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8 Privatizing Social Security: First-Round Effects of a Generic, Voluntary, Privatized U.S. Social Security System

Alan L. Gustman and Thomas L. Steinmeier

Increasing financial pressures on the U.S. social security system are likely to foster further changes in the system.¹ A wide variety of potential changes have been discussed. The Technical Panel on Trends and Issues in Retirement Savings of the 1994–95 Advisory Council on Social Security has considered the implications of a number of incremental changes, including reducing social security benefits further and raising social security taxes.² The Bipartisan Commission on Entitlements and Tax Reform has proposed means testing social security benefits. Others are proposing to privatize the social security system or some portion of it.³

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1. The financial outlook for the social security system is less favorable than was projected at the time of the 1983 reforms, which were designed to bring about a balance in the system's finances (see, e.g., Board of Trustees 1995). Among other things, the pressures for changing the system are created by adverse financial projections for social security, reflecting demographic and other trends, and the perception that, in the United States, saving is too low.

2. Benefits might be reduced by speeding up the changes called for under the 1983 reforms, by further increasing the retirement age, by reducing cost-of-living adjustments, or by making other changes. It is also possible to raise income taxes on social security benefits by counting a larger fraction of the benefits as income.

3. Senators Kerrey and Simpson have introduced legislation based on the options discussed by the Bipartisan Commission on Entitlements and Tax Reform to privatize a portion of social security using 2 percent of the payroll tax. The Technical Panel on Trends and Issues in Retirement Savings of the 1994–95 Advisory Council on Social Security also discussed the possibility of partial privatization through converting part of the social security trust funds into individual ac-

Along with the other papers in this volume, this paper is concerned with the effects of privatizing social security. Consistent with the privatization schemes adopted in Great Britain (Budd and Campbell, chap. 3 in this volume), Argentina (Cottani and Demarco, chap. 5 in this volume), and elsewhere, under the privatization proposal analyzed here, the individual remains free to choose between a traditional social security system, perhaps modified where necessary, and a privatized alternative. Specifically, the individual is assumed to be free to choose whether to allocate the 10.6 percent payroll tax contribution, currently earmarked for old age and survivors benefits, to a private IRA or to use it to qualify for benefits under the traditional social security system. Moreover, the analysis assumes that the social security system and the privatized system will exist side by side, not just in a transition, but also in the new steady state. In that sense, the privatized system analyzed here differs from a privatization system where participation in the IRA is mandatory and vestiges of the social security system are left to a grandfathered benefit system or to recognition bonds. These differences make the choice of which program to participate in a central focus of our analysis.

The paper begins by exploring the incentive structure to opt out of social security that is created by this privatization proposal. Simulations then analyze the differences in central outcomes under our current system and the privatized alternative. Outcomes examined include program participation, the path of benefits and taxes, and retirement behavior.

The sensitivity of the simulations to behavioral assumptions is examined, including the sensitivity to how respondents value spouse and survivor benefits and to their expected mortality. Economic assumptions are varied, including the real discount rate and the effect of social security reforms on pensions in the economy. Alternative assumptions are made about reductions in benefits. Program parameters are changed by imposing different gaps between the return to the IRA and the economy-wide discount rate. Also, one run assumes that participation in the privatized IRA is mandatory. Most of the analysis focuses on the transition from the current system to the privatized alternative, but we also simulate the program in the steady state.

Econometric estimates of a structural retirement model are used to simulate outcomes under the rules that apply under present law and then under the assumption that, in 1996, a mixed privatized system is established.⁴ The simulation maximizes a utility function, with parameters estimated from behavior observed for cohorts who have already retired. The opportunity set includes

counts. The advisory council has been locked in a debate about the merits of privatizing social security, but two minority reports favor partial privatization. Many authors have proposed fully privatizing the system. For a recent discussion, see Feldstein (1996).

4. The population base for the simulation analysis is from the 1989 Survey of Consumer Finances (SCF). The preference functions have been estimated from data for males in the Retirement History Survey in Gustman and Steinmeier (1994a), modified to reflect trends toward earlier retirement, and involve a modification of our earlier work (Gustman and Steinmeier 1986b).

earnings in full-time and part-time work, pension incentives, and the appropriate social security or privatized alternative. In these simulations, households with single female earners are not considered. Men in households make all the behavioral decisions.⁵ The simulation analysis for the transition period focuses on cohorts who would first become eligible to opt out to a privatized system in 1996. The cohorts have already generated a coverage history under the current social security system and must choose whether to opt out for a portion of their remaining work life. In contrast, the steady-state analysis assumes coverage under the privatized alternative for the individual's full working life.

The mixed privatization scheme is outlined and the incentives for participation analyzed in section 8.1. Section 8.2 discusses the simulation methodology. The simulation analysis is presented in section 8.3. Section 8.4 extends the analysis to consider the participation decision in two-earner households. Section 8.5 concludes the paper.

8.1 Incentives for Participation in a Privatized System

8.1.1 Basic Features of the Privatization Scheme

The analysis assumes a simple, choice-based scheme to privatize social security in the United States. Under this scheme, for each year an individual explicitly chooses to opt out of social security, the individual and the employer pay no payroll taxes; but one-thirty-fifth of future benefits are lost to the individual. Specifically, if the individual opts out for one or more years, electing to have the employer transfer the payroll tax payment to the worker's private IRA, we assume that the primary insurance amount (PIA), on which benefits are based, is reduced proportionately. That is, if the individual opts out for twenty years, the PIA would be only 43 percent (fifteen years of the thirty-five years currently used in the PIA calculations) of the PIA he would receive if he had not opted out, and, as a consequence, benefits are 43 percent of the level they would otherwise be.⁶

5. There are a number of reasons for adopting these simplifications, in which the men in the household make all the behavioral decisions. The work history in the SCF is inadequate for projecting a covered earnings history of wives under social security. Moreover, although we have an estimate of a joint utility function for husbands and wives (Gustman and Steinmeier 1994b), that utility function cannot simulate partial retirement. Thus, we have estimates of utility function parameters based on past retirement behavior only for men. In addition, there are complex issues that must be faced in deciding how spouse and survivor benefits for couples are to be determined under the social security alternative to a privatization option. These issues are discussed in sec. 8.5, where we consider the effects of simplifying the analysis by ignoring the decisions of wives in two-earner families and outline an approach to broadening the analysis. To bracket the sensitivity of the findings to the work history of the wife, we conduct a set of runs in which the husband values only his own benefits and puts no value on spouse or survivor benefits.

6. There is no special penalty reducing the PIA for any year the worker chooses not to work. In that case, as described below, the average indexed monthly earnings (AIME) are computed using zero earnings for the year in question. The PIA is reduced by one-thirty-fifth only for each year the individual works and chooses explicitly to transfer the payroll tax to an IRA account.

The taxes that would have been paid are instead invested in a mandatory individual retirement account (IRA) on behalf of the worker. The scheme is generic in that the IRA alternative to social security has no special design features or requirements, such as requirements for additional savings.⁷ Nor does the IRA provide a basic benefit. Moreover, in any year, the entire payroll tax may be deposited in an IRA. That is, in contrast to some of the proposals emerging in the discussions of the Advisory Council on Social Security, where an addition to the payroll tax is used to finance an IRA and the rest is used to finance social security, in the privatization scheme analyzed here an individual is free to participate fully in a privatized alternative, in that the full payroll tax paid by the employee and employer is invested in the IRA.

Consider how the years opted out affect the AIME calculations. It is probably not feasible to include all years, whether in or out of the system, in these calculations. Otherwise, individuals could concentrate earnings in years they opt out of the system, which would reduce taxes without affecting AIME amounts. However, it would be unfair simply to exclude years that the individual opts out from the calculations while still using the high thirty-five of forty years of earnings. This approach would impose a double penalty for the years out: first, the AIME would be proportionately reduced because of the years out of the system since zeros would effectively replace years with earnings; and, second, the PIA would be proportionately reduced.

A plausible way around this problem would be to exclude, from both the numerator and the denominator of the AIME calculations, years in which the individual opts out. For instance, if the individual opts out for twenty years, the AIME would be the average of the highest fifteen years of indexed earnings during the period that the individual was in the traditional system rather than the highest thirty-five, as would otherwise be the case.⁸

8.1.2 Benefits for Those Who Are Covered by the Privatization Option for Their Entire Worklife

To illustrate the fundamentals of the participation decision, we make a number of simplifying assumptions. These are relaxed in the course of the empirical analysis. For purposes of introducing the basic incentives, assume that an-

7. An alternative proposal, in which the privatization scheme requires all workers to make a basic contribution to social security to fund its redistributive portion, is analyzed later in the paper. In that scheme, when a person opts out of social security, only a portion of the payroll tax is deposited in an IRA.

8. This penalty, of proportionately reducing the fraction of the AIME that is reflected in benefits for each year the individual has the payroll tax deposited in an IRA, may be compared with another approach, entering zero earnings in the AIME for any year the individual opts out. The former approach exacts a larger penalty for opting out on those in the transition generation who have already accumulated many years under the social security system. Indeed, under the latter approach of counting opt-out years as years of zero earnings, members of the transition generation who had accumulated thirty-five years under the current scheme would experience little or no reduction in benefits from opting out of social security for their remaining working life.

nual earnings w_t increase proportionately to the average wage index.⁹ This implies that the indexed wage used in the AIME calculations is a constant w .¹⁰ Further, let us make the following definitions: g = the real growth rate of wages; r = the real interest rate (i.e., the discount rate); x = the total number of years of work; x_s = the number of years that the individual remains in the social security system; and x_o = the number of years that the individual opts out of the system ($= x - x_s$). For this calculation, we also assume that the total number of years of work, x , is fixed at $x = \bar{x}$. In the simulation analysis to follow, we allow the individual to choose the optimal length of work, x , but, for this simple illustration of the factors governing the length of stay in the social security system, x_s is the only variable under the individual's control.

The modified AIME discussed above is given in equation (1):

$$(1) \quad \begin{aligned} \text{AIME} &= \frac{xw - x_0w}{35 - x_0} = \frac{x_s w}{35 - (x - x_s)} \quad \text{if } x < 35, \\ &= \frac{35w - x_0w}{35 - x_0} = w \quad \text{if } x \geq 35. \end{aligned}$$

In both instances, the numerator is the wages that would normally go into the AIME calculation, the thirty-five highest years of wages less the wages associated with the years the individual opts out of the system by transferring the payroll tax to the privatized IRA. Similarly, the denominator is reduced by the number of years the individual is out of the system.

The PIA is a quasi-concave function of the AIME where the function f is 90 percent of the first \$437 of AIME, 32 percent of AIME between \$437 and \$2,635, and 15 percent of AIME over \$2,635.¹¹ The PIA is given in equation (2):

$$(2) \quad \begin{aligned} \text{PIA} &= \left(1 - \frac{x_0}{35}\right) f(\text{AIME}) \quad \text{if } x_0 < 35, \\ &= 0 \quad \text{if } x_0 \geq 35. \end{aligned}$$

The first factor on the right-hand side of equation (2) simply reflects that the PIA is reduced proportionately for years out of the system and in a privatized IRA.

The value of the stream of social security benefits at age sixty-two, less the value of the contributions, is given by

9. For an analysis of analogous choices made within the British system, see, e.g., Disney and Whitehouse (1992) and Brugiavini, Disney, and Whitehouse (1993).

10. This assumption is only approximate. The actual rules state that wages before age sixty are indexed up to age sixty for the AIME formula and that wages after age sixty enter the formula unindexed.

11. These are the 1996 bend points.

$$(3) \quad V = g(a_o + x)PIA - \int_{(a_o+x)-x_s}^{a_o+x} \beta w e^{-(r-g)(t-62)} dt.$$

In the first term, $g(a_o + x)$ is the annuitized value of the social security benefits for each \$1.00 of PIA, adjusted for the early retirement penalty or late retirement credit and discounted to age sixty-two. The individual starts work at age a_o and retires at age $a_o + x$. For example, if the individual retires at age sixty-three, the value of a \$1.00 annuity starting at age sixty-three and discounted to age sixty-two would be \$13.61.¹² The individual would be eligible for 86.7 percent of the PIA (because he retired two years before the normal retirement age), so the value of the function g would be \$13.61 times 86.7 percent, or \$11.80.¹³

In the second term, β is the social security contribution rate, currently 10.6 percent. The expression $\beta w e^{-(r-g)(t-62)}$ represents the value of the contributions paid at age t , discounted to age sixty-two. The discounted value of these contributions decreases over time since the discount rate exceeds the growth rate of wages. This means that, if the individual plans to spend any years in the privatized alternative, he or she will want to choose those years as early as possible since the discounted value of the contributions that would otherwise be paid will have to be maximized if the individual spends the early rather than the later years in the privatized alternative. This means that, if the individual begins work at age a_o and will work for x_s years in the traditional system out of a total of x years of work, he or she will spend the years between $(a_o + x) - x_s$ and $(a_o + x)$ in the traditional system. The second term in the equation above thus reflects the discounted value of contributions during the years the individual remains in the traditional system.

We are now in a position to characterize how the value of traditional social security varies with the number of years the individual spends in the traditional system. The analysis is somewhat different depending on whether the individual plans to work more or less than thirty-five years in total. Let us examine the case where the individual plans to work $x \geq 35$ years first. Substituting the AIME and PIA formulas into the value formula yields

$$(4) \quad \begin{aligned} V &= - \int_{(a_o+x)-x_s}^{a_o+x} \beta w e^{-(r-g)(t-62)} dt \quad \text{if } x_s < x - 35, \\ &= g(a_o + x) \left(1 - \frac{x - x_s}{35} \right) f(w) \\ &\quad - \int_{(a_o+x)-x_s}^{a_o+x} \beta w e^{-(r-g)(t-62)} dt \quad \text{if } x_s \geq x - 35. \end{aligned}$$

12. This calculation uses a 2.3 percent real interest rate, consistent with the assumptions of the social security trustees.

13. In this analysis, and in the subsequent empirical analysis, we ignore the effects of the individual's private information, i.e., known differences among individuals about their life expectancy that may make social security more attractive to individuals with a long life expectancy and less attractive to those who expect to live for fewer years.

The upper part of equation (4) refers to the situation where the individual has participated in the privatized system for more than thirty-five years and hence has lost all benefits in the traditional system. Thus, the contributions for any years the individual is in the traditional system buy no benefits.

