.05
2058	780.86	795.15	808.95	822.37	835.40	848.07	860.44
2065	872.55	884.37	896.00	907.47	918.83	930.10	941.30
	D. Payroll Tax Needed to Maintain Trust Fund Trajectory (% of Payroll)						
1995	12.40	12.40	12.39	12.37	12.36	12.33	12.30
2002	12.26	12.22	12.16	12.10	12.02	11.93	11.82
2009	11.70	11.58	11.43	11.24	11.03	10.82	10.59
2016	10.32	10.04	9.73	9.41	9.06	8.69	8.32
2023	7.92	7.52	7.09	6.68	6.27	5.85	5.43
2030	5.00	6.02	6.23	5.96	5.70	5.42	5.15
2037	4.89	4.64	4.39	4.13	3.88	3.63	3.37
2044	3.13	2.88	2.64	2.41	2.19	1.98	1.77

Table 6.9 (continued)

	D. Payroll Tax Needed to Maintain Trust Fund Trajectory (% of Payroll)						
2051	1.58	1.41	1.25	1.10	.96	.83	.72
2058	.62	.53	.46	.39	.33	.28	.24
2065	.20	.17	.14	.11	.09	.08	.06
	E. Total Payroll Tax Plus Mandatory Contribution (% of Payroll)						
1995	13.57	13.70	13.83	13.96	14.08	14.20	14.31
2002	14.42	14.50	14.59	14.67	14.72	14.77	14.79
2009	14.81	14.81	14.79	14.71	14.62	14.51	14.38
2016	14.22	14.03	13.82	13.58	13.31	12.89	12.48
2023	12.03	11.57	11.10	10.63	10.18	9.72	9.25
2030	8.79	9.79	9.98	9.69	9.40	9.10	8.80
2037	8.52	8.25	7.99	7.71	7.44	7.17	6.91
2044	6.64	6.38	6.12	5.87	5.63	5.41	5.20
2051	4.99	4.81	4.64	4.47	4.32	4.18	4.06
2058	3.95	3.85	3.77	3.70	3.64	3.58	3.54
2065	3.50	3.47	3.44	3.42	3.40	3.38	3.37

isolation and ignores the favorable effect on revenue elsewhere in the system. A complete accounting requires crediting the additional corporate tax revenue.

6.6 Distributional Considerations: Protecting the Poor

The method of calculating social security benefits in the current unfunded system is designed to provide some redistribution from individuals with high lifetime earnings to those with low lifetime earnings. In practice, this redistribution is attenuated and in some cases reversed because of a variety of ways in which low- and high-income individuals differ. Low-wage workers generally enter the full-time labor force at an earlier age, have higher mortality rates, and are more likely to be in two-earner families. Each of these characteristics reduces the implicit rate of return on the household's social security taxes.[29] In order to prevent poverty in old age, the regular social security program is currently augmented by the means-tested supplemental security income (SSI) program. The SSI program could of course be continued in parallel to a privatized social security system, a subject that we will not pursue further here.[30]

A privatized system of individual funded accounts is explicitly nonredistrib-

29. On the relation between social security net transfers and income distribution, see Hurd and Shoven (1985).

30. The combination in the SSI program of an age test in addition to a means test reduces the problem of the work disincentive associated with means-tested welfare programs for younger workers. The SSI means test still creates incentives to reduce saving during working years. It also encourages low-wage workers to work in the underground economy to avoid social security payroll taxes since any resulting increase in social security benefits would be fully offset by lower SSI payments.

utive. Each individual receives income after age sixty-five on the basis of that individual's MIRA contributions. It is worth stressing, however, that the MIRA system would make low-income workers much better off after the transition than they would be with the current unfunded system. The reason for this is that, instead of a payroll tax of 12.4 percent, they would pay an MIRA contribution of only about 2 percent of payroll. They would receive the benefit of a tax cut equal to 10 percent of income.

A modification of the basic MIRA system might permit individuals with below-average earnings to make voluntary contributions, perhaps limited by the level that would provide the same benefits that they would have received under the existing social security system. A lower-income individual who earns the equivalent of a 4 percent rate of return under the unfunded system (because of its redistributive features) could make MIRA contributions that achieved that level of benefits and still enjoy a substantial net tax reduction.[31]

Although we do not pursue this possibility, we do want to address the question of how the system of individual accounts could be modified in a simple way so that no individual is left with an unacceptably low annuity. For this purpose, we define *unacceptably low* to mean less than half the average annuity. The calculations that we report in this section show that a very small tax transfer at retirement would be sufficient to provide all retirees with at least this level of retirement annuity.[32]

Since the size of each individual's accumulated MIRA funds at age sixty-five depends on the entire annual pattern of earnings from age thirty to age sixty-five, the frequency and extent to which the MIRA accounts at age sixty-five fall below half the mean account cannot be inferred from single cross sections of earnings. We therefore use the Social Security New Beneficiaries Survey, a unique data set that provides the necessary lifetime earnings histories. More specifically, the data are a sample of all persons who began receiving social security retirement benefits between June 1980 and May 1981. For each person in the sample, social security earnings histories are available beginning with 1951. Since most people in the sample were between thirty-two and thirty-six in 1951 (88 percent of the sample were born between 1915 and 1919), we assumed that the real earnings between age thirty and the age in 1951 were the same as the actual earnings in 1951. All nominal dollar amounts are restated to 1996 dollars using the CPI. Since the rate of MIRA contributions varies over time during the transition, we calculate the long-run value of the annual MIRA contributions as shown in panel D of table 6.5, that is, 2.04

31. Workers born in 1945 who have a dependent spouse and who earn half the median income would receive an actuarial return of about 3.5 percent on the taxes that they and their employer pay.

32. We are grateful to Jeffrey Liebman for making the calculations that we report in this section. The current analysis does not deal with differences in rates of return that different individuals in the same age cohort would earn on their savings. To the extent that this reflects voluntary decisions to hold different types of portfolios because of differences in risk preferences, it may not be appropriate to compensate individuals with low outcomes (other than through the means-tested SSI program). We return to the subject of return uncertainty in the next section.

percent of the amount of earnings up to the annual social security maximum covered earnings.

Among men who retired in 1980–81, MIRA contributions of 2.04 percent of their earnings from age thirty would have accumulated (at a 9 percent real rate of return) to a mean value of $82,985 in 1981 at the 1996 price level.[33] Approximately 19 percent of such accumulated MIRA accounts had less than half this amount. The average shortfall among these accounts, that is, the amount that must be added to these accounts to bring them up to half the mean account, was $3,889.[34] The aggregate amount of this shortfall is thus equivalent to only 4.7 percent of the total of all MIRA accounts at age sixty-five. This implies that increasing each MIRA contribution by 4.7 percent, that is, from the 2.04 percent of covered earnings reported as the long-run value in panel E of table 6.5 to 2.14 percent of covered earnings, and then levying a "tax" of 4.7 percent on all accounts at age sixty-five would provide the funds to preclude any account from having less than half the mean account while keeping the mean net-of-tax annuity equal to the level of social security benefits projected in current law (with the solvency correction described above).[35]

This calculation of an additional 0.10 percent of payroll MIRA contribution and the associated tax on the accumulated accounts assumes that levying the tax and providing the transfer would not alter individuals' incentives to earn. Even if this had to be adjusted because of incentive effects, the implication is clear that "unacceptably low" accumulations can be avoided with a relatively small tax and transfer. The distributional issue, judged in this way, need not be an impediment to privatized individual MIRA accounts.

