NBER WORKING PAPER SERIES

# THE EFFECT OF SOCIAL SECURITY ON PRIVATE SAVING: THE TIME SERIES EVIDENCE

Martin Feldstein

Working Paper No. 314

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge MA 02138

February 1979

NBER Working Paper 314
February 1979

Summary

The Effect of Social Security on Private Saving:
The Time Series Evidence

Martin Feldstein

This paper reviews the studies by Barro, Darby and Munnell as well as my own earlier time series study and presents new estimates using the revised national income account data. The basic estimates of each of the four studies point to an economically substantial effect that is very unlikely to have been observed by chance alone. Although including variables like the government surplus (Barro) or a measure of real money balance (Darby) can lower the estimated coefficient of the social security wealth variable, this paper explains their inappropriateness in the aggregate consumption function. Use of the new Department of Commerce data on national income and its components improves my earlier estimates and shows that the unemployment variable does not belong in the consumption function once the level of income and its rate of change are included.

Martin Feldstein
National Bureau of Economic Research
1050 Massachusetts Avenue
Cambridge, Mass. 02138
(617) 868-3905

# The Effect of Social Security on Private Saving: The Time Series Evidence

Martin Feldstein*

It is now well known that private pensions represent a substantial part of total saving, accounting for some 25 percent of personal saving during the past decade. Less generally recognized, but of great importance, is the common practice known as "integrating" private pensions and social security. A private pension plan is said to be "integrated" with social security when the private pension benefits to which an individual is entitled are reduced by the amount (or some fraction of the amount) of his social security benefits. The extent of such integration is of course taken into account in pension funding with less funding required in more fully integrated plans. The tax laws and ERISA rules explicitly recognize and permit this substitution of social security for private pensions. Thus "integration" provides a specific mechanism by which social security depresses pension saving and therefore total private saving.

Of course, social security can depress private pensions even when there is no formal integration procedure. For a worker who has had median lifetime earnings and who retires at age 65 with a dependent spouse, social security now provides benefits that replace approximately 80 percent of final years' after-tax earnings. This high level of benefits leaves little incentive for any substantial additional private pensions or direct personal retirement saving.

---

*President, National Bureau of Economic Research, and Professor of Economics, Harvard University. The views expressed here are my own and should not be attributed to any organization. The research reported is part of the NBER's research program in Social Economics and its special study of Capital Formation. This note is a reply to the comments of Esposito (1978) and will be published in the Social Security Bulletin.

Common sense and everyday observation make it clear that many middle income and lower-middle income families do not provide for their retirement because they expect to depend primarily on social security. This remains true despite the doubling of real per capita incomes that has occurred in the past 30 years because social security has more than kept pace with that income growth. Only families with incomes substantially above average, whose social security benefits replace only a relatively small fraction of the income lost at retirement, generally save a significant fraction of their income. It is not the real income level, but the level of income relative to future social security benefits, that appears to determine the extent of household savings.

I think the real issue is therefore not whether social security reduces saving but by how much it reduces saving.[1] The potential impact is very large. Social security taxes in 1977 were $91 billion while personal savings were only $67 billion. If the money paid in social security taxes would otherwise have been saved, the magnitude of the current social security program implies that personal saving would otherwise be more than double what it was in 1977. Even if half of the money paid in social security taxes would otherwise have been saved, the volume of personal saving would have increased by 68 percent.

Economists are now using different bodies of data to estimate the impact of social security on saving. Aggregate time series for the economy as a whole was the first type of data to be used. What can we hope to learn with

---

[1] Theoretical arguments can be adduced that imply that the effect of social security on saving is ambiguous, e.g., Barro's (1974) theory of induced bequests or Feldstein's (1974) theory of the saving effect of induced early retirement. There is little reason to believe that these theoretical possibilities are powerful enough to alter the common sense conclusion that social security discourages private saving.

this type of information? During the late 1930's and the succeeding war years, there was a general expectation among economists that the saving rate would continue to rise as people became more affluent and a widespread fear among economists that the difficulty of absorbing this extra saving would prevent full employment. That increase in saving did not materialize. Even as incomes rose very substantially in the 1960's, the savings rate did not increase significantly. This was also the period in which social security was introduced and in which it grew rapidly. One possibility, predicted by some of the early Keynesians like Seymour Harris[1] and even by Keynes himself,[2] is that the growth of social security precluded the growth of private saving.