Differentiating this expression by x_s yields

$$(5) \quad \begin{aligned} \frac{\partial V}{\partial x_s} &= -\beta w e^{-(r-g)(a_0+x-x_s-62)} \quad \text{if } x_s < x - 35, \\ &= \frac{1}{35} g(\cdot) f(w) - \beta w e^{-(r-g)(a_0+x-x_s-62)} \quad \text{if } x_s \geq x - 35. \end{aligned}$$

The first few years in the traditional system, between 0 and $x - 35$ additional years, clearly have a negative effect on the value of the traditional benefits net of contributions. Contributions are paid, but there are still no benefits because the individual is still participating in the privatized system for more than thirty-five years. For additional years in the traditional system beyond $x - 35$, the marginal effect on the value is ambiguous. The situation is illustrated in figure 8.1. The relation between years in the traditional system and the value of the traditional benefits net of contributions is negative at first, but, at $x - 35$, the slope increases by the amount $(1/35)g(\cdot)f(w)$. Remember that, in figure 8.1, the length of the work life is fixed. Work years spent out of the social security system reduce the PIA only if the individual requests that payroll taxes earned be transferred to a private IRA.

The relation is further clarified by looking at the curvature, obtained by differentiating again by x_s :

$$(6) \quad \frac{\partial^2 V}{\partial x_s^2} = -(r-g)\beta w e^{-(r-g)(a_0+x-x_s-62)} < 0.$$

Since this is always negative, the relation between x_s and V is concave except at the point B . There are several possibilities for the optimal value of x_s in this problem. The curve is clearly negative between A and B , but between B and C the situation is ambiguous. If the curve slopes uniformly upward and the point C_1 is above the horizontal axis, the optimal solution is to remain in the traditional system the entire time. If the curve rises to a peak between B and C_2 and the peak is above the horizontal axis, the individual will spend a few years in the privatized alternative at the beginning of the work life and then switch to the traditional system.¹⁴ If the peak is below the horizontal axis, as occurs between B and C_3 , the individual will never choose the traditional system.

Equations (4) and (5) suggest the kinds of factors that make it more likely that the individual will stay in the traditional system and increase the number of years in the system. If the maximal value given in equation (4) is positive,

14. We assume that the IRA would be made available in installments starting at age sixty-two, with the result that the decision is not driven by liquidity constraint considerations.

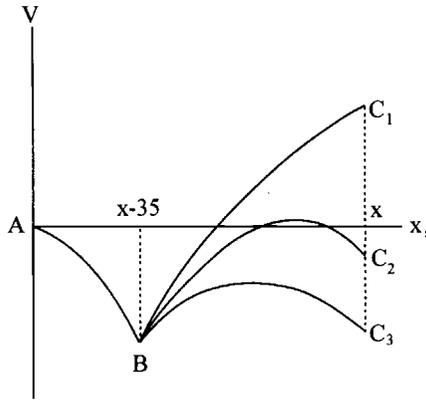


Fig. 8.1 Value function for a fixed work life ≥ 35 years

the individual will choose to remain at least partly in the traditional system. And the greater the first term of equation (5) is relative to the second, the greater will be the optimal value of x_s that equates these two terms. The maximal value of equation (4) is more likely to be positive, and the optimal value of x_s in equation (5) will be higher, if (i) the contribution rate is lower, (ii) the generosity (i.e., the value of $f[w]$) is higher, (iii) the mortality rate is lower (which increases $g[\cdot]$), and (iv) the interest rate is lower (which lowers the value of discounted contributions relative to benefits).

Now turn to the case where the individual plans to work for fewer than thirty-five years. There are two main differences between this and the previous case. First, the value function does not have a segment corresponding to AB in figure 8.1. Second, the expression for AIME is no longer simply w . Substituting the expression for the AIME, as given in equation (1), into the value function given in equation (3) yields

$$\begin{aligned}
 (7) \quad V = & g(a_0 + x) \left(1 - \frac{x - x_s}{35} \right) f \left(\frac{x_s w}{35 - (x - x_s)} \right) \\
 & - \int_{(a_0+x)-x_s}^{a_0+x} \beta w e^{-(r-g)(t-62)} dt.
 \end{aligned}$$

Differentiating this with respect to x_s yields (after some algebraic manipulation)

$$(8) \quad \frac{\partial V}{\partial x_s} = \frac{1}{35} g(\cdot) \left\{ f(\cdot) + f'(\cdot) \frac{(35 - x)w}{35 - (x - x_s)} \right\} - \beta w e^{-(r-g)(a_0+x-x_s-62)}.$$

Differentiating again by x_s yields (after some additional manipulation)

$$(9) \quad \frac{\partial^2 V}{\partial x_s^2} = \frac{1}{35} g(\cdot) \frac{(35 - x)^2 w^2}{[35 - (x - x_s)]^3} f''(\cdot) - \beta w(r - g)e^{-(r-g)(a_0+x-x_s-62)} < 0.$$

The sign of equation (8) is indeterminate, but, since f is quasi concave, f'' is nonpositive, and the second derivative is negative. This implies that the value function must take a form such as those illustrated in figure 8.2. If the first derivative is positive throughout the range (as occurs if the value function is BC_1), the optimal solution is always to remain in the traditional system. If the function rises to a peak and then declines (BC_2), the optimal solution is to spend the first few years in the privatized alternative, then to join the traditional system for the last x_s years. Finally, if the first derivative is negative throughout the range (as in BC_3), the optimal choice would be to switch to the privatized alternative and remain there.

Factors that make the first term of equation (8) large relative to the second term will tend to increase the number of years that a worker will remain in the traditional system. These factors include all the things listed in the previous case, such as higher generosity and lower contribution rates, lower mortality, and lower interest rates. In addition, a higher value for the marginal generosity, which is $f'(w)$, increases the first term and increases the number of years an individual would wish to remain in the traditional system.

8.1.3 Analysis for Workers during the Transition

A steady-state worker who chooses to spend part of his or her time in the privatized system and part in the traditional system will want to choose the privatized system early in his or her career and the traditional system later. For a worker during the transition period, however, this is not possible since such

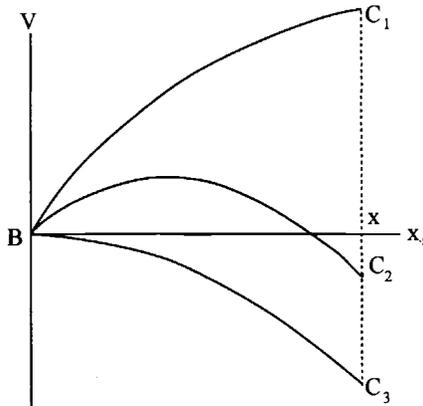


Fig. 8.2 Value function for a fixed work life < 35 years

a worker will have already spent a number of years in the traditional system before the privatized system is made available. To continue the analysis for transition workers, we introduce a new definition: x_i = the number of years the worker has spent in the traditional system before the privatized system is introduced. In the analysis for transition workers, we will assume that the total number of years in the work life is greater than thirty five but that the number of years left in the work life after the privatization option is introduced is less than thirty-five. This will simplify the presentation, and the extension to cases where the work life is greater than thirty-five is straightforward.

The choices of x_s are now limited to lie between $x_i \leq x_s \leq x$, where $x_i \geq x - 35$. The benefit side of the value function remains the same as in the previous case, but the contribution term is somewhat different. The individual will still want to bunch the years of participation in the traditional system as late as possible since the discounted value of the contributions is lowest in those years. The individual has already spent the first x_i years in the traditional system, and he or she will want to bunch the remaining $x_s - x_i$ years at the end of the work life. This means that the integral in the value function representing the discounted contributions will be split into two integrals, as follows:

$$(10) \quad V = g(a_0 + x) \left(1 - \frac{x - x_s}{35} \right) f \left[\frac{x_s w}{35 - (x - x_s)} \right] - \int_{a_0}^{a_0 + x_i} \beta w e^{-(r-g)(t-62)} dt - \int_{(a_0+x)-(x_i-x_s)}^{a_0+x} \beta w e^{-(r-g)(t-62)} dt.$$

The first integral is the discounted value of the contributions before the privatized alternative is made available, and the second integral is the discounted value of the contributions for the $x_i - x_s$ years that the individual chooses to be in the traditional system after the introduction of the privatized alternative. Note that the years in the traditional system after the alternative is offered will be concentrated at the end of the work life since the discounted value of the contributions is least then.

To get an idea of the nature of the relation between the decision to remain in the traditional system and the value of the traditional benefits less contributions, we again differentiate the value function as given above:

$$(11) \quad \frac{\partial V}{\partial x_s} = \frac{1}{35} g(\cdot) f(w) - \beta w e^{-(r-g)[(a_0+x)-(x_s-x_i)-62]}.$$

As before, it is relatively simple to evaluate $\partial^2 V / \partial x_s^2$ and show that it is negative.

The value function is illustrated in figure 8.3. As compared to the steady-state situation, the value function for transition workers is lower for a given number of years in the traditional system. The reason is that, while the benefits are the same, some of the contributions will have been made in the preprivatization years, when the discounted value of those benefits is higher. Thus, each of the curves in figure 8.3 is a little lower than the corresponding curve in figure

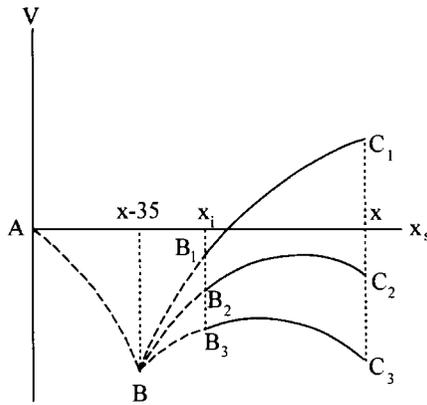


Fig. 8.3 Value function for transition workers

8.1 above. However, the slope of the value function for transition workers is higher in the relevant range of x , than it is for steady-state workers. This is because the exponential term in equation (11) is smaller than the corresponding term in equation (5).

The decision to participate in the traditional system is as follows. Recall that the individual has already spent x_i years in the traditional system, so the optimal choice of values for x_s is constrained to lie between x_i and x , that is, along the solid parts of the curves. If the value function is the curve B_1C_1 in figure 8.3, the individual will always choose to be in the traditional system. If the curve is B_2C_2 in figure 8.3, the individual will maximize his or her traditional benefits less contributions by being at the peak of the curve. Note that this peak is to the right of the peak of the corresponding curve in figure 8.1 since the slope of the value function is more in figure 8.3 than it is in figure 8.1. This implies that the transition worker will spend longer in the traditional system than would a steady-state worker in similar circumstances. Finally, if the value function is represented by the curve B_3C_3 in figure 8.3, the individual will choose enough additional years of traditional coverage to reach the peak in the curve. Note that the corresponding individual in figure 8.1 would have opted out of traditional coverage altogether. However, the transition individual has already been forced to absorb the loss of paying social security contributions in years for which there will be no effective benefits, and, given that situation, it will pay him or her to be in the system a few more years in order to minimize those losses. The worker will still want to bunch the remaining years of traditional coverage at the end of the work career. As a result, such a worker will opt out of traditional coverage as soon as the privatized alternative is made available but will eventually return to the traditional system as he or she approaches retirement.

The net result is that some transition workers will spend more years in the

traditional system than they otherwise would have in a steady-state situation and that others will voluntarily choose to be in the system after the privatization alternative is introduced even though they would not have chosen to be in the traditional system at all had they had the option from the beginning of their working careers. For both reasons, the participation in the traditional system will be higher among transition workers than among steady-state workers, even in years after the privatized alternative is available.

8.1.4 From the Simple Example to More Complex Specifications

The preceding analysis has been highly simplified to illustrate some of the basic considerations governing the choice between the IRA and the social security alternative. In the example, length of work life is fixed, wage growth is constant and equal to the rate of increase in the economy-wide wage index, spouse and survivor benefits are not considered, the return to the mandatory IRA is assumed to be equal to the economy-wide discount rate, and effects on private pensions are ignored, to name a few. The simulation analysis will relax all these simplifications and introduce a number of other complexities.

8.2 The Simulation Methodology

In order to investigate the likely effects of privatization in a more concrete setting, we begin with simulations for a transition cohort of individuals who are midstream in their careers when the privatization is made available. The scheme that is to be simulated is the generic program described above, to be made available beginning in 1996. There are many outcomes of potential interest, but we focus on the fraction of the workforce participating in a privatized social security system, labor force participation patterns, and benefit payouts and payroll tax payments under the remaining federal system.

Labor supply is assumed to be determined in the context of a life-cycle model with a perfectly operating capital market.¹⁵ The opportunity set for the simulations comes from thirty- to fifty-five-year-old males in the 1989 Survey of Consumer Finances. These cohorts of males have already spent many years under the current system. Nevertheless, if privatization were introduced in 1996, they would still have a considerable period of time under the privatized system. The life-cycle preferences come from a model we have previously estimated. We simulate the choices that individuals with these preferences would make, given the opportunity set both with and without privatization, and compare the outcomes.

15. Although it is convenient for this type of initial analysis, a bare-bones life-cycle model is much too simple for understanding the central behavioral features characterizing savings, labor supply, and pensions. These behaviors have not yet been successfully integrated into a single empirical analysis. For a discussion of the shortcomings of present models, see Gustman and Juster (1996).

8.2.1 The Opportunity Set

The opportunity set for the simulation model is estimated for males in the 1989 Survey of Consumer Finances who were working full-time and who were neither self-employed nor government employees.¹⁶ Wages in full-time jobs and in partial retirement are calculated, with wages being assumed to be a quadratic function of experience.¹⁷ Pension plan features for covered individuals are reported by their employers and are used to calculate the pension accrual rates associated with alternative retirement dates.¹⁸ The current social security law is coded and applied to each individual in the sample, including rules governing the earnings test, the delayed retirement credit, and benefit recomputation, as they separately apply to each individual according to year of birth. In our basic set of runs, benefits are then reduced by 20 percent on the assumption that individuals are adjusting benefits down by that amount to reflect expected adjustments to the financial problems of the system.¹⁹ The interest rate used in the initial simulations and the overall wage growth rate correspond to the long-term intermediate social security projections.²⁰ In the basic set of runs, the IRA in a privatized system is assumed to earn this interest rate. The chance of falling into poor health is modeled as a hazard and is built into the opportunity set.

