

**SOCIAL SECURITY AND THE REAL ECONOMY:
EVIDENCE AND POLICY IMPLICATIONS[†]**

Social Security: Privatization and Progressivity

By LAURENCE J. KOTLIKOFF, KENT A. SMETTERS, AND JAN WALLISER*

The Balanced Budget Agreement of 1997 achieved budget balance by the year 2002 but did not resolve the nation's long-term fiscal problems. Those problems stem, in large part, from the Medicare and Social Security programs whose projected expenditures outstrip their projected receipts. One government commission is now dealing with Medicare's finances. Another, the Social Security Advisory Council, recently delivered three mutually exclusive sets of recommendations, one of which calls for the system's privatization.

A sizable literature shows that privatizing Social Security would increase the economy's long-run productive capacity at the price of higher fiscal burdens for those generations alive during the transition.¹ Less well explored is how Social Security's privatization would alter the intragenerational resource distribution. The answer, as discussed below, depends on the method of privatization. Some privatization schemes entail no progressive elements. But even these schemes may help the long-run poor more than the long-run rich. Other schemes use flat minimum benefits or progressive contribution matches to enhance intragenerational progressivity. This paper studies the interface of Social Security privat-

ization and progressivity using a large-scale overlapping-generations model. The paper's bottom line is that privatization and progressivity can be mutually compatible, particularly if the redistribution is achieved through progressive matching of individual accounts and is financed with a consumption tax.

I. The Model

Our model (Kotlikoff et al., 1997) is a substantially enhanced version of the dynamic general-equilibrium model of Alan Auerbach and Kotlikoff (1987). It features 55 overlapping generations and solves for the economy's perfect-foresight transition path. The model, which is calibrated to U.S. data, has three sectors: households, firms, and the government. Households allocate their full lifetime resources to consumption and leisure over their life span (ages 21–75); retirement decisions are endogenous. Household behavior is governed by a time-separable constant-elasticity-of-substitution utility function with intertemporal and intratemporal elasticities of substitution of 0.25 and 0.8, respectively. Population and productivity both grow at 1 percent per year.

The model follows Don Fullerton and Diane Lim Rogers (1993) in capturing intragenerational heterogeneity by dividing each cohort into 12 lifetime-earnings classes. The 12 classes represent the 10 deciles of the population ranked by lifetime income where the bottom and top deciles are each divided into percentiles of 2 and 8 percent. Age-productivity profiles for each of these classes were estimated from the Panel Study of Income Dynamics. Firms are perfectly competitive and maximize profits subject to a Cobb-Douglas production function with a capital-income share of 25 percent.

[†] *Discussants:* Barry Bosworth, Brookings Institution; Martin Feldstein, Harvard University; Theodore Bergstrom, University of Michigan.

* Kotlikoff: Department of Economics, Boston University, 270 Bay State Road, Boston, MA 02215, and NBER; Smetters and Walliser: Congressional Budget Office, U.S. Congress, Washington, DC 20515. The views herein do not necessarily reflect those of the CBO. We thank Joyce Manchester for helpful comments.

¹ The literature includes Martin Feldstein and Andrew Samwick (1998), Patricio Arrau and Klaus Schmidt-Hebbel (1993), Bernd Raffelhüschen (1993), Kotlikoff (1996), and Kotlikoff et al. (1997).

The government collects taxes to finance government consumption and OASDI benefits. In the initial steady state, the U.S. tax system is represented by a proportional state and federal consumption tax, a proportional state income tax, a proportional federal capital income tax, a proportional federal payroll tax with an earnings ceiling, and a progressive federal wage tax with a standard deduction.² Thus, households' budget constraints are non-convex and nondifferentiable because of the payroll-tax ceiling and the wage deduction. The model's initial OASDI payroll tax rate is 9.9 percent. The total payroll tax rate including hospital insurance (HI) and disability insurance (DI) is 14.7 percent.³

The model applies Social Security's OASDI inflation-indexed benefit formula to each agent's average indexed earnings. Because about 50 percent of Social Security benefits are paid to survivors and spouses, we multiply benefits by a factor of 2. All workers are covered by Social Security, and all correctly perceive and value the marginal OASDI benefits received when they earn an extra dollar. Our model incorporates many complex aspects of the economy but ignores Social Security's role in inter- and intragenerational risk-pooling.⁴

II. Privatizing Social Security

Privatizing Social Security involves three elements: (i) forcing workers to contribute to personal accounts, (ii) honoring accrued benefits, and (iii) choosing a method to finance accrued benefits in the transition.⁵ Since agents in our model are free to borrow against mandatory accounts, there is no need to add a private pension system. Instead, privatization is

achieved by simply eliminating the OASDI payroll tax and phasing out OASDI benefits starting 10 years after the reform begins. The decade wait to reduce benefits allows current retirees to get full benefits. After the 10th year, benefits are reduced by 2.2 percent per year for the next 45 years. This gradual phase-out of benefits captures the provision of accrued benefits to existing workers.