6.7 Risks: Uncertain Returns and Imperfect Annuity Markets

Until now we have ignored the problem that funded MIRA accounts involve risky investments. Of course, the current unfunded pay-as-you-go system is also risky, although in a very different way. Despite the reforms of 1983, it is clear that the existing system cannot pay the "promised" benefits. Many

33. To put this number in perspective, note that, with a 9 percent real return, such an accumulated amount would produce an annuity of about $9,950 a year. For comparison, the average annual social security benefit in 1980 (in 1996 dollars) of a retired worker was $7,795, that of a retired worker and wife $12,928.

34. There are two reasons why this overstates the cost of assuring that everyone has a fund equal to at least half the mean fund. First, many of the low social security individuals would now be eligible for SSI benefits, which would help defray the cost of increasing the fund. Second, many of those with low social security earnings are individuals who had spent most of their careers in the federal government or in state governments that provide pensions and remain outside the social security system.

35. This calculation is based on the earnings of men only, even in two-earner couples. Applying the same method of accumulation to the earnings of husbands and wives in a pooled account leads to similar conclusions. The mean accumulated MIRA account based on 2.04 percent of husbands' and wives' earnings was $104,511 in 1986 dollars. Only 19.2 percent of MIRA accounts had less than half this total, with a mean shortfall of $4,204, corresponding to a 4.2 percent tax on accumulated accounts.

younger persons say that they believe that social security benefits will not be there when they retire. Legislative proposals involve reducing all benefits, taxing the benefits of higher-income recipients, and other changes that would reduce the real value of the benefits for some individuals very substantially. This section focuses on the risks of the funded MIRA accounts and asks how individuals could be protected from such risks.

Although the real pretax return on the nonfinancial corporate capital stock has averaged somewhat more than 9 percent since 1960, there are substantial year-to-year fluctuations in the return earned by portfolio investors. If MIRA contributions are based on the expected 9 percent return (as in the calculations of sec. 6.5 above), an individual who is fortunate enough to save and contribute to an MIRA account during years when the stock and bond markets are relatively low and to retire and dissave when those markets are relatively high will enjoy a level of benefits greater than those provided by the pay-as-you-go social security system (as well as having paid a much lower cost of financing that benefit). Conversely, an individual who retires when the level of stock prices is relatively low will receive annuity payments that are less than those provided by the pay-as-you-go system if the MIRA contributions are based on an assumed 9 percent return.

The lifetime return in an MIRA account that is invested in the market's debt-equity mixture is almost certain to exceed the return in the pay-as-you-go unfunded social security system.[36] Nevertheless, the existing variability of returns does mean that an individual who contributes on the basis of an expected 9 percent return could have very much lower retirement income if the ex post return is substantially lower.

This market fluctuation risk is compounded by the inability to purchase actuarially fair variable annuities based on the return earned by the market's debt-equity mixture. Without such an annuity, individuals must save enough to finance more than the total benefits that they expect to receive or must accept the risk of a much-reduced level of consumption if they live longer than the normal life expectancy. Although the life expectancy for men at age sixty-five is now nearly sixteen years, 33 percent of sixty-five-year-old men live more than an additional twenty years, and 5 percent live more than thirty years.

Although the introduction of a universal system of MIRA accounts might lead to market innovations that ameliorate the market risk (e.g., the availability of long-term put options) and the annuity risk (e.g., the availability of actuarially fair variable annuities), we have explored how the MIRA program might

36. This is similar to MaCurdy and Shoven's (1992) conclusion that individuals who invested in equities are almost certain to receive a higher rate of return than those who invested in bonds or money market instruments. They show that lifetime equity returns have been better than debt return for individuals who began their life-cycle saving in every year for more than three quarters of a century. MacCurdy and Shoven's analysis takes the amount of saving as given and shows that the equity returns have dominated in the past. That is, of course, separate from the question of how much an individual should save.

be adjusted in the current institutional context in which such products are not available. Our approach does not seek an optimal adjustment of the MIRA program to the risks that we have identified. Instead, we have imposed a very demanding requirement on the MIRA accounts by asking the following question:

> In the absence of any annuity, and given the historic market uncertainty of returns on debt and equity, how much would individuals have to contribute to MIRA accounts to be able to receive the baseline level of social security benefits with probability 0.95 even if they might live to age one hundred?

Individuals who will receive some pay-as-you-go social security benefits during the transition are partially protected from these risks. In the long run, however, individuals will be wholly dependent on MIRA accounts for their retirement income.[37] We believe that the right strategy for individuals in this situation would be to "oversave," that is, to contribute more to their MIRA accounts than would be necessary to fund the target level of benefits if they knew that they would obtain a 9 percent rate of return with certainty. We have done some preliminary calculations that suggest that the contributions required achieve a probability of 95 percent of obtaining retirement income equal to the social security benefits would be very much less than the pay-as-you-go rate.[38]

Raising the average MIRA contributions in this way implies that individuals will generally die with substantial balances in their MIRA accounts. These extra MIRA contributions are returned to the next generation as either private bequests or tax revenues (if bequests from the MIRA accounts are not permitted and are taxed at death). In exchange for the resulting bequests, the subsequent generation might agree to reinsure the individuals against the "5 percent" risk that the combination of poor average stock and bond market performance for their age cohort and above-average longevity of the individual causes funds to be exhausted. This might be formalized by a government reinsurance arrangement. Such possibilities will not be explored further here.

In future work we will present simulations of the time path of the MIRA asset for someone who starts contributing to the MIRA at age thirty, works until age sixty-five, and then dissaves the social security baseline benefits from age sixty-five until death. We repeat the simulation one thousand times and note the fraction of times that the individual still has positive MIRA assets at death. We will identify that rate of MIRA calculations that implies that 95 percent of individuals die with positive assets.

In concluding this discussion of risk, we reiterate that this calculation is not

37. Individuals could of course continue to have private pensions, voluntary IRAs, and voluntary 401(k) accounts. By being *wholly dependent* on the MIRA account, we mean only that they will not receive any unfunded social security benefits.