The simulation algorithm does not assume that the opportunity set is continuous. There is a discontinuity created by the minimum hours constraint on the main job. If the individual leaves the main job for part-time work, the wage declines, and this decline is assumed to be irreversible. In addition, the incentives to postpone retirement that are created by the pension plan are frequently discontinuous. Large returns are often gained if the covered worker waits until he meets the plan's eligibility requirement for early or normal retirement. These discontinuities are taken into account in calculating the worker's optimal date of retirement.

16. These simulations focus on the transition cohorts of these groups. Since social security contains workers from the excluded groups, there is no obvious reconciliation if one were to try to derive implications for the finances of the entire social security system.

17. The coefficients of experience and experience squared are 0.0138 and -0.000283 , respectively, and the coefficient of experience interacted with education is 0.000996. This calculation of benefits is based on an earnings profile that ignores year-to-year variation in wages around the earnings function. For a model where wages follow a random walk process, see Samwick (1993). For analysis of the participation decision in the British system when earnings vary from year to year, see Brugiavini, Disney, and Whitehouse (1993).

18. Where the individual's own pension is unavailable, pensions from other individuals with the same personal and job characteristics (union status, employer size, wage level, etc.) are used.

19. According to data recently collected in the Health and Retirement Survey, future recipients place the odds that social security benefits will be decreased in the future at six of ten (see Gustman, Mitchell, and Steinmeier 1995).

20. These assumptions are 6.3 percent for the interest rate, 5.0 percent for wages, and 4.0 percent for prices (Board of Trustees 1995, 12).

8.2.2 Preferences

The preference function used in the simulations has been estimated with data from the 1969–79 Retirement History Study using the opportunity sets covering workers in that study. The lifetime utility function for the model is given by

$$(12) \quad U = \sum \left[\frac{1}{\alpha} C_t^\alpha + e^{\chi_t \beta + \epsilon} f(L_t, \delta) \right],$$

where C_t is consumption at time t , and L_t is leisure at time t ; $f(L_t, \delta)$ is 0 at full-time work, 1 in retirement, and an intermediate value, related to δ (with $\delta < 1$), for partial retirement work.²¹ If δ is close to 1, $f(L_t, \delta)$ is approximately proportional to leisure for partial retirement work, while, if δ is large and negative, $f(L_t, \delta)$ is almost 1. This means that, the closer δ is to unity, the greater is the relative disutility of partial retirement work, and the shorter and less frequent are periods of partial retirement. ϵ determines the relative utility of leisure as opposed to consumption. In the utility function, both ϵ and δ are taken to be individual fixed effects coming from the distributions $f(\epsilon) = N(0, \sigma_\epsilon)$ and $f(\delta) = \gamma e^{\gamma(1-\delta)}$, $\gamma > 0$.

The parameters of the utility function, which are α , γ , σ_ϵ , and the elements of β , are estimated using data from the Retirement History Survey (RHS) and reported in table 8.1. These results use a likelihood function developed and estimated in our previous work (Gustman and Steinmeier 1985, 1986a, 1986b, 1994a). Since the time period of the RHS, however, there has been a sharp trend toward earlier retirement by the younger cohorts. Only a quarter to a third of this trend can be accounted for by changes in pensions and social security (Anderson, Gustman, and Steinmeier 1996). Because the simulations with the SCF sample would otherwise understate retirement, with individuals working approximately three years too long, we have adjusted the constant in the linear term, β_0 , to reduce the retirement age by about three years on average.²² This should not affect the differences in outcomes between runs with the current and privatized social security system, but it will affect the levels of benefits.

21. Specifically, for partial retirement work, $f(L_t, \delta) = (L_t^\delta - L_f^\delta)/(1 - L_f^\delta)$, where L_f is the leisure associated with full-time work.

22. In the simulations, we fix the vintage coefficient at the average value of the RHS. If we use the SCF vintages in the simulations, they very substantially overpredict retirement. This overprediction probably occurs because the coefficient of this variable, which is estimated using the 1906–11 cohorts in the RHS, is being extrapolated far outside the estimation range to the SCF cohorts. In particular, the retirement trends in the 1970s were much stronger than the trends observed in the 1980s. Indeed, in the mid-1980s through the early 1990s, the trend toward earlier retirement had stopped. For related data and analysis, see Anderson, Gustman, and Steinmeier (1996). Although it would have been possible to mimic the trend toward earlier retirement by changing other parameters of the utility function beside the constant, it would have made little difference to the ultimate estimates of the effect of privatization. These estimates are based on the differences in outcomes under the current and privatized systems, and the differences are not very sensitive to the parameters of the utility function.

Table 8.1 Parameters of the Utility Function

Variables	Coefficient	t-Statistic
α , exponent of consumption	.09	2.42
γ , parameter for δ	.27	56.65
σ_ε , standard deviation of ε	1.11	65.85
β_0 , constant in linear term	.07	2.40
β_1 , coefficient of age ^a	.26	65.34
β_2 , coefficient of health	.67	19.97
β_3 , coefficient of vintage ^b	.12	9.81
Number of observations	3,283	
Log likelihood	-9,750.97	

Source: Gustman and Steinmeier (1994a).

^aThe actual variable is (age - 62).

^bThe actual variable is (vintage - 9).

8.3 Simulation Results

Simulations have been conducted for private-sector, non-self-employed males in the 1989 Survey of Consumer Finances (SCF) who were between the ages of thirty and fifty-five in 1989.²³ Thus, the analysis pertains only to males in the labor force who have been continuously covered in their employment by social security, although it takes into account relevant spouse and survivor benefits. The sample includes 186 men without a pension and 692 with a pension. One thousand simulations were run for each of these individuals.

Each set of simulations was run under current law and under a privatization program. The key simplification here is the assumption that, for purposes of calculating social security benefits arising from participation in the program by these men, only primary benefits based on the earnings of the man in the household, and associated spouse and survivor benefits, matter.²⁴ For each set of simulations, results are calculated for the fraction of time spent in the social security program as opposed to the privatization program, the labor force participation rate, and the amounts of social security taxes and benefits. To keep track of benefits paid on behalf of and contributions made by those who did not survive, the present-value figures for benefits and taxes pertain to the original cohort population, not just to survivors.

The simulations focus on transition cohorts who are old enough to have already spent several years under the current system. If the privatized system were introduced in 1996, their ages would range from thirty-seven to sixty-two. At younger ages, many individuals in this sample would not be able to opt

23. Thus, the typical person in the sample is about halfway through with his or her work life in 1989, which is the base year to which all discounted values are taken. By the time the privatization is realized in 1996, the average person in the sample is almost fifty years old.

24. The consequences of making this simplifying assumption are explored in sec. 8.4.

out because they reached the specified age before 1996, while, at older ages, some workers will have already retired. Although these results cannot be viewed as an indication of the eventual steady state but are best viewed as the likely experience of the transition cohorts, we do explore outcomes under steady-state assumptions, where we assume that each individual spent his entire career under the revised system.

The basic simulations assume a time trend in mortality and, in addition, differential mortality rates according to family income and initial marital status. First, the 1990 *Vital Statistics* mortality rates are adjusted to reflect a reduction in mortality of 1.22 percent per year.²⁵ Then, for whites and nonwhites separately, the mortality rates for married and unmarried individuals are adjusted by fractions so that overall mortality rates are the same as the projected rates.²⁶ The mortality rates in various income brackets are also adjusted down for high-income individuals and up for low-income individuals in such a manner that the overall mortality rates are the same as the projected rates.²⁷ In addition, as noted above, these basic results assume that individuals all discount the value of social security by 20 percent.

Following the basic results, but still using the Social Security Administration's assumptions about interest rates, additional findings are presented using alternative assumptions about the life expectancies that govern the economic decisions of individuals, about how the workers in the sample value the spouse and survivor benefits offered by social security, and about whether workers anticipate the possibility of reduced benefits in the future. Next, we consider the effects of varying the interest rate and allowing the returns to differ between the privatized IRA and other market investments. Finally, we consider the effects of the privatized alternative in a steady state rather than in the transition period from the current system.

8.3.1 Effects on Participation in Social Security Using SSA Assumptions

Using the basic Social Security Administration (SSA) assumptions of 4 percent inflation, a 6.3 percent interest rate, and 5 percent wage growth, with the result that the real interest rate is 2.3 percent, figure 8.4 shows the reduction in social security participation (the number opting for the private IRA) between a regime where the privatized system is available from 1996 on for those who

25. This trend is based on results reported in Panis and Lillard (1995, table 1).

26. Panis and Lillard (1995) estimated the ratio of mortality rates between married and unmarried white males to be 0.781. Applying this result to our study, we multiply the overall mortality by 0.987 for married white males and by 1.264 for unmarried white males.

27. Duleep (1989, table 1) found the following ratios of mortality by income class (1972 income in 1959 prices): 1.59 (under \$2,000), 1.79 (\$2,000–\$4,000), 1.04 (\$4,000–\$6,000), 0.90 (\$6,000–\$8,000), 0.87 (\$8,000–\$10,000), and 0.71 (over \$10,000). For blacks and whites separately, the widths of these intervals were adjusted so that the total mortality rate of the group was the same as the overall projected rate. For whites, this means that the *Vital Statistics* mortality is multiplied by 1.59 for family income levels of \$11,268 and below, by 1.79 for family income levels of \$11,368–\$22,736, by 1.04 for family income levels of \$22,736–\$34,104, and so on. For blacks, the width of the income intervals is \$6,641.

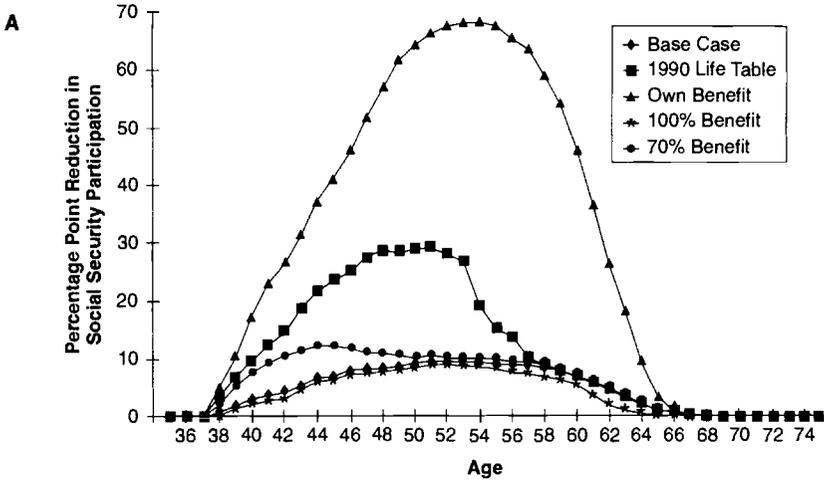


Fig. 8.4A Decline in social security participation with privatization (figure assumes 2.3% real interest rate)

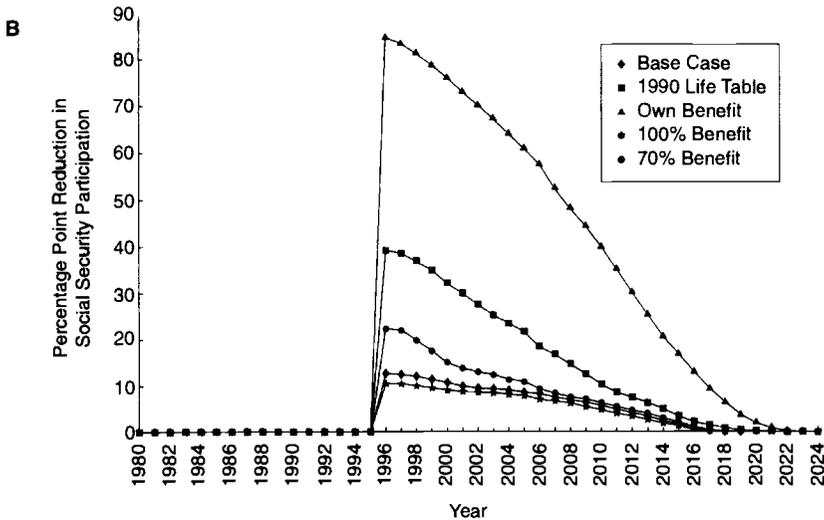


Fig. 8.4B Decline in social security participation with privatization (figure assumes 2.3% real interest)

choose it and the current system.²⁸ By *social security participation*, we mean that the individual both has earnings at a particular age or during a particular

28. We measure the participation rate in the social security program as a fraction of the original cohort population, not as a fraction of survivors, with the result that the changes in participation rates shown are the differences in percentages computed with the original cohort population as the base.

year and chooses to pay taxes into the social security system rather than opting out and paying an equivalent amount into a qualifying IRA. Figure 8.4a shows the absolute value of the reduction in social security participation by age, while figure 8.4b shows the corresponding absolute value of the reduction by year.

Consider first the results for the “base case,” demarcated by diamonds in figure 8.4, which indicate the reduction in social security participation on the assumptions (a) that individuals value fully the potential spouse and survivor benefits and that the full potential value for spouse and survivor benefits is realized, (b) that they anticipate the effects of trends in mortality, and (c) that they expect that, because of current financial problems, benefits will be reduced by 20 percent from current promised levels. The relevant curve is the second from the bottom in each figure.

In figure 8.4a, which indicates the decline in social security participation by age, the inverted U shape of the curve results from different factors at younger and older ages. At the younger ages indicated, relatively few individuals in the cohort of thirty- to fifty-five-year-olds in 1989 would be able to change their participation. For example, almost all are out of their thirties when privatization is introduced in 1996, so there is little indicated participation in a privatized system at those ages. At older ages, much of the sample is retired and cannot participate in the privatized system.

