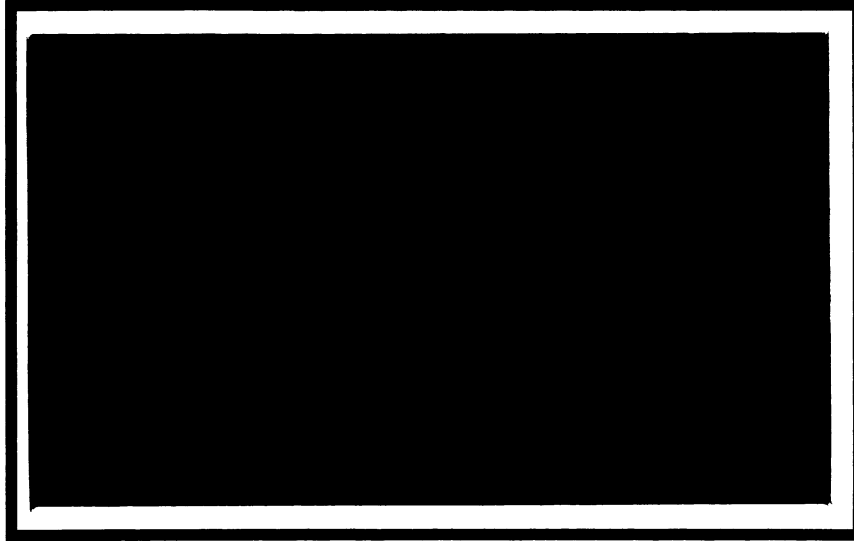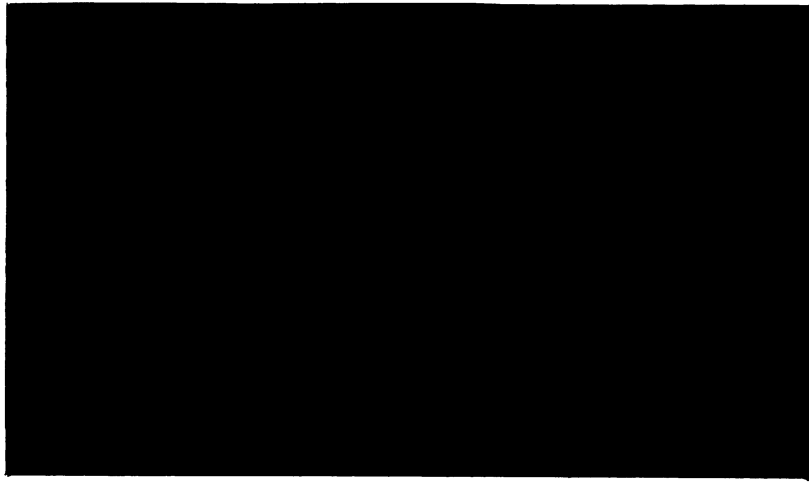R-104

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Discussion Paper

Saving, Investment, and Social Security

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I. Introduction

Current economic writing, both in professional journals and the popular

press, contains a good deal of debate about whether the U.S. economy might

be saving too little to finance the amount of capital formation required for

adequate productivity growth and international competitiveness. This is a

worthy debate, but at least one aspect of the debate is being carried on in

a state of confusion which should be embarassing to professional economists.

Some of the members of the currently fashionable school of conservative

"Supply Side" economists have taken the position that the Social Security

System is to be blamed for reducing saving and, hence, investment in productive

physical capital. A perfectly representative example of the conservative

position on this issue is given by Professor Martin Feldstein's statement in

Newsweek (July 14, 1980, pp. 55-56):

> "... (capital formation) is the key thing that we can do to increase
> productivity... It's very disturbing that the United States has such
> a low rate (of capital formation)...
>
> For most Americans, there is basically little reason to do any saving
> anymore. ... the main reason for saving traditionally has been to
> finance retirement, and now social security has taken on that job.
> The typical retiree now receives benefits for himself and his spouse
> that equal 65 to 70 percent of his lost gross-wage income. ... Given
> that, there's just not much incentive for such an individual to do
> much more saving himself... I think it's fortunate, therefore, that
> social security is having a financial crisis."[1]

[1]A more scholarly statement of the conservative economic position on Social
Security may be found in Feldstein's major paper on the topic, "Social Security,
Induced Retirement, and Aggregate Capital Accumulation," Journal of Political
Economy, Sept./Oct. 1974; and in his more recent review paper, "The Effect of
Social Security on Private Savings: The Time Series Evidence," Social Security
Bulletin, May 1979.