38. Some calculations presented at the conference and in NBER Working Paper no. 5761, on which this chapter is based, contained an error that caused the required contributions to be understated. Subsequent work indicates that the correct calculation will still imply contributions that are still very much less than the pay-as-you-go tax rates.

presented as an optimal response to the market risk and annuity risk; rather, it is intended to provide a framework for calculating the contribution rate necessary to maintain the full baseline benefits and to show that this can be achieved with a relatively small increase in the MIRA contributions, one that still leaves the MIRA contributions less than the existing payroll tax.[39]

6.8 An Alternative Baseline for Social Security: Modifying the Inflation Indexing

For the simulation in sections 6.5–6.7, the benefits correspond to the formula in the existing social security law until the trust fund is exhausted in 2030 and then drop sharply to the level of benefits that can be financed with the 12.4 percent payroll tax. This sharp drop in benefits in the year 2030 is the simplest case to analyze, but it is not the most realistic. A more plausible assumption is that, whether or not social security is privatized, the growth of benefits will be reduced gradually by reducing the annual inflation indexing of benefits.[40]

Reducing the annual indexing of benefits by 1 percentage point causes the aggregate level of social security benefits to decline eventually by about 9 percent. The decline does not continue beyond this level because the modification of indexing only affects postretirement benefits, not the level of benefits of new retirees.

The effect of this temporarily lower rate of growth of social security benefits depends on how the resulting funds are used. We assume that the path of the trust fund is kept unchanged and therefore that the payroll tax is reduced. This makes the transition to the MIRA system more attractive to the initial generation of employees as well as reducing the relative magnitude of the benefit reduction in 2030 when the trust fund is exhausted.

Panel A of table 6.10 shows the percentage reduction in benefits that results from the 1 percentage point adjustment to the indexing. At the end of seven years, aggregate benefits are 4.64 percent lower, and, at the end of twenty-one years, they are 7.97 percent lower. After 2030, the benefit reduction is the same relative to existing law as we showed in table 6.4.[41]

Table 6.11 presents our standard analysis of the time path of payroll taxes and MIRA surcharges for the policy of adjusting retiree benefits by 1 percent less than the increase in the consumer price index. Since future benefits (before 2030) will be lower than they would be with full CPI indexing, the required

39. One plausible modification would reduce benefits in any year in which the accumulated assets are less than some threshold fraction (e.g., 70 percent) of the predicted MIRA account value for that year.

40. The Senate Finance Committee has appointed an expert committee to consider how the indexing of social security benefits should be modified to be consistent with the true increase in the cost of living (see Boskin et al. 1996). For an earlier advocacy of such an inflation adjustment, see Feldstein and Feldstein (1984).

41. We discontinue the indexing adjustment after the benefit reduction in 2030.

Table 6.10 Partial Indexation: Trust Fund and Solvency Adjustment

	A. Reduction in Benefits Owing to Partial Indexation and Solvency Adjustment (%)						
1995	.00	.93	1.79	2.60	3.35	4.02	4.64
2002	5.23	5.72	6.17	6.57	6.91	7.20	7.40
2009	7.61	7.78	7.93	7.92	7.94	7.97	7.97
2016	7.97	7.99	8.00	8.01	8.01	8.00	8.05
2023	8.08	8.13	8.18	8.23	8.31	8.41	8.51
2030	8.62	18.09	24.12	24.22	24.34	24.46	24.24
2037	23.99	23.74	23.50	23.30	23.18	23.10	23.08
2044	23.11	23.21	23.45	23.74	24.06	24.40	24.80
2051	25.40	25.97	26.59	27.25	27.94	28.64	29.32
2058	29.98	30.63	31.29	31.82	32.32	32.77	33.18
2065	33.56	33.88	34.17	34.43	34.67	34.89	35.08
	B. Retirement Benefits under Partial Indexation and Solvency Adjustment ($billions)						
1995	324.72	328.37	331.96	335.80	339.86	344.38	349.46
2002	354.62	360.42	366.48	372.70	381.08	389.75	399.07
2009	408.17	417.45	429.85	443.82	457.78	471.76	486.14
2016	502.64	519.41	536.21	553.01	569.96	586.60	602.57
2023	618.79	634.72	650.75	663.78	676.68	689.63	702.59
2030	715.62	650.54	610.86	618.42	626.08	633.82	641.62
2037	649.51	657.49	665.57	673.74	681.55	689.46	697.45
2044	705.53	713.70	721.63	729.64	737.74	745.93	754.21
2051	762.37	770.62	778.96	787.39	795.91	804.53	813.25
2058	822.06	830.96	839.96	849.13	858.40	867.76	877.23
2065	886.80	896.41	906.12	915.93	925.85	935.88	946.02

MIRA contributions and required payroll tax are smaller than they would otherwise be. Since this affects only the transition before 2030, in the very long run the tax and MIRA contributions are essentially unchanged from the case of full indexing. Table 6.12 shows the analogous calculations of the resulting shift in labor supply and the change in the deadweight loss of the payroll tax.

Perhaps most interesting are the disaggregated analyses for representative individuals that are presented in tables 6.13 and 6.14. With this CPI-minus-one adjustment of benefits, the actuarial present value of the change in real disposable income is positive for all current individuals who are younger than thirty years of age. The present value losses for those who are older are substantially less than they are with no benefit adjustment before 2030.[42] The maximum loss occurs for forty-five-year-olds, and, at a 3 percent real discount rate, the loss for a couple is $6,560. If the couple has two children aged ten and fifteen, the net gain for the nuclear family would be more than $25,000.

42. Of course, these individuals will receive lower benefits at retirement than under current law. But that is common to the pay-as-you-go and privatized systems if the CPI adjustment will be adopted in either case.