As seen in figure 8.4b, consistent with the analysis in section 8.1 above, the largest number opt out of social security in the initial year, 1996. As labor force participation falls, fewer people are left to opt out, so, in later years, the difference in social security participation brought about by the privatization program is lower. At its peak effect in 1996, if cohort members evaluate social security taxes and benefits as suggested by the base-case simulation, the privatization would reduce social security participation by about 13 percentage points.²⁹

The next set of results, demarcated by squares and labeled *1990 life table* in figure 8.4, assumes that individuals use the 1990 life tables, uncorrected for mortality trends, and further that they ignore differential mortality rates according to family income and initial marital status in predicting life expectancy. If potential participants ignored trends in mortality, we see that many more individuals would leave the social security system for a privatized system than if they factored in the effects of the extended life expectancy on their social security benefits. Specifically, in figure 8.4b, just under 40 percent of covered individuals would opt to participate in a privatized system. The infer-

29. Specifically, in 1996, according to our runs, 91 percent of the original cohort of private-sector, non-self-employed workers would otherwise be covered by the current social security system. (The rest would have been retired or deceased.) Note that, because we have no firsthand knowledge of the learning process, the time paths in fig. 8.4 ignore any lag in adjustment that would accompany the implementation of such a plan. In fact, the adjustment is likely to be slower than that shown in the figure, perhaps substantially so.

ence is that the social security annuity is much more valuable when the lengthening of life expectancy is taken into account, and, if individuals understand this, it will greatly reduce the attractiveness of a privatized retirement system.

The third set of results, labeled *own benefit* and demarcated by triangles in figure 8.4*a-b*, uses the projected life tables but assumes that, for married workers, the individual places zero value on spouse or survivor benefits.³⁰ That is, under this assumption, individuals value only their own benefits and do not value benefits that will be available to their spouse either when the earner retires or as a survivor benefit. When only own benefits are valued, in 1996 almost everyone in these cohorts drops out of the social security system. Clearly, the effect of the introduction of a privatized system on participation in social security will very much depend on how spouse and survivor benefits are valued.

The fourth set of results shown in figures 8.4*a-b*, demarcated by an *x*, uses the projected life tables and assumes that spouse and survivor benefits are valued on a par with the basic benefit. However, these simulations assume that individuals believe that all benefits will be fully valued as projected under current law. For example, the individual may be unaware of the current financial problems with the system and their significance, or the individual may expect that subsidies will come from general revenue. Results under this scenario are very similar to the results under the base case. In 1996, 10.8 percent of those still covered by the social security system would opt out, only 2 percent fewer than opted out under the base case when benefits are valued at 80 percent of the promised amount.

Finally, the fifth set of results, demarcated by a star, varies the base-case result by assuming that all individuals in the sample expect only 70 percent of the promised benefits to be paid under social security. Here, 22 percent choose the private alternative when given the choice in 1996.

Because any social security reform may treat low earners differently from high earners, the actual program may involve a mix of the scenarios examined in figure 8.4. For example, rather than adopting a uniform set of rules, one can visualize a privatization reform in which low earners who continued in social security would not have their benefits altered but high earners might experience a substantial reduction should they continue under social security. Variations of means testing of benefits might be tried, with different potential effects on incentives.³¹

30. Since many spouses will be entitled to at least some benefits on the basis of their own work, the marginal values of spouse and survivor benefits are overstated in the previous calculations. For further discussion, see sec. 8.4.

31. Edey and Simon (chap. 2 in this volume) describe the Australian system, where extensive income testing may encourage the spending down of accumulated assets in the years before acceptance of social security benefits.

8.3.2 Effects of Privatizing Social Security on Labor Supply

Essentially, the changes in social security participation rates pictured in figure 8.4 have two components: changes in labor supply and changes in participation conditional on labor supply. Figure 8.5 indicates the effects of privatizing on labor force participation rates, computed by summing full-time and part-time participants.³² The curve demarcated in diamonds indicates the change in labor force participation under the base case. Examining the scale on the y axis suggests that the change in labor supply is entirely insignificant and that the change in social security participation conditional on labor supply is the only decision that matters. This result is consistent with earlier findings (Gustman and Steinmeier 1985, 1991). The social security system is approximately actuarially fair for many of those in the cohorts we analyze, and so is the privatized system.³³

The generic system analyzed here does not impose any special eligibility requirements for participants in the social security system to opt into the privatized system. One possibility is that participation in the privatized system will require the individual to save more than the payroll tax contribution.³⁴ Any requirement for additional savings might encourage firms that offer defined-benefit plans to change them to qualifying types of defined-contribution plans so that their employees could meet the savings requirements of a privatized system with little further reduction in consumption.³⁵ We have conducted a number of runs on the assumption that defined-benefit plans are converted to defined-contribution plans, altering retirement incentives. Figure 8.5 shows the results of one such set of runs. The findings suggest that, if defined-benefit plans were abolished as a result of privatization, labor force participation by those in their sixties might increase slightly as a result of privatization, with a

32. Labor force participation rates are calculated here as a fraction of the surviving population and thus are not strictly comparable to the social security participation rates presented in fig. 8.4. Comparable patterns to the labor force participation rates are obtained when the figures for earnings changes are plotted.

33. Available evidence suggests that labor force participation responds to differences in the reward for marginal effort around the age of retirement, such as the discontinuities created by bonuses or declines in benefit accrual often brought about by provisions of pension plans. But the evidence also suggests that retirement is not very responsive to differences in wages, as wealth and substitution effects are roughly offsetting (Gustman and Steinmeier 1986b).

34. The effects of such a requirement would depend in part on the savings that the individual already had. Under such a system, with a higher propensity to save, higher-income individuals are more likely to meet any savings requirement. They are also more likely to opt out not only because of the progressivity of the benefit structure but also because those with high incomes will meet any minimum savings rates more easily since such required minimum savings levels are likely to bear a relation to the maximum social security benefit. For those who would not otherwise accumulate the required level of savings to meet any eligibility requirements, the extent of participation in a privatized system would depend on the disutility of additional required savings. This is an issue that our model does not address.

35. In the British system, one may opt out of the equivalent of our social security system by participating in the equivalent of a defined-benefit pension. For further discussion, see Disney and Whitehouse (1992).

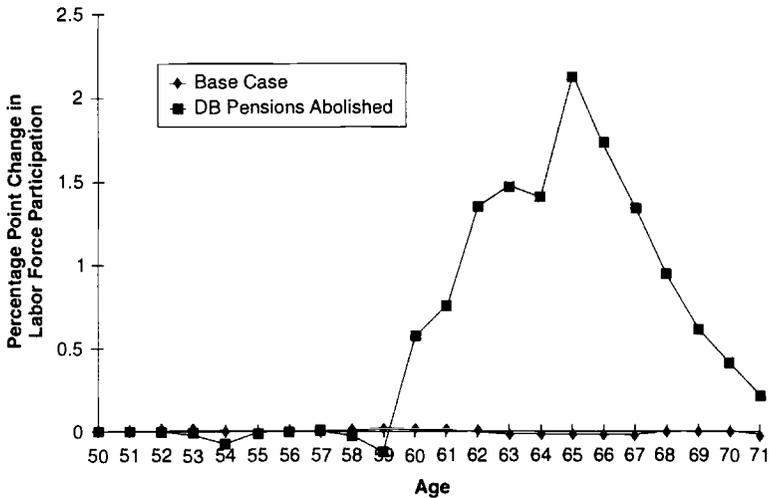


Fig. 8.5 Change in labor force participation with privatization (figure assumes 2.3% real interest)

maximum increase in participation at age sixty-five amounting to 2 percentage points.

8.3.3 Effects on Present Values of Taxes and Benefits

Table 8.2 reports, under alternative scenarios, the present value of total earnings, the present value of total payroll taxes paid into the social security system by the cohort members, the present value of all benefits paid to the cohort members including own, spouse, and survivor benefits, and the present value of own benefits. These values are averages per member of the simulated cohorts. For instance, the entry of \$110,812 in the first row of the column labeled *taxes* means that, on average, under the current system, over his lifetime each member of the simulation group would pay that amount in social security taxes, discounted to 1989. As previously noted, to keep track of benefits paid on behalf of and contributions made by those who did not survive, these present values pertain to the original cohort population, not just to survivors.

Reflecting the findings of no effect of privatization on labor force participation, changes in the present value of earnings with privatization are minuscule. Earnings are predicted to rise very slightly if a privatized system were instituted and there were no changes in pensions. Even if pensions did change, the effect on earnings would be very small.

The fall in social security participation with privatization is mirrored in the declines in taxes paid. Because these figures refer to the entire lifetime of the individual, not just to the time since the system is privatized, the declines in benefits and taxes are measured on average over only a third of the working

Table 8.2 Present Values of Earnings, Social Security Payroll Taxes, and Benefits for Cohorts Born from 1934 to 1959, Transition Results at 2.3 Percent Real Interest (thousands of 1989 dollars)

	Earnings	Taxes	Total Benefits	Own Benefits
Projected life tables (base case):				
Current system	1,382,597	110,812	121,248	66,831
Privatized system	1,382,687	105,530	117,822	63,591
Privatized—current	90	-5,282	-3,426	-3,240
Only own benefits valued:				
Current system	1,383,745	110,916	120,234	67,587
Privatized system	1,383,593	74,382	73,073	40,816
Privatized—current	-152	-36,534	-47,161	-26,771
Benefits valued at 100%:				
Current system	1,381,897	110,747	151,549	83,530
Privatized system	1,381,936	106,252	148,152	80,147
Privatized—current	39	-4,495	-3,397	-3,383
Benefits discounted 30%:				
Current system	1,382,952	110,845	106,096	58,479
Privatized system	1,383,085	103,268	100,927	54,448
Privatized—current	133	-7,577	-5,169	-4,031
1990 life tables:				
Current system	1,368,296	109,830	96,036	48,597
Privatized system	1,369,105	94,440	83,901	41,357
Privatized—current	809	-15,390	-12,135	-7,240
Defined-benefit converted to defined-contribution plans:				
Current system	1,382,597	110,812	121,248	66,831
Privatized system	1,389,766	106,011	118,059	63,700
Privatized-current	7,169	-4,801	-3,189	-3,131
IRA returns 3% above real interest:				
Current system	1,382,597	110,812	121,248	66,831
Privatized system	1,383,742	79,104	81,995	44,449
Privatized—current	1,145	-31,708	-39,253	-22,382
IRA deposits 3% below payroll tax:				
Current system	1,382,597	110,812	121,248	66,831
Privatized system	1,382,618	107,979	118,941	64,524
Privatized—current	21	-2,833	-2,307	-2,307
Mandatory schemes:				
Current system	1,382,597	110,812	121,248	66,831
Privatized system	1,386,033	69,134	68,494	37,528
Privatized—current	3,436	-41,678	-52,754	-29,303

life. As expected in a system with voluntary choice, where individuals will choose a privatized system only if there is a net benefit associated with the choice, the decline in taxes exceeds the decline in benefits. In the base case, where spouse and survivor benefits are fully valued, taxes and benefits fall with privatization by 5 and 3 percent, respectively. The differences are very small, with the excess in the decline of taxes over benefits amounting to about 2 per-

cent of the basic lifetime tax payment. A somewhat larger change is found when 1990 life tables are used. The present values of lifetime social security taxes and benefits fall about 14 percent and 12.5 percent, respectively.

When social security potential beneficiaries do not value spouse or survivor benefits, then privatization has a very large effect on taxes and benefits, with total but not own benefits falling much more than taxes do. Table 8.2 also indicates the decline in benefits and taxes if participation in the private IRA were made mandatory and thus indicates the maximum decline in benefits and taxes per individual that could be realized for these cohorts in the transition period. Comparing the tax and benefit declines when only own benefits are valued with the results for mandatory privatization, 88 percent of the maximum decline in tax receipts and 89 percent of the maximum decline in benefit payments would be realized if individuals do not value spouse and survivor benefits and are given the chance to opt out of social security.

The differences in the present values of taxes and benefits associated with voluntary privatization indicate one dimension of the financial costs of privatization. But the major concern is not with the present values but with the time paths of taxes and benefits. These are illustrated in figure 8.6*a-b* and indicate the problem privatization will create. As seen in figure 8.6*a*, under all scenarios, the decline in taxes is immediate. From figure 8.6*b*, it can be seen that the decline in benefits does not become substantial until well into the next century. This difference is a source of the immediate cash-flow problem for the system that analysts are well aware of, a cash-flow problem that is going to be made significantly worse when those outside these transition generations are included in the analysis.

8.3.4 Effects of a Higher Return to Capital

Feldstein and Samwick (chap. 6 in this volume) argue that a higher discount rate should be used than the 2.3 percent real return projected by the Social Security Administration. In particular, they argue for the use of a 9 percent real return on physical capital in the United States. That 9 percent real rate has two components, one a roughly 6 percent return to investors after taxes, the other a rebate on corporate income and property taxes raising the real return to the IRA by 3 percent. The real rate of return to equities from the Ibbotson data cited by Poterba and Wise (chap. 9 in this volume) is also around 6 percent.

Clearly, the costs of privatizing will be substantially reduced if individuals can be persuaded to invest entirely in equities, and it is prudent to ask how a voluntary privatized system will function over a range of interest rates.³⁶ At the

36. There is substantial disagreement about what an appropriate adjustment is for the additional risk associated with equity investments. If the entire difference between the returns to equities and bonds reflects risk, even when investments are pooled at the level of the economy, then there is no advantage to an all-equity portfolio. The appropriate rates of return to use in discounting also depend on the level of risk that is attached to the receipt of social security benefits relative to equities and bonds.