Three alternative tax regimes—a payroll tax, an income tax, and a consumption tax—are used to finance accrued OASDI benefits. In each simulation, federal wage and capital income taxes are adjusted endogenously to balance the federal budget. Specifically, these taxes are adjusted so that the average tax rate on wage income changes by the same percentage as those on capital income. Other adjustments of the tax schedule that would make privatization more progressive could be considered.

The top panel of Table 1 shows how privatization alters the economy. All three simulations produce the same long-run steady state. Compared to the initial steady state, the long-run steady state features a 39-percent larger capital stock, a 5-percent larger supply of labor, and a 13-percent larger level of output.

However, important differences exist in the speed of the transition. Financing the transition with a payroll tax reduces aggregate labor supply initially because privatization removes the link between taxes and benefits for young workers. Thus, output is slightly lower in the first decade. Using income-tax finance reduces both labor supply and capital accumulation in the short run, further reducing the speed of transition. A transition financed by a consumption tax, on the other hand, can encourage savings and labor supply by taxing existing non-Social Security wealth, leading to growth even in the short to medium term.

Privatization increases the welfare of future workers, with the largest gains accruing to the average worker (see the first panel of Table 2). Utility, measured in wealth equivalents, would rise by 8 percent for average earners, 6 percent for the poorest agents, and 4.4 percent for the richest agents. While the poor benefit from reduced payroll taxes, their welfare is not affected by the growth-induced fall in income-

² The proportional capital income tax and the progressive wage tax approximate the federal income tax.

³ HI benefits are modeled as a constant transfer to agents of age 65 and over, and DI benefits are modeled as a constant transfer to agents below age 65.

⁴ Henning Bohn (1997) considers aggregate risk. He Huang et al. (1997) consider idiosyncratic earnings and longevity uncertainty. Walliser (1997) discusses the impact of privatization on annuities markets.

⁵ We do not address the actuarial value of performance guarantees. Those guarantees may create large unfunded liabilities in the case of rate-of-return uncertainty (Smetters, 1997).

tax rates because their earnings are exempt from taxation. Higher earners benefit less than average earners because most of their earnings are above the payroll-tax ceiling.

Welfare effects for generations alive during the transition depend heavily on the method of transition finance. Payroll-tax finance would harm those with the largest payroll-tax burden as a percentage of income: the lifetime poorest. The elderly are largely unaffected while workers carry most of the load. Income-tax finance would put the largest burden on high earners whose capped payroll taxes are replaced by a progressive wage tax and a proportional capital income tax. Consumption taxes would levy a tax on owners of non-Social Security wealth, placing a higher burden on older and middle-aged generations than payroll-tax finance. Consumption taxes place a burden on the poor that is similar to payroll taxes.

III. Privatizing with a Flat Minimum Benefit

Some plans, most prominently the Personal Security Account Plan of the Social Security Advisory Council, propose a pay-as-you-go-financed flat minimum benefit. We investigate this policy by (i) providing a wage-indexed flat minimum annual benefit of \$6,000 in the long run and (ii) paying a weighted average of the old OASI and the new flat minimum benefit during the transition. We consider the same three financing methods but assume that these alternative taxes also finance the flat minimum benefit. In this case, the different financing methods imply different steady states.

Providing a flat minimum benefit substantially reduces the output effect of privatization (see the second panel in Table 1). Long-run increases in capital, labor, and output are between 40 percent (consumption-tax finance) and 70 percent (income-tax finance), smaller than under complete privatization. Short-run effects on capital, labor, and output are similar to complete privatization but are substantially diminished by year 25.