Table 6.11 **Phase-In Partial Privatization (Partial Indexation)**

	A. Mandatory Individual Contributions ($billions)						
1995	19.01	21.76	24.69	27.82	31.14	34.58	38.16
2002	42.02	45.92	50.03	54.41	58.81	63.37	67.93
2009	72.76	77.72	82.59	86.83	91.26	95.84	100.34
2016	104.57	108.77	112.87	116.81	120.44	120.11	120.17
2023	119.75	119.37	118.68	117.98	117.50	117.13	116.90
2030	116.82	117.11	118.10	118.88	119.58	120.03	120.34
2037	121.17	122.29	123.42	124.33	125.21	126.20	127.08
2044	127.96	128.60	129.28	129.89	130.58	131.44	132.06
2051	132.69	133.78	134.61	135.35	135.87	136.38	137.07
2058	137.91	138.89	139.94	141.10	142.35	143.70	145.14
2065	146.67	148.27	149.94	151.68	153.49	155.35	157.25
	B. Mandatory Individual Contributions (% of Payroll)						
1995	.65	.73	.81	.90	.99	1.08	1.17
2002	1.26	1.35	1.45	1.55	1.65	1.74	1.84
2009	1.94	2.04	2.14	2.22	2.30	2.38	2.46
2016	2.53	2.60	2.67	2.73	2.79	2.75	2.72
2023	2.68	2.64	2.60	2.55	2.51	2.47	2.44
2030	2.41	2.39	2.38	2.36	2.35	2.33	2.31
2037	2.29	2.29	2.28	2.27	2.26	2.25	2.24
2051	2.14	2.14	2.13	2.11	2.10	2.09	2.07
2058	2.06	2.06	2.05	2.04	2.04	2.04	2.04
2065	2.03	2.03	2.04	2.04	2.04	2.04	2.04
	C. Benefits Replaced Owing to Privatization ($billions)						
1995	.00	.13	.38	.78	1.34	2.16	3.20
2002	4.44	6.10	8.08	10.37	13.21	16.55	20.70
2009	25.12	30.15	35.99	43.66	51.86	60.68	70.56
2016	81.72	93.74	106.84	121.06	136.64	153.40	170.19
2023	188.59	207.61	227.96	248.15	268.62	289.78	311.54
2030	334.04	310.24	303.98	320.95	338.42	356.61	375.26
2037	393.42	411.53	430.08	449.32	468.52	487.90	507.68
2044	527.69	548.06	568.03	587.98	607.72	627.03	646.30
2051	664.97	682.81	700.46	717.66	734.44	750.59	766.05
2058	780.86	795.15	808.95	822.37	835.40	848.07	860.44
2065	872.55	884.37	896.00	907.47	918.83	930.10	941.30
	D. Payroll Tax Needed to Maintain Trust Fund Trajectory (% of Payroll)						
1995	12.40	12.29	12.19	12.09	11.98	11.88	11.78
2002	11.68	11.57	11.47	11.36	11.24	11.11	10.97
2009	10.83	10.68	10.50	10.30	10.09	9.87	9.63
2016	9.35	9.06	8.75	8.42	8.07	7.70	7.32
2023	6.93	6.53	6.10	5.70	5.30	4.89	4.48
2030	4.06	6.02	6.23	5.96	5.70	5.42	5.15
2037	4.89	4.64	4.39	4.13	3.88	3.63	3.37
2044	3.13	2.88	2.64	2.41	2.19	1.98	1.77
2051	1.58	1.41	1.25	1.10	.96	.83	.72

Table 6.11 (continued)

	D. Payroll Tax Needed to Maintain Trust Fund Trajectory (% of Payroll)						
2058	.62	.53	.46	.39	.33	.28	.24
2065	.20	.17	.14	.11	.09	.08	.06
	E. Total Payroll Tax Plus Mandatory Contribution (% of Payroll)						
1995	13.05	13.02	13.00	12.98	12.97	12.96	12.95
2002	12.94	12.93	12.92	12.90	12.88	12.85	12.81
2009	12.77	12.72	12.64	12.52	12.39	12.25	12.08
2016	11.88	11.66	11.42	11.15	10.85	10.44	10.04
2023	9.61	9.17	8.70	8.26	7.81	7.37	6.92
2030	6.47	8.41	8.61	8.33	8.05	7.75	7.45
2037	7.18	6.93	6.67	6.40	6.14	5.88	5.62
2044	5.36	5.09	4.84	4.60	4.36	4.14	3.93
2051	3.73	3.55	3.38	3.21	3.06	2.92	2.79
2058	2.69	2.59	2.51	2.43	2.37	2.32	2.27
2065	2.23	2.20	2.17	2.15	2.13	2.12	2.11

6.9 Maintaining Current Law Benefits

Our final analysis deals with the possibility of maintaining the level of benefits specified by current law. The future insolvency of the existing social security system will force a reduction in benefits unless taxes are raised dramatically or a much higher return is earned on individual contributions. Unlike the previous sections of this paper, we now explore the role of the MIRA system if the level of benefits implied by current law is to be maintained.

Tables 6.3 and 6.4 showed that, with the current pay-as-you-go system, the trust fund is projected to be exhausted in 2030 (panel B of table 6.3) and that benefits must be reduced by 24 percent in 2032 if they are to be financed by the revenue produced by a 12.4 percent tax. The benefit reduction consistent with a 12.4 percent tax rises to 35 percent by the last year of the projections (2071). These numbers imply that maintaining the level of benefits implied by current law would require raising the tax by 31 percent in 2032 (from 12.4 to 16.3 percent) and then continuing to raise the tax rate, reaching 19.1 percent in 2071.[43]

The MIRA system would permit benefits to be maintained at the level provided by current law with a long-run MIRA contribution rate of only 3.15 percent (instead of the 2.04 percent required to finance the level of benefits that would result from maintaining the 12.4 percent payroll tax). Thus, the MIRA contributions rise in approximately the same proportion as the payroll

43. This calculation ignores the effect of the higher tax rate on labor supply and taxable income. Because the shift from a 12.4 to a 19.1 percent tax rate would reduce taxable income, a higher rate would be necessary to offset the resulting reduction in payroll and income tax revenue.

Table 6.12 **Effect of Phase-In Partial Privatization on Tax Base and DWL Partial Indexation and Solvency Adjustment**

	A. Payroll Tax Needed to Maintain Trust Fund with No Behavioral Response[a]						
1995	12.40	12.29	12.19	12.09	11.98	11.88	11.78
2002	11.68	11.57	11.47	11.36	11.24	11.11	10.97
2009	10.83	10.68	10.50	10.30	10.09	9.87	9.63
2016	9.35	9.06	8.75	8.42	8.07	7.70	7.32
2023	6.93	6.53	6.10	5.70	5.30	4.89	4.48
2030	4.06	6.02	6.23	5.96	5.70	5.42	5.15
2037	4.89	4.64	4.39	4.13	3.88	3.63	3.37
2044	3.13	2.88	2.64	2.41	2.19	1.98	1.77
2051	1.58	1.41	1.25	1.10	.96	.83	.72
2058	.62	.53	.46	.39	.33	.28	.24
2065	.20	.17	.14	.11	.09	.08	.06
	B. New Payroll Tax Rate Allowing for Labor Supply Response						
1995	12.46	12.35	12.24	12.14	12.03	11.93	11.83
2002	11.72	11.62	11.51	11.40	11.27	11.14	11.00
2009	10.86	10.70	10.52	10.31	10.09	9.86	9.60
2016	9.32	9.01	8.69	8.34	7.98	7.59	7.21
2023	6.80	6.38	5.95	5.54	5.14	4.73	4.31
2030	3.89	5.86	6.07	5.80	5.53	5.25	4.98
2037	4.72	4.47	4.22	3.96	3.71	3.47	3.22
2044	2.98	2.74	2.51	2.28	2.07	1.87	1.67
2051	1.49	1.33	1.17	1.03	.90	.78	.67
2058	.58	.50	.43	.36	.31	.26	.22
2065	.18	.15	.13	.10	.08	.07	.05
	C. New Personal Income Tax Allowing for Labor Supply Response						
1995	20.09	20.09	20.08	20.08	20.08	20.08	20.08
2002	20.08	20.07	20.07	20.07	20.07	20.06	20.06
2009	20.05	20.04	20.03	20.02	20.00	19.98	19.96
2016	19.93	19.90	19.86	19.83	19.79	19.73	19.68
2023	19.62	19.56	19.50	19.44	19.39	19.33	19.27
2030	19.22	19.46	19.49	19.45	19.42	19.38	19.34
2037	19.31	19.27	19.24	19.21	19.17	19.14	19.11
2044	19.08	19.05	19.02	18.99	18.96	18.93	18.91
2051	18.88	18.86	18.84	18.82	18.80	18.79	18.77
2058	18.76	18.75	18.74	18.73	18.72	18.72	18.71
2065	18.71	18.70	18.70	18.70	18.70	18.69	18.69
	D. Change in Deadweight Loss Owing to Privatization ($billions)						
1995	3.46	3.35	3.28	3.27	3.29	3.30	3.29
2002	3.31	3.22	3.13	3.08	2.86	2.55	2.11
2009	1.64	1.05	.15	−1.33	−2.91	−4.62	−6.60
2016	−8.99	−11.64	−14.55	−17.73	−21.27	−25.89	−30.39
2023	−35.29	−40.25	−45.46	−50.53	−55.55	−60.59	−65.64
2030	−70.71	−56.17	−55.84	−59.86	−63.99	−63.30	−71.35
2037	−74.04	−76.53	−79.01	−81.58	−84.04	−86.41	−88.79
2044	−91.12	−93.53	−95.78	−97.96	−100.01	−101.88	−103.77