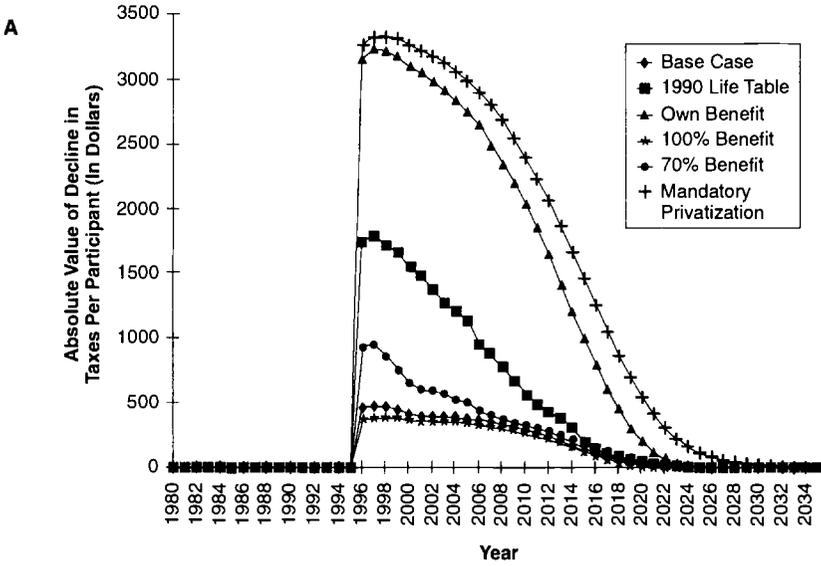


Fig. 8.6A Absolute value of decline in payroll taxes per participant (figure assumes 2.3% real interest)

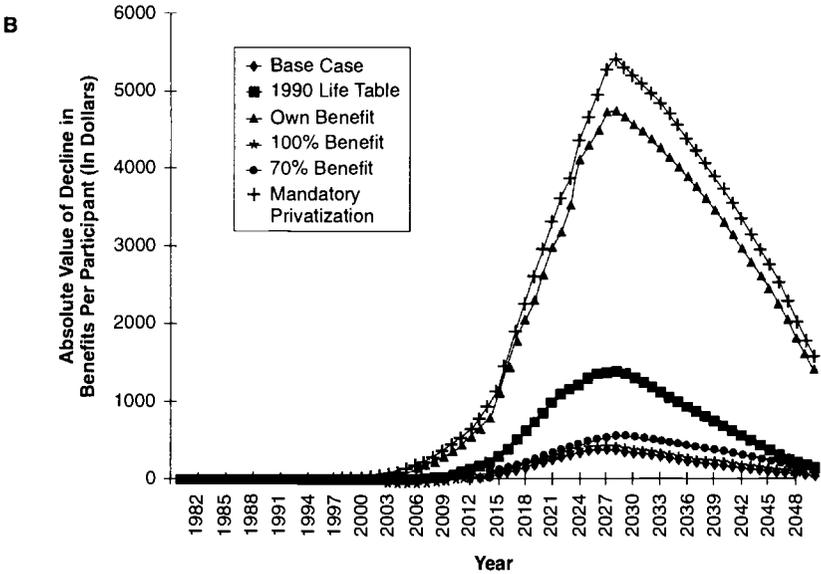


Fig. 8.6B Absolute value of decline in social security benefits per participant (figure assumes 2.3% real interest)

top of the range, we will conduct a set of simulations with a 6 percent real discount rate. As will be seen, that rate is high enough that the vast majority of covered workers will choose the privatized alternative. Therefore, at least from the perspective of choice, it is not necessary to ask what the effect of a 9 percent real interest rate will be—it will have the same effect as a 6 percent real rate. An additional set of simulations will use a real rate of 4.2 percent, halfway between 6 percent and the 2.3 percent used by the Social Security Administration.³⁷

Figure 8.7 presents a number of runs that indicate the sensitivity of the decline in social security participation with privatization to the interest rate in the economy. All use the demographic assumptions of the base case and assume that primary earners fully value all spouse and survivor benefits. As a point of reference, the run demarcated by diamonds assumes that there is a 2.3 percent real discount rate in the economy and comparable interest on the IRA. As noted before, in 1996 social security participation declines with privatization about 13 percentage points of a maximum possible decline of about 90 percent. Once the interest rate reaches 4.2 percent real, participation in social security falls to 14 percentage points in 1996 and slowly rises to a peak participation under privatization of 27 percentage points in 2010. At a real return of 6 percent, participation in social security falls with privatization to 3.6 percentage points in 1996, rising to 10.6 percentage points in 2014. These increases in social security participation over time reflect the higher present value of tax costs at younger ages, where individuals consequently are more likely to opt out.

Table 8.3 reports the effects of privatizing on the present values (in 1989 dollars) of earnings, social security taxes paid, and total and own benefits. The results are reported at the three different assumed real interest rates.³⁸ At 2.3 percent real interest, as a result of privatization, taxes per initial sample member decline in value by \$5,282. Examining the second row, labeled *mandatory schemes*, it can be seen that, over the transition period, the maximum decline in taxes per initial participant as a result of privatization is \$41,678. Thus, the decline due to privatization is about 13 percent of the discretionary taxes that remain to be paid after 1996 by these transition cohorts. Looking at the third row of table 8.3, with a 4.2 percent real interest rate payroll tax contributions are seen to fall by \$20,815. This may be compared to a maximum decline of \$29,642 that would be observed with a mandatory privatization program under a 4.2 percent real interest rate. At a real interest rate of 6 percent, over the transition period the present value of tax contributions per initial participant

37. More generally, individuals with heterogeneous preferences for risk may buy portfolios ranging from fully invested in stocks to mostly invested in bonds.

38. Present values of earnings and taxes under the current system are higher the higher the interest rate. The reason is that all discounting is taken to 1989 and that earnings and taxes paid in years before 1989 are indexed upward by the interest rate. Thus, the accrual of interest raises the value of these earlier earnings by more than the discounting of earnings and taxes paid after 1989 reduces them.

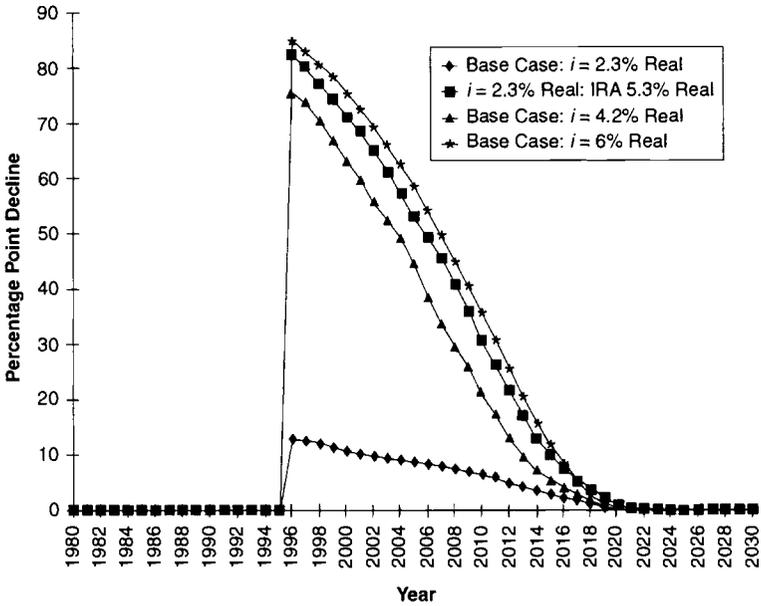


Fig. 8.7 Absolute value of decline in social security participation with privatization at different interest rates

Table 8.3 Present Values of Differences in Social Security Payroll Taxes and Benefits with Privatization under Voluntary and Mandatory Systems Estimated for the Transition Period (thousands of 1989 dollars)

	Taxes	Benefits
2.3% real interest:		
Voluntary	-5,282	-3,426
Mandatory	-41,678	-52,754
4.2% real interest:		
Voluntary	-20,815	-14,704
Mandatory	-29,642	-24,524
6.0% real interest:		
Voluntary	-20,099	-10,384
Mandatory	-21,802	-12,494

falls by \$20,099, where a mandatory program would result in a decline in payroll taxes of \$21,802. Thus, at a 4.2 percent real interest rate, the participation in social security as measured by tax receipts falls by about two-thirds, while, at a 6 percent real interest rate, the decline in payroll taxes is over 90 percent. Analogous results are seen for the decline in benefits at higher interest rates.

Finally, consider why the labor supply effects of privatizing are so small,

even at different interest rates, especially in the transition period. The transition individuals do not have the possibility of opting out for their entire working life, which would generally be much preferable to opting out in their later years, for two reasons. The tax payments are more valuable in the early years. In addition, if the individuals work more than thirty-five years, the tax payments for the extra years buy essentially nothing in the way of benefits.

As a result, the transition individuals are faced with the decision of whether to buy out a few years toward the end of the working life. Consider an individual who currently is sixty years old. If he stays in social security that year, he loses 10.6 percent of salary because that is the tax. If he opts out, he loses one-thirty-fifth of his benefits. Suppose that the replacement rate is 35 percent. In the high-interest rate setting, the total value of the benefits is around nine times the annual benefit: in the low-interest setting, the ratio may be fifteen or higher. Consider the high-interest rate setting, which means that the total value of the benefits is 35 percent of nine, or 3.15 times the current wage. If the individual loses one-thirty-fifth of the benefits, he will lose $(3.15/35 =)$ 9.0 percent of the wage. Thus, he loses around 10 percent of his wage whether he stays in the program or not. If the lost benefits are higher than the taxes, he will stay in; otherwise, he will drop out. Even if he drops out, however, the benefit is never more than a percentage or so; the assumptions generating the 9.0 percent are about as far as you can go to make the benefit loss seem small compared to the wage.

If he does drop out rather than stay in, his effective wage is higher by at most a percentage or so. This translates into a critical value percentage of the term epsilon in the utility function that is higher by about 0.01 or so. The percentage of the normal distribution that lies within a 0.01 interval, and that is subject to working in one regime and not working in the other, is around 0.35 percent (a fractional equivalent of 0.0035). And this is in the high-discount rate case. With lower discounts, the ratio of the value of the benefits to the annual benefit is considerably higher, and the labor supply effect is correspondingly lower.

This explains another phenomenon. The aggregate reduction in taxes must always be lower than the reduction in benefits since people drop out only if the reduction in taxes is bigger. However, the aggregate drop in benefits is never very much more than the drop in taxes. The fact that even among the individuals who drop out the balance between taxes and lost benefits is about equal would help explain this fact.

8.3.5 Differences between the Discount Rate and the Return to the Private IRA

If there are no special returns to the IRA, then the discount rate and the IRA will exhibit similar returns. But a difference may be created if there is a special rebate of corporate taxes only to IRA participants, as suggested by Feldstein and Samwick. On the other hand, the generic system analyzed here does not

impose any special fee or additional requirements for those who wish to opt out of the social security system to participate in the privatized IRA. Thus, it might be possible to find less than the full payroll tax refunded to those choosing the IRA.³⁹

Figure 8.7 also reports results, indicated in squares, for a case with a 2.3 percent real interest rate in the economy but with a real return on the private IRA of 5.3 percent. This is the expected relation if there is a refund of corporate income and property taxes to holders of privatized IRAs. Here, in 1996, all but 8 percent of the relevant population opts out of the social security system and chooses the privatized IRA. In 2010, 22 percent of participants remain in the privatized system, compared with 53 percent in the base case presented in table 8.2 above. When we did a comparable run (not shown in fig. 8.7) in which 3 percent of the payroll tax is not refunded, the decline in social security participation in 1996 is only about 10 percentage points.

8.3.6 Voluntary versus Mandatory Privatization

Other papers in this volume consider mandatory privatization schemes rather than the voluntary privatization scheme considered here. To put the issue of mandatory versus voluntary participation into perspective, focus again on table 8.3.

Consider how differences in taxes and benefits collected under social security change when mandatory and voluntary privatization schemes are introduced and how these differences vary with the interest rate. Under the voluntary schemes, the decline in benefits is always less than the decline in taxes. Under mandatory schemes, the decline in benefits exceeds the decline in taxes with privatization when interest rates are low. However, because benefits are realized at the end of the life cycle, benefits are discounted more heavily than taxes. As a result, when interest rates are higher, the decline in the value of taxes exceeds the decline in the value of benefits, even under the mandatory schemes. More generally, at higher interest rates, the values of both taxes and benefits are lower, the key relation underlying the modest costs of privatizing estimated by Feldstein and Samwick.

Most important, we can see that, if the real interest rates are low, there is a dramatic difference in the effects of adopting a voluntary as opposed to a mandatory scheme. At low interest rates, there will be a much smaller effect of the voluntary than of the mandatory scheme. But, at higher interest rates, there is almost no difference since most participants will opt out. It appears that most of the effects of privatization will be realized if privatization is voluntary and the appropriate real interest rate is 4.2 percent.

39. To be sure, if there is a fee charged to cover the cost of the redistributive portion of social security while at the same time there is a rebate of the corporate income and property tax, the result may roughly be a wash.

8.3.7 Steady-State Analysis

The data used in the simulations presented to this point pertain to cohorts who already have spent a considerable amount of time under the current social security system. Accordingly, the analysis we have conducted pertains to differences under the social security system and the generic, privatized system, but only for a transition period.

It is of interest to ask what behavior will look like in the steady state. To gain some insight, we restart the simulation model at the beginning of the work life for each sample member and assume that, from the first day in the labor market, the individual is operating under the privatized system. Thus, the results that we label *steady state* still pertain to the same cohorts we have examined above and to the same time period. The differences are that incentives from privatization are assumed to have existed from day 1 of the individual's work life, not to have begun in 1996, and that the contribution rate is assumed always to have been 10.6 percent, rather than the historical contribution rate that was used in the simulations for transitions.

Table 8.4 shows the effects of privatizing in the steady state, comparing the current system with a privatized system. A major difference from the results for the transition is that, in the steady state, even at a real interest rate of 4.2 percent, there is virtually no participation in the social security alternative. As seen in column 2, at 4.2 and 6.0 percent real interest, almost no taxes are paid to the social security alternative to the private IRA. The voluntary IRA totally dominates social security. In contrast, at a 2.3 real interest rate, about 60 percent of social security taxes realized under the current system would continue

Table 8.4 Present Values of Earnings, Social Security Payroll Taxes, and Benefits for Cohorts Born from 1934 to 1959, Steady-State Results at Different Interest Rates (thousands of 1989 dollars)

	Earnings	Taxes	Total Benefits	Own Benefits
2.3% real interest:				
Current system	1,383,042	119,078	121,268	66,842
Privatized system	1,383,812	73,139	85,217	44,585
Privatized—current	770	-45,939	-36,051	-22,257
4.2% real interest:				
Current system	1,411,386	120,044	60,459	33,996
Privatized system	1,411,928	936	1,059	566
Privatized—current	542	-119,108	-59,400	-33,430
6.0% real interest:				
Current system	1,552,167	129,461	33,191	19,676
Privatized system	1,551,936	227	224	128
Privatized—current	-231	-129,234	-32,967	-19,548

to be paid under the privatized system, and 70 percent of benefits would continue to be realized.

In figures 8.8a–c, social security participation, labor force participation, and taxes and benefits are plotted by age under a steady-state simulation. However, these figures pertain only to the interest rate where social security participation will be substantial, a 2.3 percent real interest rate. Figure 8.8a indicates that the number opting out of social security is largest at the early ages, reaching a peak of about one-third. The reason again is that the real value of social security tax payments is highest at younger ages. Over time, the number opting out declines steadily, even throughout the age ranges when individuals are too young to retire. The effect of privatization on labor force participation at different ages in the steady state is modest. The maximum increase in labor force participation occurs at age sixty-five and is less than 1 percentage point. As before, the financing problem for privatization (as illustrated in fig. 8.8c) is reflected in the fact that the decline in taxes precedes the decline in benefits for each individual.