There are two reasons for these outcomes. First, the continuing unfunded liability, which amounts to about half of the current unfunded liability in the Social Security system, reduces the effect of privatization on saving and capital

TABLE 1—MACROECONOMIC RESPONSES TO PRIVATIZATION (PERCENTAGE CHANGE FROM STEADY STATE)

Finance	Variable	Year of transition			
		5	10	25	150
Privatization:					
Payroll tax	<i>K</i>	0.3	0.7	5.2	38.6
	<i>L</i>	-1.1	-1.1	1.8	5.2
	<i>Y</i>	-0.8	-0.7	2.6	12.7
Income tax	<i>K</i>	-2.4	-5.0	-4.6	38.6
	<i>L</i>	-4.5	-4.7	0.0	5.2
	<i>Y</i>	-4.0	-4.8	-1.0	12.7
Consumption tax	<i>K</i>	1.8	4.1	12.8	38.6
	<i>L</i>	0.3	0.4	2.4	5.2
	<i>Y</i>	0.6	1.3	4.9	12.7
Privatization with Flat Minimum Benefit:					
Payroll tax	<i>K</i>	0.0	0.0	2.0	19.0
	<i>L</i>	-1.3	-1.4	0.2	2.3
	<i>Y</i>	-1.0	-1.1	0.6	6.2
Income tax	<i>K</i>	-2.8	-5.7	-8.7	12.4
	<i>L</i>	-4.7	-4.9	-2.9	1.2
	<i>Y</i>	-4.2	-5.1	-4.4	3.9
Consumption tax	<i>K</i>	1.4	3.2	8.9	23.2
	<i>L</i>	0.0	0.1	1.1	2.7
	<i>Y</i>	0.4	0.8	3.0	7.5
Privatization with Progressive Matching:					
Payroll tax	<i>K</i>	-0.7	-1.4	0.9	35.4
	<i>L</i>	-3.2	-3.3	-0.2	4.0
	<i>Y</i>	-2.6	-2.9	0.1	11.1
Income tax	<i>K</i>	-3.4	-7.1	-9.7	35.4
	<i>L</i>	-6.7	-7.3	-3.0	4.0
	<i>Y</i>	-5.9	-7.2	-4.7	11.1
Consumption tax	<i>K</i>	1.8	4.1	13.0	39.8
	<i>L</i>	-0.5	-0.4	1.7	4.5
	<i>Y</i>	0.0	0.7	4.4	12.4

Notes: *K* = capital stock, *L* = labor supply, *Y* = output; all runs assume positive marginal link between taxes and benefits.

accumulation. Second, the tax that finances the flat minimum benefit is now completely distortionary since benefits no longer change at the margin.

The long-run welfare gains, though much smaller, are more progressive than those under complete privatization, especially with income-tax financing. Also, because implicit debt is reduced only by half, transitional welfare losses tend to be smaller.

TABLE 2—CHANGES IN REMAINING LIFETIME UTILITY
(WEALTH EQUIVALENTS) AFTER PRIVATIZATION
(PERCENTAGE CHANGE FROM STEADY STATE)

Finance	Class	Year of birth			
		-54	-25	1	150
Privatization:					
Payroll tax	1	0.0	-2.0	-0.6	6.0
	6	-0.1	-1.4	-0.2	8.0
	12	-0.1	-0.6	-0.1	4.4
Income tax	1	-0.1	-0.2	3.2	6.0
	6	-1.3	-2.1	0.7	8.0
	12	-1.7	-3.6	-3.0	4.4
Consumption tax	1	0.7	-2.1	0.5	6.0
	6	-0.9	-1.7	1.6	8.0
	12	-1.5	-2.5	-1.0	4.4
Privatization with Flat Minimum Benefit:					
Payroll tax	1	0.0	-0.1	0.3	4.0
	6	-0.1	-0.8	-0.2	4.3
	12	-0.1	-0.5	-0.2	2.3
Income tax	1	-0.1	1.8	4.3	5.7
	6	-1.3	-1.6	0.6	4.4
	12	-1.7	-3.6	-3.4	0.5
Consumption tax	1	0.7	-0.3	1.4	4.9
	6	-0.9	-1.3	1.6	5.4
	12	-1.5	-2.5	-1.2	2.0
Privatization with Progressive Matching:					
Payroll tax	1	0.0	-1.0	1.6	8.0
	6	-0.4	-1.6	0.0	8.1
	12	-0.5	-1.7	-1.2	3.5
Income tax	1	-0.2	0.9	5.3	8.0
	6	-1.6	-2.4	0.7	8.1
	12	-2.1	-4.9	-4.3	3.5
Consumption tax	1	0.9	-1.6	1.9	7.6
	6	-1.1	-1.9	1.9	8.4
	12	-1.8	-3.2	-1.6	4.0

Notes: 1 = bottom 2 percent, 6 = fifth decile, 12 = top 2 percent of lifetime income distribution.