Table 6.12 (continued)

	D. Change in Deadweight Loss Owing to Privatization ($billions)						
2051	−105.52	−107.00	−108.49	−109.92	−111.31	−112.59	−113.69
2058	−114.63	−115.43	−116.16	−116.82	−117.40	−117.91	−118.37
2065	−118.77	−119.12	−119.42	−119.68	−119.92	−120.13	−120.32
	E. Change in Deadweight Loss as % of Covered Wages						
1995	.12	.11	.11	.11	.10	.10	.10
2002	.10	.09	.09	.09	.08	.07	.06
2009	.04	.03	.00	−.03	−.07	−.11	−.16
2016	−.22	−.28	−.34	−.42	−.49	−.59	−.69
2023	−.79	−.89	−.99	−1.09	−1.19	−1.28	−1.37
2030	−1.46	−1.15	−1.12	−1.19	−1.26	−1.33	−1.37
2037	−1.40	−1.43	−1.46	−1.49	−1.52	−1.54	−1.57
2044	−1.59	−1.61	−1.63	−1.65	−1.67	−1.68	−1.69
2051	−1.70	−1.71	−1.71	−1.72	−1.72	−1.72	−1.72
2058	−1.72	−1.71	−1.70	−1.69	−1.68	−1.67	−1.66
2065	−1.65	−1.63	−1.62	−1.61	−1.59	−1.58	−1.56

[a]Panel D of table 6.11.

Table 6.13 **Net Gains (% of payroll) from Phase-In Partial Privatization (by cohort) Partial Indexation and Solvency Adjustment**

	Age in 1995 = 25						
1995	−.02	.01	.04	.06	.08	−.42	−.42
2002	−.43	−.44	−.44	−.45	−.44	−.43	−.40
2009	−.37	−.33	−.26	−.14	−.00	.14	.32
2016	.53	.77	1.04	1.33	1.66	2.12	2.57
2023	3.05	3.54	4.05	4.54	5.02	5.49	5.97
2030	6.44	4.12	3.83	4.11	4.39	.00	.00
	Age in 1995 = 40						
1995	−.76	−.76	−.76	−.76	−.77	−.79	−.81
2002	−.83	−.84	−.86	−.88	−.89	−.89	−.87
2009	−.86	−.83	−.77	−.66	−.54	−.41	−.26
2016	−.06	.16	.41	.69	.00	.00	.00
	Age in 1995 = 55						
1995	−1.34	−1.34	−1.35	−1.37	−1.39	−1.42	−1.44
2002	−1.47	−1.50	−1.52	−.00	−.00	−.00	−.00

tax would have to rise (from 12.4 to 19.1 percent), but the level is dramatically lower.

Table 6.15 presents our usual analysis of the transition path. The analysis assumes that benefits are maintained at the levels implied by current law after the trust fund is exhausted. Thus, instead of cutting the benefits at that time to

Table 6.14 **Actuarial Present Value of Net Gains from Phase-In Partial Privatization Partial Indexation and Solvency Adjustment**

	Thousands of Dollars per Worker			% of Future Wages		
Age (1995)	$r = 3\%$	$r = 5\%$	$r = 8\%$	$r = 3\%$	$r = 5\%$	$r = 8\%$
5	22.06	10.36	3.69	5.18	4.62	3.89
10	18.20	9.03	3.46	3.88	3.32	2.61
15	14.02	7.30	2.97	2.71	2.21	1.60
20	9.61	5.12	2.11	1.68	1.28	.81
25	5.50	2.80	.95	.97	.67	.33
30	1.95	.60	−.30	.37	.15	−.10
35	−1.04	−1.21	−1.24	−.22	−.31	−.43
40	−2.75	−2.38	−1.96	−.66	−.69	−.72
45	−3.28	2.81	−2.30	−.98	−.98	−.97
50	−3.02	−2.67	−2.26	−1.20	−1.19	−1.18
55	−2.38	−2.20	−1.96	−1.41	−1.40	−1.40
60	−1.38	−1.33	−1.27	−1.60	−1.60	−1.60

the level that can be financed with the 12.4 percent payroll tax, the tax rate is raised to keep the trust fund at zero. In table 6.5, the payroll tax rate rises from 5.00 percent in 2030 (when the trust fund was exhausted), to 6.02 percent in the next year, and 6.23 percent in 2032, before resuming its gradual decline. In contrast, in table 6.15, the payroll tax rate rises from 5.00 percent in 2030, to 7.57 percent in 2031, and 8.21 percent in 2032, before resuming a gradual decline. Panel E of table 6.15 shows that the maximum combined amount of payroll tax and MIRA contribution rises from 8.30 percent in 2030 to 11.50 percent in 2032 and then declines. Thus, maintaining the original level of benefits after the trust fund is exhausted does not require a tax rate that is as high as the current 12.4 percent, which would not be capable of financing the existing benefit formula in a pay-as-you-go system. Note also that, in the earlier years, there is little difference in the combined payroll tax and MIRA contribution. For example, in 2005, the combined payment is 13.87 percent versus the 13.71 percent in the baseline case. That is not surprising since, in these early years, most employees need make little provision for the benefits to be received after 2030.