8.4 Further Analysis

8.4.1 Joint Decision Making

Earnings and Benefits of Husbands and Wives

Among the important simplifying assumptions made in the preceding analysis, behavioral decisions are made only by men. Limitations in the data forced

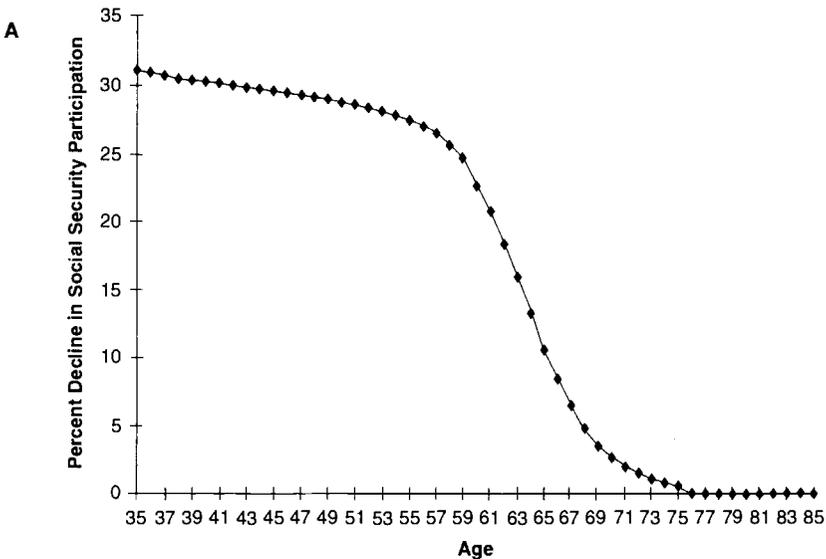


Fig. 8.8A Steady-state decline in social security participation by age due to privatization (figure assumes 2.3% real interest)

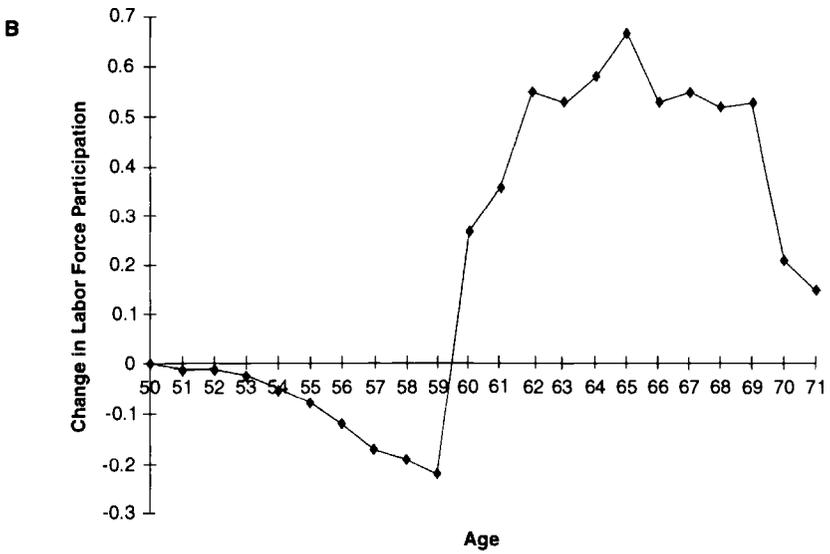


Fig. 8.8B Steady-state change in labor force participation by age due to privatization (figure assumes 2.3% real interest)

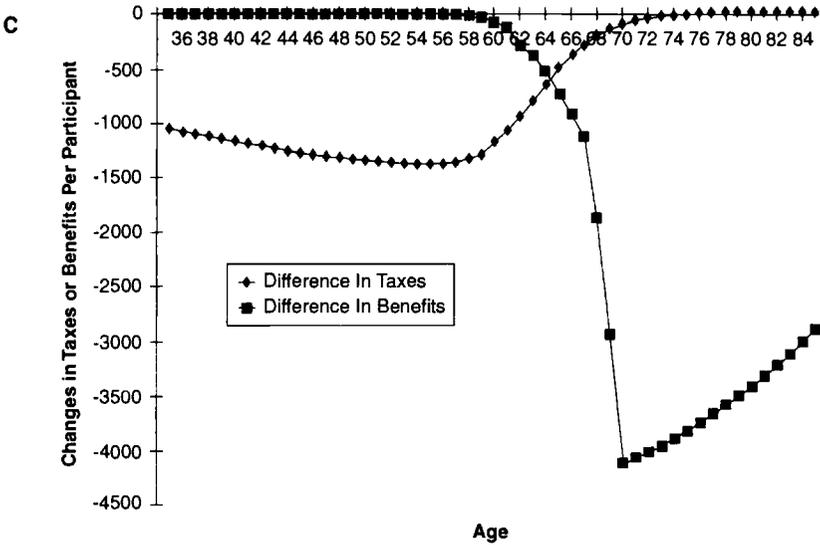


Fig. 8.8C Steady-state decline in taxes and benefits per participant due to privatization (figure assumes 2.3% real interest)

us to ignore the labor market behavior and participation decisions of wives and their consequences for social security evaluations made by each spouse and to exclude single women from the analysis.⁴⁰ Not only does ignoring the labor market behavior of married women make our analysis relevant to only a part of the population, but it also causes some distortion in the behavioral estimates we make for married men. In addition, we oversimplify the determination of spouse and survivor benefits, not allowing appropriately for households in which there are dual earners who nevertheless partially benefit from spouse and survivor social security benefits. Once we recognize the role of labor market participation by the spouse, however, there are additional consequences for the estimated effects of privatizing social security. Specifically, we must confront the question of how the social security rules are going to be modified when either spouse may choose not to participate in the social security system.

Thus, the assumptions that we made in our earlier discussion greatly simplified matters by allowing us to focus on basic aspects of behavior rather than on the details of the alternative policies. In particular, under the assumption that wives claim spouse or survivor benefits only, but not benefits based on own earnings, one can analyze the effects of privatization on the social security system by comparing outcomes in the presence and absence of a privatized alternative. Whether or not there is a privatized alternative, the social security system is assumed to operate under current rules.

In contrast, when wives also earn social security benefits based on own earnings, a new set of rules must be drawn up to address the question of how spouse and survivor benefits are handled when either spouse is free to opt out. Thus, when the privatized system is introduced, it comes with an alternative set of rules for social security. Consequently, there are two social security systems to consider in estimating the effects of privatization. One is the present system operating in the absence of a privatized alternative. The other is a social security system with modified rules operating in the presence of a privatized alternative. As will be seen below, not only will the responses to privatization depend on the fact that a privatized alternative to social security is made avail-

40. Two key limitations in the data have narrowed the focus of our analysis to the decisions made by men. The parameters of the utility function we use are estimated in the context of a structural retirement model, with estimation based on data from the Retirement History Study, which is a representative sample of men. The budget constraint is estimated from more recent data, the 1989 Survey of Consumer Finances. At the time of writing, the SCF was the only data set available that included employer-supplied descriptions of pension plans, from which we obtain our data on pension incentives. But the SCF does not provide detailed information on work history. Considering the limitations in the SCF data, it is not too distortionary to use the information the SCF reports on the number of years of full-time and part-time participation to impute the covered earnings history and AIME of men in the sample. Since most of the sample worked full-time, we probably will not be too far off in our calculation of the incentives for continued coverage by social security. But the information on years of full-time and part-time work is inadequate to impute the covered earnings history of the women in the SCF. We would have a great deal of difficulty imputing the covered wage in years when employment was reported and in deciding whether employment was in a covered job.

able, but they will also depend on exactly how the social security system is modified under the privatization scheme.

Because the simplifications that we have adopted cause us to ignore the behavior of the woman in the household and to oversimplify the behavior of the man, it is useful to discuss the next steps required to generalize this line of research.⁴¹ Ideally, we would like to expand this work using a survey that provides updated information on labor supply, provides information on covered earnings history, and also includes employer-provided pension plan descriptions for calculating retirement incentives created by pensions. The new Health and Retirement Survey (HRS) is designed to provide this information, and the required data will be available in a year or so.⁴²

It is also useful to discuss the nature of the bias that has resulted from the simplified treatment of spouse and survivor benefits. In the discussion that follows, we consider, first, how the work histories of spouses, which we have ignored, may affect the valuation of spouse and survivor benefits under the current social security system. We then consider how the determination of spouse and survivor benefits under the social security alternative to the privatized system may be modified to take account of the earnings of spouses and the incentives that will be created, affecting the decisions of husbands and wives to participate in a privatized system.

41. The present analysis is also limited because we do not have parameters from a model of joint retirement decisions by husbands and wives. In other work, we have estimated parameters of a utility function for husbands and wives in the context of a preliminary model of joint retirement (Gustman and Steinmeier 1994b). But that model has two limitations for the purposes of the current analysis. First, there is no partial retirement in that model. Second, the parameters were estimated on the basis of pension plan descriptions provided by the respondent, who is the woman covered by the survey, the National Longitudinal Survey of Mature Women (NLS-MW). Plan descriptions obtained from covered workers are typically imperfect (Mitchell 1988; Gustman and Steinmeier 1989). Descriptions of plan features provided by the spouse of a covered worker are likely to be even less reliable.

Employer-provided pension plan descriptions have just become available for the NLS-MW. We are now estimating a family retirement model using NLS-MW data together with matched employer-provided pension plan descriptions.

Note that labor supply is less responsive to market incentives when the utility function in Gustman and Steinmeier (1994b) is used as the basis for simulations than when the utility function from table 8.1 is used to examine sensitivity to market incentives. That is, whichever utility function is used, the findings will suggest that labor supply response to privatization will not be of major importance.

42. After entering the field in the spring of 1996, the third wave of the HRS will be cleaned. It will be ready for analysis in 1997. Information from the third wave of the HRS is necessary to fit a structural model of the type required to analyze privatization issues. Matched data from the social security earnings histories are being released in a restricted data file. These will be invaluable for classifying families according to the way that privatization will affect incentives for each spouse to participate in a privatized system. The HRS also is making available a restricted data file with detailed information on pensions. Currently, the restricted pension and social security earnings files cannot be merged. It is not clear when a restricted file containing both social security earnings histories and detailed pension data will be made available, but a file with aggregate pension data and detailed social security records could conceivably be forthcoming shortly.

A limitation of the HRS data is that, currently, they pertain to a cohort born from 1931 to 1941. Younger cohorts will be added to the survey every five years.

In the current social security system, there are specific rules for determining spouse and survivor benefits. When an individual is entitled both to old age benefits based on own earnings and to spouse or survivor benefits, the procedure is to pay benefits based on own earnings first. If spouse or survivor benefits are below benefits based on own earnings, no spouse or survivor benefits are paid. If spouse or survivor benefits exceed benefits based on own earnings, then the difference is paid on top of the payment based on own earnings, and the recipients are called *dual beneficiaries*. In the end, the individual receives the highest of the benefits he or she is entitled to.

Social security benefits are structured so as to increase the likelihood of a spouse collecting benefits based on own earnings rather than on the record of the primary earner. For example, the progressivity of the benefit formula makes it easier for the secondary earner in a household to earn at least half the benefits of the primary earner. To be entitled to half the benefits of the primary earner, the spouse of a primary earner whose indexed yearly earnings fall at the second bracket amount or beyond, that is, whose average indexed monthly earnings multiplied by twelve are \$31,620 or more in 1996, must earn one-third the amount earned by the primary earner.⁴³

The progressivity of the benefit formula reduces the effect of additional earnings by the primary earner on benefits paid to the spouse or survivor. To the extent that the secondary earner's labor supply over the life cycle is substantial and largely predetermined as far as the social security participation decision is concerned, the simulations made under the assumption that the primary earner largely ignores spouse benefits will be closer to the mark than the simulations in which spouse benefits are positively valued.

From the perspective of the secondary earner, benefits accrued as a result of own earnings are much smaller than the nominal benefits called for under the system. Indeed, the availability of a privatization scheme provides a mechanism for two-earner couples to avoid a system that is notoriously unfair to them relative to one-earner couples. Accordingly, not only will the husbands in two-earner families come closer to the scenario in which spouse benefits are not valued and be more likely to opt out of the system, but, to the extent that the

43. Using 1996 bend points, each dollar of the first \$5,244 of average indexed earnings per year results in almost three times the benefit, as does each dollar of earnings between \$5,244 and \$31,620, and six times the benefit from average indexed earnings between \$31,620 and the maximum covered earnings. For a family whose primary earner has earnings at the second bracket point, i.e., who has indexed earnings of \$31,620 per year, the primary earner will receive \$13,160 per year. To earn half those benefits, \$6,580, the secondary earner must have average indexed yearly earnings of \$11,058. Thus, the secondary earner requires just over a third of the earnings of the primary earner to be eligible for half the benefits of the primary earner. For a family with a primary earner who has \$50,000 in average indexed yearly earnings, the yearly social security benefit of the primary earner is \$15,917. For the spouse to earn half that benefit based on own earnings, \$7,958, the spouse needs average indexed yearly earnings of \$14,840. So it takes about 30 percent of the primary earner's income for a spouse to be entitled to half the benefit to be received by a primary earner with \$50,000 in average indexed earnings a year.

rules force a joint decision to participate, wives in families with substantial earnings are also likely to opt out.

To provide some insight into the relative size of the different groups among the currently retired, it is useful to distinguish three groups of spouses.⁴⁴ We do so in the context of current data on beneficiaries. In 1994, there were 20.8 million women beneficiaries age sixty-two or over. The three groups are as follows: *group 1* is the 8 million women sixty-two or older in 1994 entitled to benefits as a wife or widow, not having worked enough to qualify for any benefits based on own earnings history; *group 2* is the 5.3 million who were dual beneficiaries, receiving spouse or survivor benefits; *group 3* is the 7.5 million entitled to workers' benefits only (Social Security Administration 1996, 214).