Multiple regression analyses of time have been used to evaluate the extent to which the introduction and expansion of social security have influenced the patterns of savings and consumption over time. There are two basic difficulties in using time series data for this purpose. The first problem is finding an adequate measure of the public's expectations of the social security benefits that they will later receive. Surveys confirm that individuals do not have precise estimates of the likely value of their future social security benefits. Although legislative changes create benefit entitlements immediately, these new benefits are only recognized slowly by the individuals affected. There is no completely satisfactory solution to this problem. In practice, all of the researchers have used the variable "social security wealth," i.e., the present actuarial value of the future benefits to

---

[1] See S. Harris (1941).

[2] My colleague, Richard Musgrave, recalls the occasion when Lord Keynes visited the U.S. Treasury and commented that the new U.S. Social Security program would prevent the excess saving that many economists then feared.

which the working population is entitled.[1] This overly precise measure cannot provide an accurate picture of year to year variations in the public's perception of the extent to which they can rely on social security but, hopefully, it does capture the broad sweep of changes including the original introduction, the major extensions of coverage and the provision of dependents' benefits.

The second basic problem with time series analysis is that many variables move closely together over time. Even if an equation is correctly specified, i.e., has the correct variables and only the correct variables, it may not be possible to estimate the coefficients with useful precision because the variables are too closely interrelated. This "multicollinearity" problem is more severe when there are relatively few observations and when there is relatively little independent movement of the variable of interest. This is a problem for attempts to estimate equations describing consumer expenditure based on only about 40 annual observations. The problem is particularly severe when the sample is restricted to the postwar period with less than 30 observations and much less independent variation in the social security variable (i.e., variation that is not just proportional to income). When the equation is misspecified by adding variables that do not belong, it is even harder to estimate the coefficients of the correct variables.

The importance of these problems is illustrated by the estimates that I presented in my 1974 paper. For the period from 1929 through 1971, the coefficient of the social security wealth variable was rather precisely estimated as 0.021 (with a standard error of 0.006), implying that an extra $100 of social security wealth reduces private saving by $2.10. But when the unemployment rate was added to the equation, there was too much intercorrelation to

---

[1]The idea of "social security wealth" is introduced and described in Feldstein (1974).

make any precise statements: the coefficient of the social security variable fell to 0.010 while its standard error rose to 0.011 and the coefficient of the unemployment variable was 1.17 with a standard error of 0.89. When the sample was restricted to the postwar period, there was even less information and the coefficient of social security wealth was, as a result, less than its standard error. This is primarily a reflection of the fact that social security wealth has much less independent variation when the sample is restricted to the postwar period.

In his review, Esposito emphasized the fact that adding the unemployment variable to the equation (with the full sample from 1929 through 1971) made the coefficient of social security wealth much smaller and not significantly different from zero at conventional probability levels. Esposito implicitly rejected my argument that the theoretical case for including the unemployment rate is much weaker than the case for including social security wealth and therefore that its insignificance implies that it should be omitted.

Without new data or a new approach, the analysis of the time series data would be stalled at this point. Fortunately, shortly after the publication of my 1974 paper, the Department of Commerce published revised estimates of national income and its components which embody a number of improvements over the information previously available.[1] Analysis with this new and better data supports my original conclusion more strongly and substantially reduces the ambiguity introduced by unemployment.

Equation 1 presents the estimate of my preferred specification of the consumption function based on the revised national income account data:

---

[1]"The National Income and Product Accounts of the United States: Revised Estimates, 1929-74," in U.S. Department of Commerce, Survey of Current Business, vol. 56 (January 1976), pp. 1-38.

$$C_t = \underset{(0.061)}{0.604}\ YD_t + \underset{(0.040)}{0.111}\ YD_{t-1} + \underset{(0.076)}{0.194}\ RE_t + \underset{(0.005)}{0.006}\ W_{t-1}$$

$$+ \underset{(0.009)}{0.024}\ SSWG1_t + \underset{(80)}{338}$$

1929-40, 1947-74

$\bar{R}^2 = 0.99$

D.W.S. = 1.45

where C is consumption, YD is disposable income, RE is corporate retained earnings, W is wealth, and SSWG1 is social security wealth.

The social security wealth coefficient of 0.024 is clearly statistically very significant and is quite close to the estimate of 0.021 in my 1974 paper. The earlier estimate is thus affected hardly at all by extending the sample period (which previously ended in 1971) and using the newly revised national income account data.