6.10 Summary and Questions for Future Research

The analysis in this paper has convinced us that the transition to a fully privatized system of individual retirement accounts can be conducted in a way that conveys a very substantial long-run benefit and that has relatively modest transition costs. The longer-term benefits would exceed 5 percent of GDP every year. Younger employees at the time of the transition would be net gainers in their own working lives. The net extra costs incurred by older employees during the transition would be very small and would generally be more than

Table 6.15 **Phase-In from Partial to Total Privatization with Current Law Benefits**

	A. Mandatory Individual Contributions ($billions)						
1995	21.09	24.19	27.52	31.09	34.91	38.88	43.05
2002	47.55	52.14	57.01	62.24	67.55	73.09	78.73
2009	84.74	90.97	97.18	102.82	108.77	115.00	121.26
2016	127.32	133.46	139.63	145.75	151.66	152.71	154.18
2023	155.13	156.10	156.69	157.20	157.91	158.63	159.41
2030	160.20	161.29	163.28	165.02	166.68	168.06	169.30
2037	171.25	173.61	176.00	178.13	180.24	182.49	184.61
2044	186.72	188.51	190.33	192.04	193.85	195.87	197.53
2051	199.16	201.40	203.24	204.91	206.23	207.48	208.95
2058	210.62	212.44	214.34	216.37	218.52	220.78	223.15
2065	225.63	228.19	230.85	233.59	236.41	239.30	242.23
	B. Mandatory Individual Contributions (% of Payroll)						
1995	.72	.81	.91	1.00	1.11	1.21	1.32
2002	1.43	1.54	1.65	1.77	1.89	2.01	2.13
2009	2.26	2.39	2.51	2.62	2.74	2.86	2.97
2016	3.08	3.20	3.31	3.41	3.51	3.49	3.49
2023	3.47	3.45	3.43	3.40	3.38	3.35	3.33
2030	3.31	3.29	3.29	3.28	3.28	3.26	3.25
2037	3.24	3.25	3.25	3.25	3.25	3.26	3.26
2044	3.26	3.25	3.24	3.24	3.23	3.23	3.22
2051	3.21	3.22	3.21	3.20	3.19	3.17	3.16
2058	3.15	3.14	3.14	3.13	3.13	3.13	3.13
2065	3.13	3.13	3.13	3.14	3.14	3.15	3.15
	C. Benefits Replaced Owing to Privatization ($billions)						
1995	.00	.13	.38	.78	1.35	2.28	3.25
2002	4.52	6.22	8.25	10.62	13.57	17.03	21.32
2009	25.93	31.17	37.29	45.26	53.82	63.07	73.44
2016	85.18	97.86	111.70	126.74	143.23	160.99	178.93
2023	198.55	218.93	240.74	262.44	284.59	307.56	331.29
2030	355.89	378.74	400.58	423.54	447.27	472.11	495.30
2037	517.57	539.62	562.21	585.79	609.89	634.48	660.04
2044	686.31	713.69	742.02	770.99	800.25	829.43	859.48
2051	891.33	922.29	954.19	986.44	1,019.23	1,051.81	1,083.78
2058	1,115.19	1,146.31	1,177.25	1,206.22	1,234.25	1,261.40	1,287.75
2065	1,313.36	1,337.57	1,361.13	1,384.04	1,406.46	1,428.41	1,449.99
	D. Payroll Tax Needed to Maintain Trust Fund Trajectory (% of Payroll)						
1995	12.40	12.40	12.39	12.37	12.36	12.33	12.30
2002	12.26	12.22	12.16	12.10	12.02	11.93	11.82
2009	11.70	11.58	11.43	11.24	11.03	10.82	10.59
2016	10.32	10.04	9.73	9.41	9.06	8.69	8.32
2023	7.92	7.52	7.09	6.68	6.27	5.85	5.43
2030	5.00	7.57	8.21	7.87	7.53	7.18	6.79
2037	6.43	6.08	5.74	5.38	5.05	4.71	4.39

(*continued*)

Table 6.15 (continued)

	D. Payroll Tax Needed to Maintain Trust Fund Trajectory (% of Payroll)						
2044	4.07	3.75	3.45	3.16	2.88	2.61	2.36
2051	2.12	1.91	1.70	1.51	1.33	1.16	1.02
2058	.89	.77	.67	.57	.49	.42	.36
2065	.30	.25	.21	.17	.14	.12	.10
	E. Total Payroll Tax Plus Mandatory Contribution (% of Payroll)						
1995	13.12	13.21	13.29	13.38	13.46	13.54	13.61
2002	13.69	13.75	13.81	13.87	13.91	13.94	13.95
2009	13.96	13.96	13.94	13.86	13.77	13.68	13.56
2016	13.40	13.23	13.04	12.82	12.57	12.18	11.81
2023	11.39	10.97	10.52	10.08	9.64	9.20	8.76
2030	8.30	10.86	11.50	11.15	10.80	10.44	10.04
2037	9.68	9.33	8.99	8.64	8.30	7.97	7.64
2044	7.32	7.00	6.69	6.39	6.11	5.84	5.58
2051	5.34	5.12	4.91	4.71	4.52	4.34	4.18
2058	4.04	3.92	3.81	3.71	3.62	3.55	3.48
2065	3.43	3.38	3.34	3.31	3.29	3.26	3.25

offset by the positive net benefits that their own children would receive. For the first fifty years of the transition taken as a whole, the present value of net gains would be positive for any reasonable rate of interest.

Our research has suggested a variety of issues that deserve further attention. One important issue is the ability to protect individuals from the risk of market volatility. Another significant issue is the treatment of couples, including the special problems caused by divorce and remarriage. In principle, this should be easier to deal with in a system of individual accounts, but this deserves detailed analysis.

The role of survivor benefits and disability benefits should also be considered more explicitly. How can these be provided in a way that captures the potential real return on the market mix of equity and debt? How would permitting bequests affect the economics of the program?

Although our calculations indicate that a small tax-based redistribution of MIRA assets at age sixty-five can prevent poverty in old age, it would be good to examine this and other distributional issues in more detail.

The potential long-run gain from privatizing social security implies that further research on these issues deserves a very high priority.

References

Advisory Council on Social Security. 1997. *Quadrennial report.* Washington, D.C.: U.S. Government Printing Office.

Auerbach, Alan, and Laurence Kotlikoff. 1987. *Dynamic fiscal policy.* Cambridge: Cambridge University Press.

Auten, Gerald, and R. Carroll. 1994. Taxpayer behavior and the 1986 Tax Reform Act. Washington, D.C.: Treasury Department, Office of Tax Analysis, July.

Board of Trustees. Federal Old Age and Survivors Insurance and Disability Trust Funds. 1995. *Annual report.* Washington: U.S. Government Printing Office.

Boskin, Michael, Laurence Kotlikoff, Douglas Puffert, and John Shoven. 1987. Social security: A financial appraisal across and within generations. *National Tax Journal* 40:19–34.

Boskin, Michael, et al. 1996. *Preliminary report to Senate Finance Committee.* Washington, D.C.: U.S. Government Printing Office.

