IMF WORKING PAPER

WP/89/103

INTERNATIONAL MONETARY FUND

Western Hemisphere Department

National Savings and Targets for the Federal Budget Balance in the United States

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December 18, 1989

Abstract

The U.S. national savings rate has declined in the 1980s, with both public and private components falling. This paper discusses that decline and whether a policy response is needed. The drop in the private savings rate appears to reflect factors not easily reversible by policy and increases in public saving may thus provide the most effective means of bolstering national savings. Illustrative calculations based on two alternative frameworks indicate that a net national saving rate substantially above its current level could be a desirable objective and that a large federal budget surplus could be needed to that end.

JEL Classification Numbers
230, 3200

1/ The author is grateful to his colleagues in the Western Hemisphere Department and to Lans Bovenberg and David Coe for helpful comments and discussions. Responsibility for the views expressed and any errors are his alone.

Contents

Summary

The U.S. national saving rate has dropped markedly in the 1980s reflecting declines in both its public and private components. Many of the factors that may be behind the decline in the private saving rate appear difficult to reverse. An alternative strategy would be for the federal government to aim for the achievement of budgetary surpluses to offset reduced private saving. Such an approach would be motivated by the fact that some part of the decline in private saving may reflect unintended consequences of public sector interventions into private market decisions--such as the provision of social security and various aspects of tax policy--and more fundamentally because private sector decisions may not adequately take account of the interests of future generations.

Two alternative frameworks aimed at quantifying medium-term objectives for the federal fiscal balance are developed. The first is based on an explicit optimality criterion--namely, finding the neoclassical steady state path on which per capita consumption is maximized. Illustrative calculations indicate that the current U.S. national saving rate appears to be well below the optimal level by this criterion and suggests that a net national saving rate of close to 10 percent of net national product (NNP) might be called for. The associated target for the federal fiscal balance would be a surplus in the range of 3 percent of NNP.

The second approach calculates net national saving rate consistent with a target output growth rate, assuming, inter alia, no reliance on foreign saving. In this framework the assumption concerning the future behavior of multifactor productivity growth is key; one way to proceed is to assume that the latter rebounds in the projection period above its performance in the 1970s and 1980s, while remaining below the rapid growth rates of the 1950s and 1960s. On this basis, and assuming no reliance on foreign saving, output growth of 3 1/4 percent annually--in line with average growth from 1950-88--would also require a net national saving rate of almost 10 percent of NNP and a federal budgetary surplus of close to 3 percent of NNP.

The two alternative frameworks analyzed in the paper yield the same broad result that a federal budgetary surplus equivalent to 3 percent of NNP or more may provide an appropriate medium-term objective for U.S. fiscal policy. While the precise numerical results, of course, depend on the specific frameworks presented and the assumptions made, they indicate that a strong case can be made for a substantial surplus to be an objective of U.S. fiscal policy.

I. Introduction

The national saving rate in the United States has dropped markedly in the 1980s, with both the public and private components exhibiting declines. This paper discusses reasons for the decline and reviews possible responses by policymakers. In a recent speech, the Managing Director of the Fund observed that "a strong argument could.... be made for the Federal Government to run a significant surplus to offset the low level of private saving." 1/ The aim of this paper is to develop an analytical basis for such an argument and to make some preliminary attempts at quantifying what magnitude of surplus might be desirable. To provide background for the policy issues analyzed later in the paper, sections II and III review the magnitude of the decline in savings rates relative to historical averages, address questions related to measurement and discuss the factors underlying the recent decline in the national saving rate.

Section IV examines whether there are reasons for seeking to reverse that decline by policy changes. The conclusion drawn is that there is a strong case for policy changes aimed at raising national saving. Morever, to the extent that the factors behind the decline in private saving do not appear easy to reverse (and assuming an absence of Ricardian equivalence effects), increases in public saving may provide the most effective means of bolstering the national saving rate.

The first principal strand of the argument is that the national saving rate is a variable that public policy should seek to influence. The second main strand is that changes in the federal fiscal balance may provide the most effective means for policy to influence the national saving rate. It would be quite possible, of course, to accept the first element of the argument--that public policy should seek to influence the national saving rate--while maintaining that structural measures directed at private saving provide the most effective tools for the task.