The husbands and wives in these three groups face different incentives and would react differently to a privatized system. The 8 million households in group 1, with women who did not become covered on the basis of their own work history, fit the single-earner model that we analyzed above. Only the earnings of the primary earner are relevant to the participation decision. And the outcome will depend primarily on the value that husbands place on spouse and survivor benefits, as we have simulated.

Those in groups 2 and 3 are entitled to benefits from own work even in the absence of benefits from their husband's work. Accordingly, they would place a lower value on spouse and survivor benefits, which are of value only to the extent that they exceed the benefits the spouse is entitled to from own work. The 5.3 million women in group 2 who qualified for benefits on the basis of their own work history, but effectively received no increment in their benefits due to their own work, would value spouse and survivor benefits more strongly than the 7.5 million in group 3, whose benefits from own earnings exceed the benefits due to their husband's earnings.⁴⁵ We can expect the husbands of those in group 2 to place a stronger value on spouse and survivor benefits than do the husbands of women in group 3.

The women in group 3 find their benefits increased from own earnings when their husbands are alive, but, with few exceptions, their benefits will be no higher as a result of own earnings should their husbands have died.

We have also obtained data that provide a rough indication of the relative size of each group for cohorts between the ages of forty-five and sixty and

44. The discussion takes the husband as the primary earner. Although that may change in the future toward a situation where more husbands earn less than their wives, the assumption is consistent with the data to date. For example, in 1994, there were 2.4 million women who were dual beneficiaries receiving spouse benefits, while there were 27,000 men who were dual beneficiaries receiving spouse benefits (Board of Trustees 1995, table 5.G2). Similarly, 3.0 million wives were entitled to spouse benefits solely because of age, along with 30,000 husbands (Board of Trustees 1995, table 5.F1). There were 5.0 million women receiving nondisabled widows' benefits and 37,000 nondisabled men receiving widowers' benefits in 1994 (Board of Trustees 1995, table 5.F8), with 38 percent of those dual beneficiaries (Board of Trustees 1995, table 5.G2).

45. Some of the women in group 2 may have been in group 3 before their husbands died.

those sixty to seventy.⁴⁶ These summary data have been obtained for couples in the Survey of Income and Program Participation (SIPP). Researchers at the SSA have matched restricted social security earnings records to the survey data provided by SIPP participants and have run the earnings records through the Social Security Administration's ANYPIA program to estimate the benefits to which each individual would be entitled on the basis of covered earnings through 1 January 1990.

Table 8.5 shows the relative valuation of spouse and survivor benefits for those families with a husband over and under age sixty. Evaluating these benefit outcomes is a bit tricky because earnings until retirement are not projected by the SSA; instead, benefit amounts are computed by assuming that there are zero earnings between 1990 and retirement. The failure to project earnings may be quite important because the benefit formula is progressive. A related complication is that, in these projections, there are different numbers of years of zero earnings counted for those who survive until the social security retirement age and those who do not.⁴⁷ The last column of table 8.5 shows the ratio of a to b , where a is the sum of spouse and survivor benefits plus the husband's own benefits and b is his own benefits. The first panel uses the SCF sample analyzed above, under the assumption that the wife has no earnings. Under this assumption, spouse and survivor benefits are worth 70 or 80 percent of the husband's own benefits, depending on the interest rate. For the SIPP group under age sixty, the spouse and survivor benefits are worth between 34 and 42 percent of the husband's benefits. For those over age sixty, a group that is less subject to bias from assuming that future earnings are zero but that is more likely to be subject to mortality bias, spouse and survivor benefits are worth 32–38 percent of the husband's benefits.

This finding does not mean that one could correct our earlier analysis simply by dividing spouse and survivor benefits by 2. In addition to the appropriate corrections for the biases mentioned above, one would still need to know the distribution of earnings histories among husbands and wives, that is, how the earnings history for each wife matched up to the earnings history for each husband.

Table 8.6 provides another measure from the SIPP sample, this time the number of people in each family type. In about a third of the families with a

46. Michael Leonesio of the Social Security Administration has kindly provided these data, which are still preliminary and subject to revision.

47. Expected survivor benefits are calculated by multiplying the value of survivor benefits for each year of death by the probability of the covered worker dying. For example, because death benefits are paid on a shorter work history according to date of death rather than on the high thirty-five years of earnings, the portion of survivor benefits that assumes death in 1990 is calculated with no zero earnings appearing in the husband's AIME formula. However, the wife's benefits from her own work are calculated on the assumption that she earns zero from 1990 until retirement. Thus, the failure to project earnings until retirement may differentially affect the value of own and spouse benefits. Similarly, there is an effect due to the progressivity of the PIA formula of counting many years of zero earnings in the PIA, and there is also the possibility that a spouse who will eventually qualify for own benefits has not done so yet.

Table 8.5 Value of Spouse and Survivor Benefits in SCF under Base-Case Assumptions and Computed with SIPP Matched Social Security Earnings Histories (\$)

	Husband's Total Benefit	Husband's Own Benefit	Ratio Total to Own
SCF base-case assumptions:			
2.3% real interest	121,248	66,831	1.81
4.2% real interest	60,445	33,989	1.78
6.0% real interest	29,289	16,974	1.73
SIPP sample under age 60:			
2.3% real interest	107,357.86	75,527.56	1.42
4.2% real interest	70,578.07	51,426.48	1.37
6.0% real interest	48,999.47	36,661.71	1.34
SIPP sample over age 60:			
2.3% real interest	140,921.55	101,788.74	1.38
4.2% real interest	114,963.56	85,441.15	1.35
6.0% real interest	96,847	73,559.50	1.32

Source: Preliminary data provided by Michael Leonasio of the Social Security Administration, matching the 1990 SIPP Full Panel Longitudinal Research File, limited to couples in which the husband or wife was at least forty-five years old. This produced a file with 5,975 couples, reduced to 4,770 after restricting ages to less than seventy, and to 3,580 after eliminating cases with unmatched social security data or uninsured husband.

Table 8.6 Distribution of Couples by Wife's Eligibility Status for Social Security Benefits

	Husband Younger than 60		Husband Aged 61-70	
	Number	Percent	Number	Percent
Wife is not eligible for benefit based on her own work	767	32.2	365	30.5
Wife is dual beneficiary when husband is alive	312	13.1	209	17.5
Wife is dual beneficiary only when husband is dead	1,206	50.6	516	43.1
All of wife's benefits are due to her own earnings	99	4.2	106	8.9
Total	2,384	100.1	1,196	100.0

Source: SIPP and matched social security records.

husband under age sixty in 1990, the wife is not eligible for benefits based on her own work. In about a seventh of those families, the wife is a dual beneficiary when the husband is alive and thus will also be a dual beneficiary should the husband die. In about half the families with a husband under age sixty in 1990, the wife will be a dual beneficiary only when the husband is dead. When he is alive, she will receive benefits based on her own earnings. And, in 4

percent of these families, all the wife's benefits are due to her own earnings, even when the husband dies. By and large, the results are consistent for those families with a husband who was sixty-one to seventy in 1990.⁴⁸

Our simulations in the base case pertained only to the primary earner. These simulations had nothing to say about tax receipts from the wife or benefits paid to the wife based on her own earnings. The behavior observed for the base case continues to apply to those one-earner families where the sole earner fully values spouse and survivor benefits. For the few cases in which both spouses have similar earnings histories, with the result that neither spouse nor survivor benefits are of any value, the simulations under the situation where spouse and survivor benefits are not valued at all apply not only to the husband but also to the wife. Other families fall between these cases, meaning not only that spouse and survivor benefits are not fully valued by the primary earner but also that the spouse does not fully value own benefits. This sets up a situation in which participation by each spouse will be sensitive to the precise set of rules established for determining spouse and survivor benefits under the social security system that will function side by side with a privatized IRA.

Potential Changes in Social Security Rules Affecting Spouse and Survivor Benefits

For any alternative set of rules for the social security alternative to the privatized system, it seems reasonable to assume that, when an individual opts out, social security benefits are prorated depending on the fraction of time spent in the privatized alternative, as in the analysis outlined above. A few approaches are considered, but many more combinations of these policies are possible.⁴⁹ The policies differ in their treatment of own benefits and of spouse and survivor benefits when one spouse or the other opts out of the social security system.

Own Benefits and Benefits Payable to the Individual's Spouse or Survivor Are Lost. One option is that offered under the current system where spouse and survivor benefits are payable to the degree that the worker stays in and pays social security taxes. For most families with two earners, under a requirement in which spouse and survivor benefits depend only on the participation of the primary earner, at least one partner will drop out of the system. Consider families with a high and a low earner. If the higher earner stays in, then the taxes paid by the lower earner are buying almost no additional benefits, and that earner will surely drop out. If the higher earner drops out, the lower earner will benefit from the progressivity of the PIA formula and may well stay in. To be

48. The fact that the proportion of those families with a wife who will receive benefits based only on own earnings is higher for those families with a husband over age sixty than for families with a husband under age sixty is suspicious; it may or may not be a result of truncation of the earnings histories, especially for those families with a head between forty-five and sixty in 1990.

49. For a discussion of these and related issues, see General Accounting Office (1996).

sure, there may be some exceptions. But, most commonly, the social security alternative to the privatized system will lose the taxes from at least one individual, with probably only a minimal reduction in benefit obligation.

Own Benefits, Entitlement to Benefits as a Spouse or Survivor, and Benefits Payable to the Individual's Spouse or Survivor Are Lost. There is already a precedent for adjusting spouse benefits on the basis of the spouse's own participation in an uncovered system. In particular, there is a special provision that reduces spouse and survivor benefits for a spouse who works in uncovered employment, which up until now involved work in exempt government employment. Two-thirds of the outside pension, or imputed pension if there is a lump sum pension settlement from the government employer, are subtracted from the spouse or survivor benefit under social security.⁵⁰

What would adjusting spouse and survivor benefits based on both the worker's and the spouse's participation do to participation in the social security alternative to the privatized system by members of the three groups analyzed above? The answer is that the husbands of those in group 1, those whose spouse did not work, would stay in or leave independently of such a scheme and their wives would remain out of the labor force. Members of group 3, those families with wives whose current benefits are based only on own earnings, are likely to behave according to the simulations for single earners. Thus, in the case of those in group 3, the behavior of husbands will be similar to the behavior of males who do not value spouse benefits as simulated above, and many of their wives will behave in a similar fashion. This suggests that many will choose the privatized system. This response depends, however, on the extent to which survivor benefits are adjusted for nonparticipation of the spouse. Similarly, members of group 2, dual beneficiaries, will divide in accordance with own and spouse earnings and the specific set of offset rules that is adopted.

All Spouse and Survivor Benefits Are Provided through Actuarially Fair Adjustments in the Primary Earner's Benefits. The logical conclusion to an argument that two-earner couples should not be placed at a disadvantage relative to single-earner couples is to eliminate spouse and survivor benefits as additional benefits, providing them only as part of an actuarially fair joint and survivor benefit. Thus, members of two-earner families might receive both benefits from own covered earnings and benefits as a spouse or survivor, rather than the highest of the benefits to which the individual is entitled. The terms for the

50. To reduce the primary benefits of those who were in exempt employment until 1983, there is an ad hoc reduction in the calculation of the PIA. After a transition phase, those who were in exempt employment have their benefits computed as 40 percent of the AIME up to the first bracket amount, rather than the 90 percent figure called for when computing the benefits of those continually in covered employment.

joint and survivor benefits might vary under different proposals. Here, primary earners from couples would receive a lower basic benefit than a single earner with the same earnings history, but the expected total payment to the single and to the couple would be the same. There would be no need to eliminate spouse or survivor benefits of those spouses who opted out of the system because the total benefit they and the primary earner received would depend only on the participation of the primary earner.⁵¹

Given the earnings distribution, the progressivity of the benefit structure (which, however, would be more difficult to maintain), and the possible use of unisex life tables, we would expect, in accordance with the incentives for participation in a privatized alternative analyzed above, that many more husbands than working wives would opt out of the system.

Joint Accounts Are Set Up in Which Both Spouses Share Credit for Working. Given the redistributive aim of the social security benefit formula, to take account of full family income and avoid distortions due to unequal allocation of market and nonmarket time within the family and unequal wage offers, a modified system might include some form of income averaging for the couple. That is, instead of a scheme in which the contribution of each spouse to total family benefits is determined independently by own earnings, as in the preceding proposal, the earnings of both spouses may be aggregated into a single account, with half the earnings attributed to each. Outcomes under such a scheme will again depend on the specific rules adopted for determining benefits from these individual accounts, with the progressivity of benefits determining the reactions of couples according to the earnings of each spouse.

8.4.2 Further Caveats

The present analysis indicates the sensitivity of choice of program under a privatized social security system to a set of behavioral, market, and program parameters. But it is highly simplified and leaves many questions unresolved.

Because the actual values of many of the key parameters driving the simulation outcomes are not known to us, a wide range of outcomes is possible. Moreover, the analytic framework has simplified various dimensions of economic behavior and is only a partial equilibrium analysis. It includes first-round responses by individuals, but it does not include the consequences of whatever redesign of the revenue system or borrowing alternative is adopted to ensure financial solvency. For example, depending on how a privatized pro-

51. To be sure, moving to a system in which all those covered workers with the same earnings received a social security package, for them and their families, that had the same expected benefit, irrespective of marital status, is not likely to be feasible for the transition generation. Many families with only one earner will have planned their life-cycle participation with the idea that they will be eligible for the higher amounts that the current system now provides in the form of spouse and survivor benefits. Nevertheless, it is still useful to consider this alternative.

gram is financed, there may be a wide range of changes in income taxes, and these changes may differentially affect families with different social security entitlements. Nor does the analysis consider the macroeconomic implications of privatization.⁵²

To recognize the implications of the financial imbalance in the current system for social security benefits, the base-case analysis assumes that benefits under the current social security regime, and under the social security alternative to a private IRA, would be reduced by 20 percent. We also examine an alternative where the benefit reduction is 30 percent, which is about the size of the projected shortfall in the financing of the current system. Additional costs of a voluntary program are not explicitly considered but may be treated as incorporated within the 20 or 30 percent benefit reduction from current levels and whatever tax increases are imposed. To incorporate a range of outcomes, we have also run the simulations with no benefit reduction. To allow for special charges for opting out, we have run simulations in which some of the payroll tax is retained in social security. Other simulations have raised the return to the privatized IRA above the market discount rate. Each of these is only a crude adjustment. Future analysts will have to do a better job of including the consequences of financial adjustments to privatization.