Browning, Edgar. 1987. On the marginal welfare cost of taxation. *American Economic Review* 77, no. 1 (March): 11–23.

Bureau of the Census. 1996a. Population projections of the United States by age, sex, race and Hispanic origin: 1995 to 2050 (vital rate inputs). Washington, D.C. Machine-readable data file.

———. 1996b. U.S. population estimates by age, sex, race and Hispanic origin: 1990 to 1995. Washington, D.C.: Machine-readable data file.

Economic report of the president. 1996. Washington, D.C.: U.S. Government Printing Office.

Feldstein, Martin. 1987. Should social security be means tested? *Journal of Political Economy* 95, no. 3 (June): 468–84.

———. 1995a. The effect of marginal tax rates on taxable income: A panel study of the 1986 Tax Reform Act. *Journal of Political Economy* 103, no. 3 (June): 551–72.

———. 1995b. Tax avoidance and the deadweight loss of the income tax. Working Paper no. 5055. Cambridge, Mass.: National Bureau of Economic Research, March.

———. 1995c. Would privatizing social security raise economic welfare? Working Paper no. 5281. Cambridge, Mass.: National Bureau of Economic Research.

———. 1996. The missing piece in policy analysis: Social security reform (Richard T. Ely Lecture). *American Economic Review* 86, no. 2 (May): 1–14.

Feldstein, Martin, Louis Dicks-Mireaux, and James Poterba. 1983. The effective tax rate and the pretax rate of return. *Journal of Public Economics* 21, no. 2 (July): 129–58.

Feldstein, Martin, and Kathleen Feldstein. 1984. Time for a threshold. *Boston Globe,* 27 November 1984.

Feldstein, Martin, and Andrew Samwick. 1992. Social security rules and marginal tax rates. *National Tax Journal* 45, no. 1 (March): 1–22.

———. 1996. The transition path in privatizing social security. NBER Working Paper no. 5761. Cambridge, Mass.: National Bureau of Economic Research.

———. 1997. The economics of prefunding social security and medicare benefits. In *NBER macroeconomics annual 1997,* ed. B. Bernanke and J. Rotemberg. Cambridge, Mass.: MIT Press.

Harberger, Arnold. 1964. Taxation, resource allocation, and welfare. In *The role of direct and indirect taxes in the Federal Revenue System,* ed. J. Due. Princeton, N.J.: Princeton University Press.

Hurd, Michael, and John Shoven. 1985. The distributional impact of social security. In *Pensions, labor and individual choice,* ed. D. Wise. Chicago: University of Chicago Press.

Kotlikoff, Laurence. 1996. Privatization of social security: How it works and why it matters. In *Tax policy and the economy,* ed. James Poterba. Cambridge, Mass.: MIT Press.

MaCurdy, Thomas, and John Shoven. 1992. Stocks, bonds and pension wealth. In *Topics in the economics of aging,* ed. David Wise. Chicago: University of Chicago Press.

Poterba, James, and Andrew Samwick. 1995. Stock ownership patterns, stock market fluctuations, and consumption. *Brookings Papers on Economic Activity*, no. 2:295–357.

Rippe, Richard. 1995. Further gains in corporate profitability. *Economic Outlook Monthly*, August. New York: Prudential Securities.

Samuelson, Paul. 1958. An exact consumption loan model of interest with or without the social contrivance of money. *Journal of Political Economy* 66:467–82.

Social Security Administration. 1995. *Social Security Bulletin, Annual Statistical Supplement*. Washington, D.C.: U.S. Government Printing Office.

World Bank. 1994. *Averting the old age crisis: Policies to protect the old and promote growth*. Policy Research Report Series. Oxford: Oxford University Press for the World Bank.

Comment John B. Shoven

This is a "must read" paper for anyone interested in privatizing social security. The reason is that it addresses the most difficult aspect of social security reform—the transition. It is a fundamentally honest paper in that it shows that, even though a mature MIRA (mandatory individual retirement account) system could be funded with approximately a 2 percent contribution rate, there would be a transitionary period where the total contributions for social security retirement would have to be increased from the existing 12.4 percent of covered payroll. The startling aspect of the paper, however, is how small and temporary the necessary contribution increase is. The authors phase in the MIRA plan in such a way that total payroll deductions for social security and the MIRA accounts peak at 13.74 percent in 2007. The total deductions and contributions fall below 12.4 percent by 2019 and eventually decline to about 2.1 percent. Often it is stated that stopping a pay-as-you-go retirement system would of necessity cause one generation to pay for two retirements. Feldstein and Samwick show that there is some merit to that logic but that the losses to those working during the transition can be kept quite modest. The long-run gains are extremely impressive in this analysis, approximating 12 percent of covered payroll, or 5 percent of GDP.

There are a number of features of the Feldstein-Samwick study that are worth noting. First, they credit the additional saving in the MIRA accounts with the full pretax return (estimated at a real 9 percent) on the incremental capital. As the authors argue, some accounting of the tax proceeds generated by the additional capital is necessary for a complete economic analysis of the plan. They credit the tax proceeds (primarily the corporate income tax) back to the MIRA accounts. As political economy, this is more questionable. Again,

John B. Shoven is the Charles R. Schwab Professor of Economics and dean of the School of Humanities and Sciences, Stanford University, and a research associate of the National Bureau of Economic Research.

the authors realize this and provide some analysis crediting the accounts with only the 5.4 percent net of corporate tax rate of return. With the 5.4 percent return, the long-run MIRA contribution rate rises to roughly 3.3 percent. The authors also do not deduct a management fee for those handling the MIRA accounts. There is room for disagreement about the necessary magnitude of such fees, but a deduction of between 0.2 and 1.0 percent a year would seem reasonable. To offset such a reduction in net rates of return, the required contribution rate would have to be slightly increased.

A second feature of the Feldstein-Samwick paper that represents good economic analysis is that they have recognized that the existing social security system is unsustainable. Before you can compare the outcomes with the MIRA system with the existing structure, you have to make assumptions about how the existing system will be changed to regain financial sustainability. Their base-case adjustment to the present system is to assume that it will switch to a pure pay-as-you-go basis once the trust fund is exhausted and that benefits will be reduced to live within the proceeds of the 12.4 percent payroll tax. The benefit reductions begin in 2031 and are approximately 24 percent initially, rising to 35 percent by 2070. These reductions could be partially achieved by raising the retirement age more than currently scheduled. As a matter of political economy, once again, the adjustments to restore long-run solvency to the existing system might well involve tax increases as well as benefit reductions. While this would slightly raise the required MIRA contribution rate, it would presumably only increase the efficiency gain of the privatized plan over the pay-as-you-go social security system.