Public policy should only be concerned about the national saving rate if there are reasons for believing that the rate generated by market outcomes should be viewed as suboptimal or inappropriate. The approach taken here on this central issue is twofold. First, a variety of government policies may tend to diminish private saving below a pure market outcome. If it is either not desirable or not feasible to eliminate such impediments, a second-best alternative may be for the Government to aim for a surplus in its own accounts to offset the induced loss of private saving. Second, it should be recalled that the fundamental welfare theorems yield a presumption that market outcomes are optimal only in the absence of market failures. In an economy characterized by the assumptions of the life cycle model--there being a lack of effective intergenerational linking of preferences--there is a fundamental market

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1/ Camdessus (1989).

failure in the sense that unborn economic agents are not represented in capital formation decisions. Consequently, there may be a role for policy intervention in an effort to offset this market failure. The nature and magnitude of such intervention of course involve difficult questions of intergenerational equity.

Following the discussion of the rationale for policy intervention, two alternative frameworks aimed at quantifying an appropriate medium-term objective for the national saving rate are then presented. The first (presented in Section V) is based on an explicit optimality criterion--namely the neoclassical steady state path on which per capita consumption is maximized, with a possible adjustment for a positive rate of social time preference. Illustrative calculations based on this framework indicate that a net national saving rate close to 10 percent of NNP might be called for. While tax policy measures to boost private saving could play some role, the approach indicates that the associated target for the federal fiscal balance would nonetheless be a substantial surplus--perhaps in the neighborhood of 3 percent of NNP.

The second framework, provided in Section VI, aims to calculate the net national saving rate and associated federal budget balance consistent with a target growth rate of output and assuming no reliance on foreign saving. On this basis, the calculations indicate that achievement of output growth consistent with the postwar average and the U.S. Administration's medium-term economic projections might also require a net national saving rate close to 10 percent of NNP, and thus a substantial federal budget surplus.

II. The Decline of U.S. National Saving

The allocation of resources between present consumption and future consumption is among the most fundamental of economic choices. The magnitude of saving will help to determine the living standards of the current generation later in life and of future generations. Either by augmenting a country's stock of productive capital or by adding to its income-earning external assets (reducing its external liabilities), saving raises a nation's future consumption possibilities. Concern about future living standards is at the core of widespread recent discussion of the low national savings rate in the United States.