In the present analysis, no special value is placed on the full annuitization of the benefits provided under social security. Although it is possible that a significant number of people are overannuitized, this simplification will most likely lead to an understatement of the value of the conventional social security option.⁵³ To be sure, provisions may be adopted to foster a well-functioning annuity market, for example, by requiring annuitization of the IRA alternative.⁵⁴

With the advent of indexed bonds in the United States, the full indexation of benefits under social security will be less of a novelty. Nevertheless, the analysis does not include the inflation insurance from having indexed benefits under social security.

The present model, with its perfect capital market assumption, oversimplifies the savings decision. Available evidence suggests that savings behavior is

52. For discussions that do take macroeconomic effects into account, see Feldstein and Samwick (chap. 6 in this volume) and Kotlikoff (chap. 7 in this volume).

53. If participation in an annuity is not required of those who choose the IRA, adverse selection will raise the costs to those who wish to use the proceeds from their IRA to obtain the kind of annuity at retirement age that social security now provides. Other things the same, those who expect to live for a long time will favor the indexed annuity and, thus, the social security program. To the extent that the population does not fully understand the advantages of an annuity, these effects are weakened.

54. Some of those who choose a lump sum benefit or limited payment period under a privatized alternative may outlive their assets. It is hard to reconcile a retirement savings program with mandatory participation, on the one hand, with an option that allows the individual to spend down retirement assets, perhaps having to resort to some other form of public support, on the other. Thus, it would not be surprising to see the IRA adopted with some form of mandatory annuity provision.

governed by a mix of precautionary and life-cycle motives, leaving some workers liquidity constrained.⁵⁵ For constrained workers, heterogeneity in time preference will generate additional heterogeneity in social security participation and labor market choices. Further, although a privatization program may present a choice between social security and a privatized IRA, the program may come with additional restrictions, such as requiring additional savings beyond the payroll tax. These restrictions will create additional behavioral responses that can be analyzed only in the context of a model that is correctly parameterized to reflect observed savings behavior.

The analysis clearly shows the sensitivity of program choice to the interest rate. But we still need to determine exactly what the appropriate interest rate is. Moreover, the return on each asset should be adjusted to reflect some proper risk factor. This requires a better idea of what the proper premium is to attach to social security owing to political and other risks. It also requires a better understanding of the behavior governing choice of investments that will be made in the privatized IRA.⁵⁶

Nor has anything been said about investment costs or losses from inefficient churning by some ill-informed investors.⁵⁷ Moreover, the present analysis has ignored the value of the life insurance component of social security for those with small children. This feature should be explicitly valued.

Any policy analyst is going to want information on winners and losers and where they lie in the income distribution. If the assumption is correct that there is a single earner in each household and spouse and survivor benefits are fully valued, with the result that AIME reflects lifetime earnings, then the answer is clear. People leave the system voluntarily only if there is a gain to their expected incomes, and the gains accrue first to those with the highest incomes. In those runs in which only a small fraction of the individuals leave the system, in particular the runs with low real interest rates, the gains accrue to those with the very highest covered earnings. If the real interest rate is higher and most therefore choose to opt out, then the gains accrue throughout the income distribution. But the largest gains still accrue to those with the highest incomes since they are not the beneficiaries of redistribution via the social security benefit structure. What clouds this discussion is the failure to incorporate good information on the role of spouse earnings. Those two-earner couples who are heavily disadvantaged by the treatment of spouse earnings under social security are not necessarily high-income couples, allowing the benefits from privatization to spread more evenly throughout the income distribution. A further problem is that we have not included the effects of unearned incomes in the analysis. Given the preliminary nature of this analysis, the sense of false precision that

55. For a related discussion of savings and retirement behavior, see Gustman and Juster (1996).

56. For a discussion of the range of investments in IRA and 401(k) accounts, see Poterba and Wise (chap. 9 in this volume). For a discussion of the range of risks associated with defined-contribution and related pension plans, see Bodie (1990).

57. Mitchell (chap. 10 in this volume) discusses the investment costs of privatized systems.

would accompany inclusion of data on nonwage income and wealth is not warranted.

One could take a very different approach to the analysis of privatization, at least for the scenarios in which the real interest rate is above 2.3 percent. The present analysis essentially links the idea of funding and privatization together. If the real interest rate were 4.2 or 6 percent, one could break the changes analyzed here into two parts, asking first what the cost is of fully funding social security and then how a voluntary, privatized system compares to a fully funded social security system. The work by Feldstein and Samwick (chap. 6 in this volume) suggests that fully funding social security will first increase the payroll tax but in the long term reduce it. In that case, a voluntary, privatized system might be even more attractive compared to a fully funded social security system in the short run, but it might be less attractive in the long run.

8.5 Conclusions

This analysis has provided a framework for analyzing choice within the context of a voluntary privatized social security system, has provided some initial estimates of the participation that might be observed under different circumstances, and has highlighted the sensitivity of choice between programs to key behavioral and economic parameters. We have been able to determine which economic measures and taste parameters are central to the decision to opt out of social security and which are not. By adopting alternative assumptions about key parameters, we have a first indication about the range of outcomes that might result from such a program.

The choice between a private IRA and a traditional social security alternative is very sensitive to the real interest rate. At the higher interest rate examined, a real return of 6 percent, it becomes less important to offer a choice between a traditional social security alternative and a private IRA because most will choose the private IRA. At the lower interest rate, a real return of 2.3 percent, a wide range of outcomes is possible. A private IRA will be chosen by most in the transition group if spouse and survivor benefits are not very important or are not highly valued by the primary earner. A private IRA is also more likely to be chosen if life expectancy is not projected by most individuals. At the 2.3 percent real interest rate, if spouse and survivor benefits are highly valued, and if individuals are aware of trends in life expectancy, most would remain with the traditional social security alternative, and first-year participation in a privatized system could therefore be below 10 percent. A common problem for all alternatives is that, with privatization, taxes decline earlier than benefits, creating the potential of a substantial cash-flow problem for social security.

Our findings also suggest that, in judging the effects of privatization, labor supply adjustments will not be very important. This is true even if major changes in the pension system are induced to allow more workers to qualify for

the privatized scheme. The findings about changes in labor force participation suggest that simulation models of the effects of privatization may, as a first approximation, ignore labor supply responses.

An analysis of the type presented here, modified to incorporate a more sophisticated model of two-earner decision making, savings behavior and differential risk, and budget and tax consequences at the level of the economy, could provide the basis for a model of public choice, which in turn will provide an indication of whether such a privatization program would generate a majority in favor of its adoption.

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Comment David M. Cutler

In many analyses, privatizing social security is envisioned as a mandatory change in retirement programs. A common scenario, for example, is to redirect some share of individual contributions to a private account rather than the current social security system, regardless of whether people want to make this substitution.

But, if we actually do privatize social security, participation in the new system is likely to be voluntary rather than mandatory. Because so many people like social security so much, it will be hard to deny people the ability to remain in that system. Most likely, contributions will be made to private accounts only if people direct them to be so.¹

Recognizing this political imperative, Gustman and Steinmeier make a valuable contribution to the privatization debate. They analyze the “first-round” effects of a voluntary privatization system. The “first round” on which they focus principally comprises the share of people who would opt out of the system, ignoring “feedback” effects such as changes in real interest rates or wage rates. They conclude that the most important factor affecting individual choice is the real interest rates: at high interest rates, essentially everyone would opt out of the traditional system; fewer people opt out as interest rates fall.

At its basic level, Gustman and Steinmeier’s analysis is straightforward. The

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1. For example, in the Republican proposals to “privatize” Medicare in 1994–95, individuals were given the option to remain in the traditional Medicare system at no additional cost. This option was guaranteed because the current system was so popular.

return to social security has two parts. The first is the return in a pay-as-you-go system. As Samuelson (1958) showed, pay-as-you-go social security has an implicit return equal to the rate of real wage growth—the sum of labor force growth and the growth of real wages per worker. Generally, labor force growth is about 1 percent per year, and real wage growth is about 1 percent per year, so the average social security return is about 2 percent per year.

There are then additions and subtractions to this for particular families because of the redistribution in social security. Social security redistributes from rich to poor, by lowering the replacement rate for high-income workers. Social security also redistributes from families with working spouses to families without working spouses, through its spousal and survivorship rules.

The return to individuals saving on their own, in contrast, is the real interest rate. Gustman and Steinmeier consider real interest rates around 2–4 percent. In light of this, it is easy to understand Gustman and Steinmeier's results. When the return to private saving is very high (4 percent or more), the private return dominates social security for just about everyone. As a result, essentially everyone opts out of the system. When the private return is only 2 percent, however, the benefits to opting out vary across families. This is particularly true because of the redistributive component in social security. As a result, higher-income families and two-income families will be particularly likely to opt out of Social Security.

I want to stress one point about this analysis. We typically think that giving people choice is optimal since people can decide what is best for them. Thus, the economic bias is to believe that, if people want to opt out of social security, they should be allowed to do so. In the context of social security privatization, however, this analysis is *not* right. Allowing people to opt out of social security to avoid adverse redistribution is not efficient; it just destroys what society was trying to accomplish. If rich people and two-worker families opt out of social security, for example, we will no longer be able to redistribute from rich to poor or from dual earners to single earners. One of the purposes of social security will have been defeated. This is a cost of privatization of which we must be aware.

An analogy may be helpful. Suppose that contributions to national defense are made voluntary. Probably, few people would choose to contribute; why pay when you can get the public good for free? Realizing this, we make payments for national defense mandatory. The same is true of redistribution. Redistribution is a public good just as much as national defense; no one wants to do it, but everyone benefits from it. As a result, making contributions to redistribution voluntary will be just as bad as making contributions to national defense voluntary. We need to make redistribution mandatory, or no one will pay for it.

One may not like all the forms of redistribution in social security. For example, most people would agree that the rules subsidizing nonworking spouses are a relic of a bygone era. But, if that is true, we should change those rules in

the current social security system, not allow that system to fall apart by letting people opt out of that transfer.

This principle leads to some interesting design issues for social security privatization. There may be ways to allow people to opt out of social security while still paying the amount they would have contributed to redistribution. Perhaps the employee contribution to social security, but not the employer contribution, should be refundable. Or individuals might forfeit a one-time amount if they opt out of social security, which would offset the losses from redistribution.

I would like to have seen more analysis in Gustman and Steinmeier's paper about when voluntary privatization is good and when it is harmful and what to do in the latter case. The importance of this issue depends on the assumed real interest rate. When the real interest rate is 4 percent or higher, the gains to privatization can be large, and the harmful effects are smaller. At lower real interest rates, the harmful effects increase in proportion. By leaving aside the issue of the social costs and benefits of choice, Gustman and Steinmeier implicitly use a framework where choice is automatically good. That is not the right starting point.

I want to highlight one other issue in Gustman and Steinmeier's analysis—the rules regarding choice will matter a great deal for how many people will opt in or out of the current system. Consider one seemingly innocuous assumption of the analysis: for every year the person opts out of social security, one-thirty-fifth of future benefits are lost. Suppose that an individual has already worked for thirty-five years and is thinking of working an additional year. If she remains in the current system, her benefits are unaffected. If she opts out, her social security benefits fall. In both cases, contributions are the same. Now suppose that we change the rules slightly. Rather than subtracting one-thirty-fifth of benefits if the individual opts out for a year, we count up the number of years the individual is in the social security system, with a maximum of thirty-five. In this case, opting out after thirty-five years in the system results in no loss in benefits.

The decision to be in or out of social security will be very different in these two cases. In the case as Gustman and Steinmeier have analyzed it, the individual is likely to remain in the current system because the loss in benefits from opting out may be large. In the alternative scenario, the individual will likely opt out of the current system since traditional social security benefits are unaffected by the decision to be out for a year. As the population ages and people are capable of working longer, this type of choice will become a very important issue.

The point is not that Gustman and Steinmeier's assumptions are wrong. It may be that their system is the one that we will enact. The point is that the effects of choice on participation in social security may depend critically on a large number of seemingly innocuous rules. I could add to the list substan-

tially: the rules on opting out for all or part of a year; the rules on individual versus family choice; the rules of integration of spousal coverage with the opt-out decision; etc.

My guess is that variations in these rules could have dramatic effects on participation in the social security system. And, unlike the “good scenario,” where people opt out of social security because the rate of return is so much higher outside than in the current system, these choices would be for the “bad scenario” because there are games people can play to maximize their return.

For people who are serious about social security privatization, it is time to worry about these issues. We need less emphasis on estimating the real interest rate and more emphasis on determining how we can achieve the gains of privatization without the costs of unraveling social ties or gaming the system. Gustman and Steinmeier have made a nice start on this issue. It is time for others to follow.

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Discussion Summary Jeffrey Liebman and Andrew Samwick

The discussion quickly focused on the voluntary aspects of the privatization plan examined in the paper. The first consideration was that offering workers a choice to opt in or out may be costly owing to adverse selection on the annuity margin, as noted by the authors. A suggestion was later made that offering multiple tax and benefit schedules to those who opt out might help alleviate the potential adverse selection problem. The authors were then cautioned that it is a mistake to infer from the finding that many people opt out of the old system that privatization is a successful policy. Privatization might just be offering windfalls to some groups of workers. In fact, there did not seem to be anything in the model that made choice beneficial. The authors responded that this was explicitly a behavioral, not a normative, analysis of a particular privatization plan.

Some participants were curious as to why the analysis did not seem to generate large effects of privatization on the timing of retirement given the careful structural modeling of the retirement decision. The authors replied that the parameters of the simulation model, together with the changes in pensions and social security over the past two decades, are able to explain about one-third of the contemporaneous reduction in the labor force participation of older workers. A participant then noted that the absence of retirement effects in this case was itself an important result. The date of retirement in such a model is

determined by the relative incentives to retire at one date versus another, and the privatization scheme examined here does not substantially alter the lifetime budget constraint in a way that provides marginal incentives to retire at particular dates.

Another suggestion was made that the uncertain rates of return under a privatized system might allow for a larger effect on the timing of retirement if they were incorporated into the model. Presumably, those workers whose funds appreciated substantially would consume the added wealth in part as a longer retirement, while those whose funds did poorly would work longer and retire later. The authors agreed that incorporating uncertainty in this manner would be an interesting extension and cited other work in progress as the first stages of such an analysis.