The authors discuss the issue of risk. One of their initial points is that even the current social security system with its set of defined benefit promises is risky. Certainly, the system as it stands today cannot be sustained, and its participants bear the risk of how it will be changed. Still, once fully implemented, the MIRA system would be risky in that the rate of return in financial markets is highly variable, more so than reflected in the accounting returns and the tax proceeds on corporate capital. One potential stabilizing force offered by Feldstein and Samwick is the rebate of the corporate tax attributable to the MIRA capital. Perhaps the best measure of the riskiness of financial investments is captured by Tobin's Q, the ratio of the paper value of the nation's capital stock (i.e., the value of the stocks and bonds) to the accounting or book value of the replacement cost of the capital. The graph of Tobin's Q, as taken from Poterba and Samwick (1995), is shown in figure 6C.1.

The decline between 1968 and 1974 is truly staggering, with Q falling by more than 70 percent. The climb from 1984 to 1995 is equally dramatic, with Q more than tripling. This gives some idea of the variability in the value of the MIRA accounts through time owing to market fluctuations. Feldstein and Samwick address this by suggesting that the MIRA contribution rate could be increased by about one-third over what would be necessary on the basis of the average or expected outcome. This "oversaving" would reduce the probability

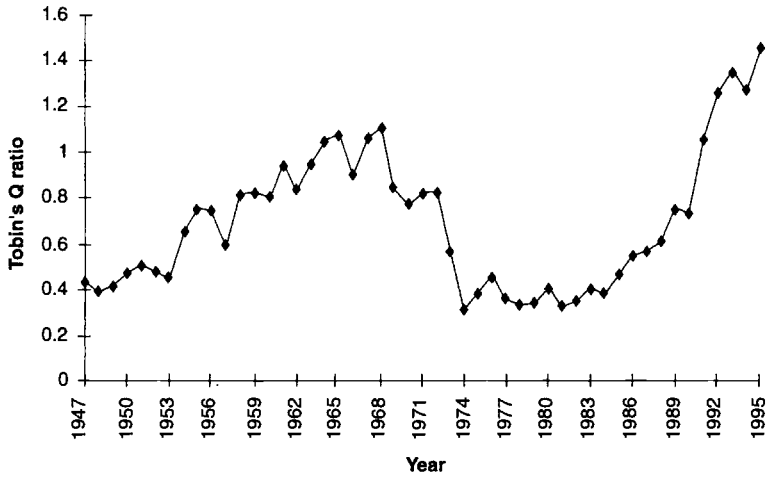

Fig. 6C.1 Tobin's *Q*: The ratio of the market value of equity dividend by the replacement cost of net assets

of faring worse than with the existing social security system to less than 5 percent even if an individual lived to the age of one hundred. Another possibility mentioned by the authors would be to leave the means-tested supplementary security income program in place to protect those who fare particularly poorly.

My own guess is that there will be a large debate between those who favor a plan such as that described by Feldstein and Samwick and those who favor a "double-decker" plan that retains a certain level of defined-benefit promises. One such plan is described by the 1994–96 Social Security Advisory Commission as personal security accounts and involves flat benefits of $410 per month for singles, $600 per month for married elderly couples, plus the proceeds of a 5 percent individual account. The first tier of defined-benefit money provides a floor of support and somewhat stabilizes retirement income, particularly for lower-income individuals. The difference between the first-tier benefits for singles and marrieds retains the transfer to couples in the current law, again particularly for low-income individuals. The benefits of the two-tier approach come at a cost, of course. The flat benefits must be tax financed, and thus the two-tier program would offer much smaller efficiency benefits for the economy than the MIRA plan described by Feldstein and Samwick.

My conclusion is that Feldstein and Samwick have provided the analysis that makes considering the privatization of social security in the United States feasible. They are not advocating the particular features of the plan that they present; rather, they are simply showing that the transition costs can be manageable and that the potential for efficiency gains for the economy is enormous. They have raised a number of issues that need to be studied further,

including accounting for the total return of incremental saving and dealing with the riskiness of both pay-as-you-go plans and privatized plans. To end where I began, this paper is a "must read."

Reference

Poterba, James M., and Andrew A. Samwick. 1995. Stock ownership patterns, stock market fluctuations, and consumption. *Brookings Papers on Economic Activity,* no. 2:295–357.

Discussion Summary

Jeffrey Liebman and Andrew Samwick

The discussion began by focusing on whether the gains achieved by the Feldstein-Samwick plan were unique to social security privatization. One participant argued that any other method of reducing the national debt would do the same thing by taking advantage of the tax wedge in the rates of return to capital. He noted that, in a simple lifetime utility model, we do not want to tax the rate of return. Another participant said that it was not necessary for the plan to include a payroll tax increase and that reduced government spending could achieve the same ends. A third participant said that the Feldstein-Samwick proposal was not really about social security reform but was instead really just a way to raise taxes that will reduce the national debt and therefore increase the capital stock. In response, a member of the Social Security Advisory Council said that the paper did an important service by making it explicit that either benefits need to be cut or taxes raised in the transition to a new system. He said that cutting benefits is as much a cost as raising taxes.

Discussion turned to the authors' assumptions about the rate of return that could be earned under their plan. One participant said that the key to the paper is the difference between the rate of return paid on equities and the rate of return paid by social security. He said that, if there were no other distortions and full access to capital markets, the higher rate of return on stocks results because there is more risk with stocks. Since some people will get hurt by this risk, it is a mistake to use the high average rates of return without adjusting for risk. One member of the Social Security Advisory Council questioned the authors' assumptions about rates of return on the accounts. The council member explained that the council's plan assumed that people hold 50 percent bonds and 50 percent equities and that there is a 4 percent spread between the returns on bonds and the returns on equities. Then 1 percent was subtracted for administrative costs. This produced a rate of return of 3.65, which is quite different from the 9 percent rate used by Feldstein and Samwick. Another participant concurred that the 9 percent rate of return was too high and asked how

all the additional saving would affect the economy and interest rates. He also argued that the Latin American experience demonstrates that the administrative costs of a privatized system are at least 1 percent.

In response, Feldstein defended the rate-of-return assumptions in the paper. He said that the paper assumes that people hold 60 percent equities and 40 percent debt. This is the same blend as in the economy as a whole. If equities currently receive a 7 percent return and debt around 3 percent, the average is 5.4 percent. However, it is necessary to add back the corporate tax payments. Thus, 5.4 + 3.6 = 9 percent. In fact, the historical average is 9.3 percent. Even accounting for administrative costs, this number is likely to be at least 8.5 percent.

The discussion turned to general equilibrium effects. One member of the group suggested that investors would reduce their holding of equities in other accounts since their MIRA accounts would be riskier than their current social security wealth. It was also pointed out that the paper assumed that MIRA contributions are net new savings because the dollars are assumed to come out of consumption. But, if there are other offsetting changes in savings, this is incorrect, and the paper overstates the benefits of this plan.

Feldstein responded that it is unlikely that many people would decrease other savings by much since most people are saving so little currently. Moreover, average retirement benefits would not increase in this plan, so it is hard to see why other retirement savings would decline.