While there is considerable validity to the microeconomic side of Feldstein's statement regarding individual saving incentives, its connection with the macroeconomic problem regarding the aggregate rate of capital formation is largely nonsense. Certainly, Social Security ought to displace private personal saving, but that itself has no first-order effects on the ability of the economy to finance capital formation. If the Social Security System has effects either on the demand for capital goods or the supply of financing, the effects are of a subtle second-order kind and it is not at all obvious in which direction the effects run. The next Section of this paper reviews the basic microeconomics of Social Security to lay the groundwork for Section III which shows that total national saving available for capital formation is basically unaffected by the presence of a social insurance system. Section IV discusses the transition problem inherent in establishing a social insurance system which covers retirees who have made no prior tax contributions to the system. Section V introduces the special considerations relating to a pay-as-you-go system. The paper concludes with a summary and a statement of related issues in Section VI.

II. The Simple Microeconomics of Social Security

Figure 1 presents the now-classical treatment of the consumption/saving decision of an individual as elaborated in Fisher capital theory. The figure contains an indifference curve relating consumption during retirement (C_2) and consumption during the worklife of an individual (C_1). The point $(y, 0)$ on the worklife consumption axis represents the individual's earnings stream: y during the working years, zero during retirement. The straight line connecting the points $(y, 0)$ and $(0, \bar{c}_2)$ is the budget constraint, the slope of which $[-(1 + i)]$ depends on the rate of interest, i, which can be earned on saving.

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The individual's equilibrium is at point A corresponding to retirement consumption $\hat{c}_2$, worklife or "current" consumption $\hat{c}_1$, and current saving (for retirement) in the amount $(y - \hat{c}_1)$. Figure 1 assumes no Social Security System and $(y - \hat{c}_1)$ is private personal saving.

Now introduce a Social Security System which, given y, taxes the working individual an amount t in return for a Social Security Benefit $(1 + i)t$ at retirement. The individual's "receipt point" is now $[(y - t), (1 + i)t]$ and is shown in Figure 2. In this instance the government retirement system promises the individual the same return to saving through Social Security as would be available in the private market. The budget line and equilibrium point A are unaffected by the Social Security System. The individual's total saving is still $(y - \hat{c}_1)$, but it has two components: personal saving through Social Security in the amount t, and private personal saving in the amount $(y - t - \hat{c}_1)$.

Indeed, private personal saving has been reduced by the presence of the Social Security System, but not total personal saving. The invariance of the latter is, of course, the result of the assumed equality of the return to private and public saving. If the Social Security System provided a lower rate of return than the private market, the relevant budget constraint would shift in toward the origin, parallel to the original budget constraint. With positive income elasticities for current and future consumption, $\hat{c}_1$ and $\hat{c}_2$ would both decline. But total personal, hence private personal, saving would actually rise compared with the amount shown in Figure 2. In order to claim much for the difference in saving, it would have to be established that the rates of return to public and private saving differ substantially, for not much can happen if the shift in the budget constraint is small.[2]

[2]Even then, there is a danger to carrying out a partial equilibrium analysis. A change in $\hat{c}_1$ relative to y will have a general equilibrium effect which will alter the value of current income itself, likely in a direction which offsets the desired change in saving revealed in the partial equilibrium analysis.

Quite clearly, the first-order impact of the Social Security System is to leave total personal saving roughly unaffected, while the flow of private personal saving is substantially reduced. Any marginal discrepancy between the public and private rates of return amounts to a marginal alteration of the result shown in Figure 2. If we take the Figure 2 case as the basic microeconomic result, the major question is what are the macroeconomic implications for the flow of funds to finance capital formation.

III. The Simple Macroeconomics of Social Security

Consider a five-sector economy with Firms, Workers, Retirees, the Government, and a Financial Sector. The economic activities of the first four sectors -- in the absence of a Social Security System -- are assumed to be as follows.