As I noted above, including the unemployment rate (RU) in this equation in my 1974 paper had the effect of cutting the coefficient of the social security wealth variable by half (to 0.10) and to less than its standard error while the coefficient of the unemployment variable was greater than its standard error. With the new Commerce Department data, the inclusion of the unemployment rate has a much smaller effect on the social security wealth coefficient, and the unemployment variable is itself completely insignificant:

$$C_t = \underset{(0.070)}{0.619}\ YD_t + \underset{(0.053)}{0.127}\ YD_{t-1} + \underset{(0.118)}{0.236}\ RE_t + \underset{(0.006)}{0.005}\ W_{t-1}$$

$$+ \underset{(0.013)}{0.019}\ SSWG1 + \underset{(2.212)}{1.033}\ RU_t + \underset{(133)}{289}$$

1929-40, 1947-74

$\bar{R}^2 = 0.99$

D.W.S. = 1.43

In his own study of the time series evidence, Robert Barro (1978) made the useful suggestion that the unemployment rate should be specified as changing the marginal propensity to consume (that is, as a multiplier of $YD_t$) rather than as a separate linear term. That is quite sensible since the linear specification of equation 2 has the implausible implications that a one percentage point change in the unemployment rate altered per capita consumption by the same real dollar amount during the 1970's as it did in earlier years when incomes were very much lower. With this suggested modification, the equation becomes:

$$C_t = \underset{(0.063)}{0.606}\ YD_t + \underset{(0.049)}{0.116}\ YD_{t-1} + \underset{(0.105)}{0.205}\ RE_t + \underset{(0.006)}{0.006}\ W_{t-1} + \underset{(0.012)}{0.023}\ SSWG1_t$$

$$+ \underset{(1.078)}{0.162}\ RU_t\ YD_t + \underset{(108)}{327}$$

1929-40, 1947-74

$\bar{R}^2 = 0.99$

D.W.S. = 1.44

The social security wealth coefficient is almost identical with its value in equation 1, while the coefficient of the unemployment variable is small and not significantly different from zero. This evidence with the new Department of Commerce data thus unambiguously supports the conclusion that social security substantially depresses private saving. To be more precise, the value of social security wealth (SSWG1) of the population in 1972 was $1.85 trillion (Feldstein and Pellechio, 1977a); a coefficient of 0.024 implies that social security increased consumption (and thereby depressed private saving) by $44.4 billion. In 1972, total personal saving was $49.4 billion while corporate retained earnings were $25.9 billion; total private saving was therefore $75.3 billion. The reduction in saving of $44.4 billion

implied by the data is thus equivalent to 59 percent of actual saving in 1972. To state this same figure in a different way, the estimates imply that, without social security, saving would have been $119.7 billion (i.e., $44.4 billion plus $75.3 billion) and that this $119.7 billion was reduced 37 percent by social security.

Esposito also discusses time series studies by Munnell (1974), Barro (1978) and Darby (1978). As Esposito notes, Munnell's basic equation found a coefficient of social security wealth of -0.030 with a standard error of 0.019 in a study using personal saving as the dependent variable. The size of the coefficient relative to its standard error indicates that the odds are greater than 15 to 1 against finding such a substantial coefficient by chance alone if the time coefficient were zero or positive. Munnell's coefficient is larger[1] than my own estimate of 0.021 for approximately the same period and data because she includes a measurement of retirement in the equation and thereby calculates the "gross" effect of social security before netting out the increased saving due to earlier retirement. She also presents equations in which current social security taxes are used to represent expected benefits; the statistical insignificance of this tax variable should be regarded as evidence that social security wealth is a better measure than the tax variable and not, as Esposito suggests, as evidence that social security may not affect saving. Munnell also attempts to isolate a component of personal saving that she calls "retirement saving" and that excludes such things as the values of stocks and bonds and residential real estate; she finds that social security has a statistically significant depressing effect on this component of saving

[1]Munnell's coefficient is negative because she uses savings rather than consumption as dependent variable. If she had used consumption, her coefficient value would be exactly the same but with the reversed sign.

but that it is absolutely smaller than the effect on total saving. I think the appropriate interpretation is therefore that social security reduces other forms of saving as well and that it is wrong to focus on only one conponent of total saving.

Barro (1978) added two variables to my initial specification: the value of the stock of consumer durables (DUR) and the government surplus (SUR). Doing so reduces the coefficient of the social security wealth variable to 0.014 with a standard error of 0.010 (and also makes an unemployment-income interaction variable statistically significant). Even if we accept Barro's specification, it should be noted that the odds against observing such a large estimated coefficient and standard error if social security did not depress saving would be greater than 10 to one. The coefficient estimate of 0.014 implies a savings reduction in 1972 of $25.9 billion or more than one-third of actual savings. Thus Barro's own evidence actually supports the conclusion that social security significantly depresses saving. A more detailed analysis of Barro's evidence indicates that the durables variable is irrelevant: its coefficient is less than one-third of its standard error and its presence does not alter the other coefficients in an important way. It is the highly novel inclusion of the government surplus as a variable that changes the other coefficients. I believe that this government surplus variable does not belong in a properly specified consumption function. Although the variable appears to be statistically significant, I believe that that significance is spurious. The government surplus is not an exogenous variable that directly affects consumption, as the Barro specification assumes, but an endogenous variable whose value changes with cyclical variations in consumption. What we really see in the positive coefficient of the government surplus variable is that an increase in consumer spending tends to expand the economy, raising tax

collections and therefore increasing the government surplus. This interpretation is confirmed by dividing the surplus variable into its two components (government expenditure and tax receipts); the government expenditure variable is then insignificant and only the tax receipts variable is significant. Moreover, the correlation between cyclical variations in consumption and in tax receipts explains why including the surplus variable also changes the statistical significance of the unemployment variable.