IV. Privatizing with Progressive Matching

Our final set of experiments considers matching contributions to mandatory private saving accounts in a progressive way. The government's match is calculated as a function of labor income, and it falls steadily as a percentage of earnings, starting at about 5 percent for the poorest. In absolute terms, it increases from about \$470 at annual earnings of \$10,000 to around \$840 for annual earnings of \$21,000 and stays constant thereafter. On a lifetime ba-

sis, the match provides a transfer to the poorest that exceeds the flat minimum benefit of the previous section by 30 percent. Workers fully incorporate the marginal subsidy associated with the progressive-contribution match into their decisions.

The first two runs reported in the third panels of Tables 1 and 2 finance the revenue shortfall from the tax credit by raising income taxes, and the third run raises consumption taxes. OASI benefits are phased out as above and financed with either a payroll tax, an income tax, or a consumption tax.

Progressive matching has a much less detrimental effect on growth than does a flat minimum benefit. The negative effects of increased income-tax rates (runs with payroll- and income-tax finance) or consumption-tax rates are substantially smaller than with a flat minimum benefit. However, since the government must finance all accrued benefits and the matching contribution during the early years, the transition with payroll-tax finance and income-tax finance is slower than in runs without matching. That slowdown is largely caused by the negative impact on aggregate labor supply due to initially higher progressive income taxes (runs with payroll- and income-tax finance) and the income effect from the matching of labor income. With consumption-tax finance of the matched contribution as well as accrued benefits, the transition path to the final steady state as well as to the final steady state itself is quite similar to that without the match.

The progressive matching of labor income leads to about the same percentage increase in welfare for low earners and average earners in the long run. Both groups fare as well as mean earners under complete privatization without matching. The lifetime richest, however, lose due to the progressivity of the match. Generations alive during the transition face a higher burden than under the flat minimum-benefit run; however, the lifetime poorest are better off than under privatization without matching.

V. Conclusions

Privatization can offer substantial long-run economic gains. But those gains are not free, nor are they immediate. Some transition gen-

erations face higher fiscal burdens, and depending on how the transition is financed, it can be quite slow.

Enhancing progressivity in a privatized system with a pay-as-you-go-financed flat minimum benefit comes at the cost of substantially smaller long-run macroeconomic and welfare gains. Matching workers' contributions on a progressive basis is an alternative means of making Social Security's privatization more progressive. Relative to a flat minimum benefit, this policy achieves an equally progressive long-run distribution of welfare. But it affords much larger long-run levels of capital, labor supply, output, and welfare.

REFERENCES

- Arrau, Patricio and Schmidt-Hebbel, Klaus.** "Macroeconomic and Intergenerational Welfare Effects of a Transition from Pay-as-You-Go to Fully Funded Pensions." Working paper, Policy Research Department, World Bank, Washington, DC, 1993.
- Auerbach, Alan and Kotlikoff, Laurence J.** *Dynamic fiscal policy*. Cambridge: Cambridge University Press, 1987.
- Bohn, Henning.** "Social Security Reform and Financial Markets." Mimeo, University of California-Santa Barbara, 1997.
- Feldstein, Martin S. and Samwick, Andrew A.** "The Transition Path in Privatizing Social Security," in Martin S. Feldstein, ed., *Privatizing Social Security*. Chicago: University of Chicago Press, 1998 (forthcoming).
- Fullerton, Don and Rogers, Diane Lim.** *Who bears the lifetime tax burden?* Washington, DC: Brookings Institution, 1993.
- Huang, He; Imrohroglu, Selahattin and Sargent, Thomas.** "Two Computational Experiments to Fund Social Security." *Macroeconomic Dynamics*, February 1997, 1(1), pp. 7-44.
- Kotlikoff, Laurence J.** "Privatizing Social Security: How It Works and Why It Matters," in James M. Poterba, ed., *Tax policy and the economy*, Vol. 10. Cambridge, MA: MIT Press, 1996, pp. 1-32.
- Kotlikoff, Laurence J.; Smetters, Kent A. and Walliser, Jan.** "Opting Out of Social Security." Mimeo, Congressional Budget Office, Washington, DC, November 1997.
- Raffelhüschen, Bernd.** "Funding Social Security Through Pareto-Optimal Conversion Policies." *Journal of Economics/Zeitschrift für Nationalökonomie*, Supplement 1993, 7, pp. 105-31.
- Smetters, Kent A.** "Privatizing Social Security in the Presence of a Performance Guarantee." Mimeo, Congressional Budget Office, Washington, DC, October 1997.
- Walliser, Jan.** "Understanding Adverse Selection in the Annuities Market and the Impact of Privatizing Social Security." Congressional Budget Office (Washington, DC) Technical Paper No. 1997-4, August 1997.