Firms	Sales of final goods	1,100
	Wages paid to workers	1,000
	Expenditures on capital equipment	130
Workers	Wage income	1,000
	Personal income taxes	100
	Personal saving	90
	Purchases of final goods	810
Retirees	Withdrawals from savings	60
	Purchases of final goods	60
Government	Tax Revenue	100
	Purchases of final goods	100

There are several matters worth noting:

1) It will be assumed that capital equipment does not depreciate, that any business or other loans incurred are not paid back in the current period, and that the market interest rate is zero. These are matters which have no effect on the main story being told, they merely simplify the subsequent accounting.

2) The MPC and APC for workers is assumed to be 9/10 of the appropriate measure of worker disposable income.

3) The aggregate economy is at a life-cycle stage in which the current flow of saving for retirement exceeds the flow out of accumulated past savings by retirees. This too has no effect on the story.

4) The Government's budget is balanced, again a harmless assumption for the purpose at hand.

Table 1 contains the relevant National Income and Product Accounts (NIPA) constructed from the above data employing the rules governing national accounting in the U.S. Table 2 supplements the NIPA with a flow-of-funds statement.

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Table 1. National Income and Product Accounts, No Social Security System

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Table 1A. Gross National Product

Gross National Product	1,100
Personal Consumption Expenditures (810 + 60)	870
Gross Private Domestic Investment	130
Government Purchases	100

Table 1B. Relation of Gross National Product and Personal Income

Gross National Product = National Income	1,100
Less: Profits (1,100 - 1,000)	100
Equals: Personal Income	1,000

Table 1C.   Personal Income and Its Disposition

Personal Income	1,000
Wage Disbursements	1,000
Less: Personal Taxes	100
Equal: Disposable Personal Income	900
Less: Personal Consumption Expenditures	870
Equals: Personal Saving	30
Addendum: Personal saving as percent of disposable personal income	3.3

Table 1D. <u>Gross Saving and Investment</u>

Gross Saving	130
Personal Saving	30
Undistributed Profits	100
Government Surplus	0
Gross Investment	130

Table 2. Flow of Funds Account
(Financial Institutions)

<u>Sources of Funds</u>

Worker Deposits	90
Government Deposits	0
Retiree Deposits	-60
Total Sources	30

<u>Uses of Funds</u>

Loans to Business (130-100)	30
Total Uses	30

The main points to note are that the MPS (and APS) for workers is 10 percent, retirees dissave, and the NIPA personal saving rate works out to be 3.3 percent. At the same time Gross Saving and Investment amount to 130 or 11.8 percent of GNP.[3] Business firms are purchasing capital equipment at a cost of 30 in excess of their profit flow and the Financial Institutions are able to finance the extra cost with the excess of the deposit inflows of workers over the withdrawals of retirees[4] (see Table 2). Finally, note for future reference that the macro

[3]The corresponding figures for the U.S. economy in 1979 were 4.5 percent and 15.4 percent, respectively.

[4]The fact that the business financing requirement happens to equal NIPA personal saving results from the fact that the government budget is balanced. This equality will disappear once the Social Security System is introduced below.

consumption function is given by

$$C = 60 + .9YD$$

where YD denotes disposable personal income, and 60 represents the consumption expenditure of the retirees.

The Social Security System is now introduced such that worker contibutions for social insurance are levied at 60, or 6 percent of wage earnings.[5] In light of the results in Figure 2, it is assumed that the Social Security tax merely displaces 60 of the private personal saving of workers which therefore declines to 30. Total personal saving is unaffected: 60 in public personal saving plus 30 in private personal saving.

If we regard the Social Security System as a newly introduced innovation, all of the contributions collected by the government become a government surplus and the retirees continue to finance their consumption as before. Alternatively, we can assume that the system has always been in operation and that the retirees' consumption is financed partly by Social Security benefits and partly by withdrawals from accumulated savings -- precisely as the current workers will finance their retirement consumption. We choose the latter assumption, but it will be clear that this has no effect on the main point. Social Security benefits are assumed to equal 40 which finances two-thirds of retiree consumption, with the balance coming from withdrawals from private savings.[6]

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[5]Employer contributions would introduce an incidence problem which is beside the point and add a minor accounting complication which is irrelevant as well.

[6]This is consistent with the assumptions that 2/3 of the personal saving of workers is done through Social Security contributions and that the "returns" to public and private saving are equal.