Darby (1978) experiments by adding measures of real money balances and other variables to the specified consumption function. With one measure of money supply (M1), his estimated SSWG1 coefficient is raised above my own (to 0.024) while with a broader money supply variable (M2) the coefficient is reduced somewhat (0.017). The evidence is thus quite compatible with my own findings. However, there seems no reason to regard the real money balances as an exogenous variable to be included on the right hand side of a consumption function: the households choose their desired level of such balance while the money balances of firms is totally irrelevant in the consumption function. It is also difficult to imagine how to interpret an equation that includes both the interest rate and real money balances among the repressors.

My summary of the evidence is thus quite contrary to Esposito's. I find that the basic estimates of each of the four studies points to an economically substantial effect that was very unlikely to have been observed by chance alone. Although including variables like the government surplus (Barro) or a measure of real money balances (Darby) can lower the estimated coefficient of the social security wealth variable. I have explained their inappropriateness in the consumption function. The availability of the new Department of Commerce data on national income and its components has improved the earlier estimates and has shown that the unemployment variable does not belong

in the consumption function once the level of income and its rate of change are included.

Data for the postwar period alone appear to be incapable of providing useful information on the effect of social security. In all of the studies, the standard error of the coefficient of the social security wealth variable is so large that no economically interesting hypothesis can be rejected. This reflects not only the shorter period but also our inability to measure accurately enough the perceived changes in the public's expectations about future social security benefits. This inadequacy of the postwar data makes it important to examine other types of information, including studies of the time-series data for other individual countries, cross-country studies and cross-sectional data on individual households. The evidence of this type that is becoming available tends to confirm the time series conclusion[1], but the importance of the impact of social security on savings suggests that we will see many more studies on this subject in the future.

---

[1] I have reported cross-country evidence in Feldstein (1977, 1979) and evidence on household wealth accumulation in Feldstein (1976) and Feldstein and Pellechio (1976b).

## References


Barro, Robert (1974), "Are Government Bonds Net Wealth?" Journal of Political Economy, vol. 82 (November-December 1974), pp. 1095-1117.

Barro, Robert (1978), "The Impact of Social Security on Private Saving," The American Enterprise Institute Studies #199.

Darby, Michael (1978), The Effects of Social Security on Income and Capital Stock, American Enterprise Institute, (forthcoming).

Esposito, Louis (1978), "Effect of Social Security on Saving: Review of Studies Using U.S. Time-Series Data," Social Security Bulletin, DHEW Publication No. (SSA), 78-11700, May 1978.

Feldstein, Martin (1974),"Social Security, Induced Retirement, and Aggregate Capital Accumulation," Journal of Political Economy, vol. 82 (September-October 1974), p. 916.

Feldstein, Martin (1976), "Social Security and the Distribution of Wealth," Journal of the American Statistical Association, vol. 71 (December 1976), pp. 800-807.

Feldstein, Martin (1977), "Social Security and Private Savings: International Evidence in an Extended Life Cycle Model," in The Economics of Public Services, an International Economic Association Conference Volume, M. Feldstein and R. Inman (eds.), 1977.

Feldstein, Martin (1979), "International Evidence on the Effect of Social Security Benefits on Private Savings," forthcoming.

Feldstein, Martin and Anthony Pellechio (1977a), "Social Security Wealth: The Impact of Alternative Inflation Adjustments," NBER Working Paper No. 212, forthcoming in Colin Campbell (ed.), Financing Social Security.

Feldstein, Martin and Anthony Pellechio (1977b), "Social Security and Household Wealth Accumulation: New Microeconomic Evidence," NBER Working Paper No. 206, forthcoming in the Review of Economics and Statistics.

Harris, Seymour (1941), The Economics of Social Security. New York: McGraw-Hill, 1941.

Munnell, Alicia (1974a), The Effect of Social Security on Personal Saving, Ballinger Publishing Company, 1974.

Munnell, Alicia (1974b), "The Impact of Social Security on Personal Saving," National Tax Journal, December 1974, pp. 553-567.