Tables 3 and 4 contain the NIPA and flow-of-funds implications of the economy with Social Security. Note first that if the economy had been in macroeconomic equilibrium without the Social Security System, it would be as well with the Social Security System. Although the measured NIPA personal saving rate has dropped from 3.3 percent to 1.1 percent, the total flow of funds available to finance capital formation is completely unaffected. The business financing requirement of 30 is satisfied not by NIPA personal saving, but by the deposit inflows of workers and the government net of the retiree withdrawals -- there is still 30 available to finance capital formation despite the change in the composition of total worker saving.[7] Nor is there anything special about the assumption that the government surplus is deposited in financial institution accounts. Were there a government debt which could be retired, the surplus would show up as deposits by workers or retirees who had sold debt back to the government.

Note finally that the accounting in Table 3C provides a disposable income measure which is inappropriate to econometric estimation of the macro consumption function. The latter is given by

$$C = 60 + .9(YD + SIC - SIB)$$

where YD, SIC, and SIB are, respectively, disposable income, social insurance contributions and social insurance benefits, all as measured in Table 3C.[8]

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[7]It should be clear that if the Social Security System had been newly introduced with existing retirees not covered the "Sources" half of Table 4 would read:

Worker Deposits	30
Government Deposits	60
Retiree Deposits	-60
Total Sources	30

[8]The exact treatment of SIC and SIB in the consumption function results from the implicit assumption that the MPC out of social insurance benefits is unity. Whether or not this is the case, the appropriate income concept in the consumption function is not NIPA disposable income. This is clear in theory from Figure 2 where c_1 is determined by y, not by (y - t) which would correspond to the NIPA measure of disposable income.

Table 3. National Income and Product
Accounts, With Social Security System

Table 3A. Gross National Product

Gross National Product	1,100
Personal Consumption Expenditures	870
Gross Private Domestic Investment	130
Government Purchases	100

Table 3B. Relation of Gross National Product and Personal Income

Gross National Product = National Income	1,100
Less: Profits	100
Contributions for Social Insurance	60
Plus: Government Transfer Payments (Social Security Benefits)	40
Equals: Personal Income	980

Table 3C. Personal Income and Its Disposition

Personal Income	980
Wage Disbursements	1,000
Government Transfer Payments	40
Less: Contributions for Social Insurance	60
Less: Personal Taxes	100
Equals: Disposable Personal Income	880
Less: Personal Consumption Expenditures	870
Equals: Personal Saving	10
Addendum: Personal Saving as percent of disposable personal income	1.1

Table 3D. <u>Gross Saving and Investment</u>

Gross Saving	130
Personal Saving	10
Undistributed Profits	100
Government Surplus	20
Gross Investment	130

Table 4. Flow of Funds Account
(Financial Institution)

<u>Sources of Funds</u>

Worker Deposits	30
Government Deposits	20
Retiree Deposits	-20
Total Sources	30

<u>Uses of Funds</u>

Loans to Business	30
Total Uses	30

IV. A Transition Problem

In the preceeding section the Social Security System was handled either by assuming it had "always" been in effect or that, upon its introduction, current retirees were not covered. If, on the other hand, the system had been introduced both to provide social insurance for current workers and to enable the current retirees to enjoy a higher standard of living through the receipt of retirement benefits, a transitional macroeconomic disequilibrium could arise. Specifically, suppose that social insurance benefit payments amount to 40, as before, and that retirees increase their consumption spending by the full amount of the newly received benefit payments. The flow-of-funds implications are as shown in Table 5 which must now be interpreted as an ex-ante statement. Total ex-ante saving has been reduced in this case because the government has attempted to provide for greater retiree consumption. In

essence, fiscal policy has become more stimulative and produced an increase
in aggregate demand, hence a reduction in ex-ante saving, at current income
levels. The prevailing level of real income cannot therefore persist; prices
and/or production will rise to accomodate the discrepancy between ex-ante
saving and investment.

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Table 5. Ex-Ante Flow of Funds,
Social Security in Transition

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Sources of Funds

Worker Deposits	30
Government Deposits	20
Retiree Deposits	-60
Total Sources	-10

Uses of Funds

Loans to Business	30
Total Uses	30

The above description of the transition problem is surely not relevant
to the 1980's, but something like this must have occurred in the 1930's when
the Social Security System was introduced. At that time provision of purchasing
power for the retired was useful social policy and an increase in aggregate
demand was useful macro stabilization policy. It did temporarily reduce total
saving at the income levels then prevailing, but there was ample opportunity
to raise income and production in response to such initial effects of the
policy. The current situation bears no resemblance to the transition period.

V. The Pay-As-You-Go Problem

Up to this point, the Social Security System has been characterized as
though it were an actuarial system under which workers paid social security
taxes in return for retirement benefits based on those tax payments. To the
extent that workers perceive this to be the case, the mature Social Security

System -- i.e., the post-transition system -- can have no real effects on total saving or capital formation. That is the message of Figure 2 and Tables 1 through 4.

Instead of an actuarial system, suppose now that Social Security were strictly a pay-as-you-go system. In other words, the government selects a per-capita pay-out level to provide a desired retirement benefit to retirees and taxes workers, per-capita, by just enough to finance the total flow of benefit payments. The demographics could be such that the pay-as-you-go system would be equivalent to the actuarial system in the sense of having no first-order effect on total saving. This would be the case if, upon retirement, workers received retirement benefits equivalent to what had been paid in through taxes during their working years. As a rough guide, this would require that the number of workers be at least 4-5 times the number of retirees.[9]

For the pay-as-you-go system to reduce total saving, the number of workers would have to exceed the critical value required for equivalence of the pay-as-you-go and the actuarial systems. With "too many" workers, each under-contributes while working relative to what will be received upon retirement. In the language of Figure 2, this amounts to a substantially higher return to public than to private saving. The result is a pure, positive

[9]Suppose R retirees each receive B in benefits so that W current workers are each taxed RB/W to finance Social Security on a pay-as-you-go basis. If the expected working life is x years, workers contribute a total of RBx/W while working. if the expected number of retirement years is y, workers receive By in benefits during retirement.

$$\frac{RBx}{W} = By \Rightarrow W = \frac{Rx}{y},$$

and x/y may be assumed to be in the range of 4 to 5. It is easily shown that if tax contributions are required to earn interest and the resulting accumulation is set equal to the present value (at the point of retirement) of retirement benefits, the number of workers would have to be more than x/y times the number of retirees in order for the pay-as-you-go system to be equivalent to the actuarial system.

income effect which raises current consumption and lowers total ex-ante saving at prevailing income levels relative to the no Social Security case.

The "too many workers" case can hardly be thought to be empirically relevant at the present time. In 1979 the U.S. labor force -- a gross over-estimate of the number of full-year contributors to Social Security -- was just about four times the number of persons over age sixty-five.[10] There is little reason to believe in the "too many workers" case; if anything there are currently "too few workers" which would imply that a pure pay-as-you-go system would _increase_ the ex-ante saving rate.

In fact, of course, our Social Security System is neither purely pay-as-you-go, nor purely actuarial. Through the 1960's -- when there may have been "too many workers" -- the System ran substantial annual surpluses which helped to counteract the reduced saving rate that would have resulted from pure pay-as-you-go. Presently -- when there may be "too few workers" -- the System is beginning to run annual deficits which would help to counteract the increased saving rate that would result from pure pay-as-you-go.

VI. Can Social Security Affect Saving and Investment?

What seems clear from the above analysis is that, beyond a transition phase, an actuarial Social Security System cannot have any first-order effect on total saving, hence on the ability to finance capital formation. A pure pay-as-you-go Social Security System can reduce the nation's saving rate if there are too many workers relative to the number of retirees. The U.S. Social Security System is a hybrid with both pay-as-you-go and actuarial properties, and we have perhaps "too few", but surely not "too many" workers.

[10]Source: Economic Report of the President, January 1980, Tables B-26 and B-27.

If the U.S. saving rate is in any sense undesirably low, it would hardly seem appropriate to point to the Social Security System as the cause of the low saving rate.

None of this is meant to deny the existence of real issues: how is monetary policy influenced by government surpluses and deficits, which may derive in part from the Social Security System; what if the government increases Social Security benefits without raising taxes; if taxes are to be increased, should the increase be levied on payrolls or on the income tax base; do wage earners perceive a deficit in the social insurance accounts as evidence of a low prospective return to public saving; do wage earners perceive the inflation-indexation of social insurance benefits as evidence of a high prospective return to public saving? Given the existence of real substantive issues in regard to Social Security, it hardly seems fitting that we should pretend that the trouble with the System is that the diversion from private saving to public saving has some clear and major effect on the economy's ability to finance capital formation.