1. A review of the data

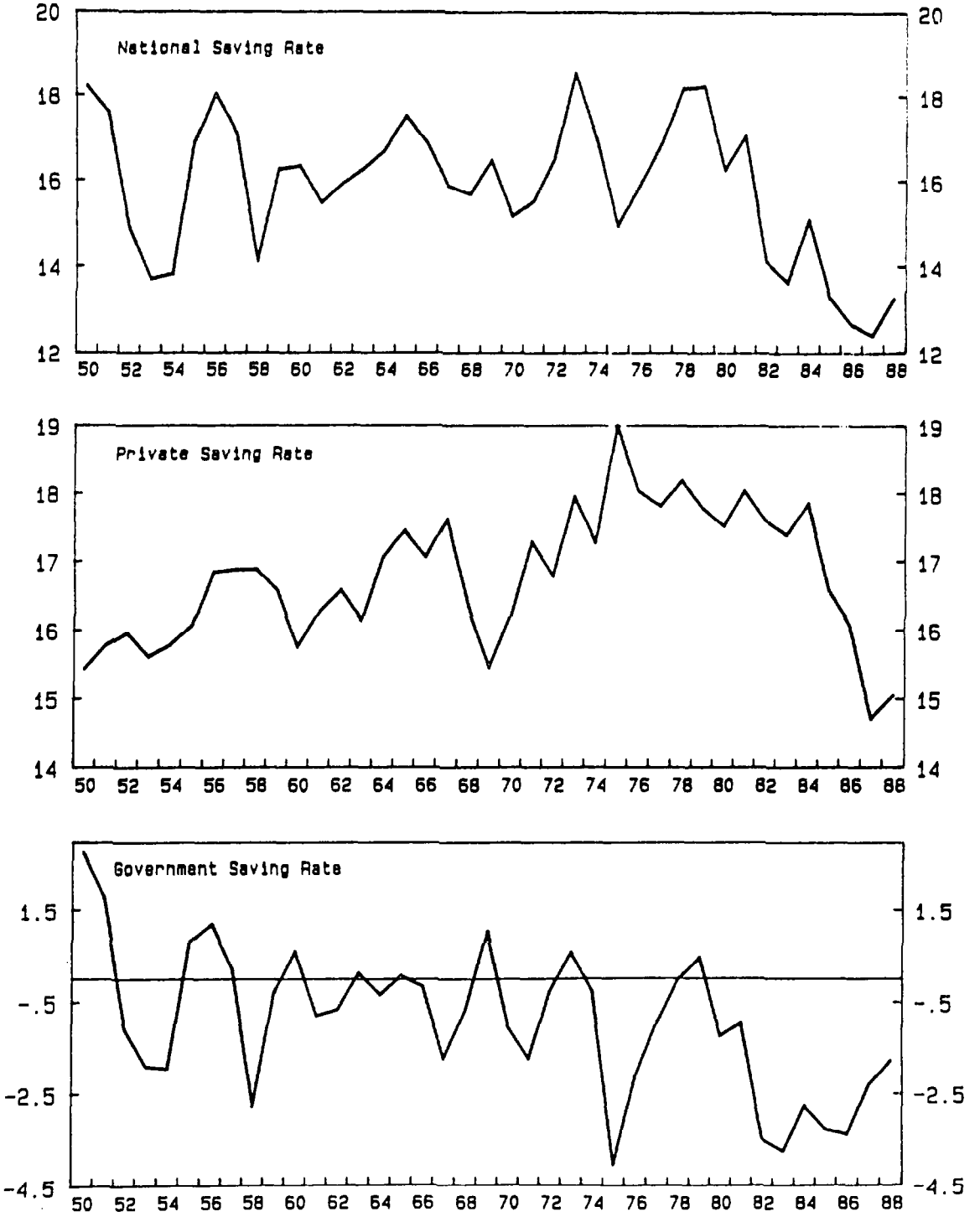
Gross national saving in the United States averaged 16 1/2 percent of GNP from 1950-79, and then fell by almost 4 percentage points to 12 1/2 percent of GNP in the latest three years (1986-88). The fall in the U.S. national saving rate and the role of the public and private components is illustrated in the tabulation below and Chart 1. In an accounting sense, the shift in the public sector balance--reflecting larger federal deficits--was responsible for a little more than half of the fall in the national saving rate, with the remainder reflecting the

CHART 1

UNITED STATES

GROSS SAVING RATES

(In percent of GNP)



drop in gross private saving from an average 16 3/4 percent of GNP during 1950-79 to 15 1/4 percent of GNP during 1986-88.

U.S. Saving Rates

	1950s	1960s	1970s	1980-1985	1986	1987	1988
	(In percent of GNP)						
Gross national saving	16.1	16.3	16.7	14.9	12.4	12.2	13.2
Private	16.2	16.6	17.6	17.5	15.8	14.7	15.1
Public	-0.1	-0.3	-1.0	-2.6	-3.4	-2.4	-2.0
Of which: Federal	0.1	-0.3	-1.7	-3.9	-4.9	-3.6	-2.9
	(In percent of net national product)						
Net national saving 1/	8.1	8.6	7.9	4.0	1.7	1.7	2.9
Private	8.2	8.9	8.9	6.9	5.6	4.6	5.2
Public	-0.2	-0.3	-1.0	-2.9	-3.8	-2.7	-2.2
Of which: Federal	0.1	-0.3	-1.9	-4.4	-5.5	-4.0	-3.3
	(In percent of GNP)						
Memorandum items:							
Current account balance	0.1	0.5	--	-1.4	-3.1	-3.2	-2.6
Absorption 2/	99.1	98.9	99.2	100.1	102.3	102.5	101.5

Net national saving (which subtracts capital consumption allowances from the gross figures) has exhibited an even more pronounced decline; it fell from an average of 8 1/4 percent of net national product (NNP) during 1950-79 to 2 percent of NNP in the period 1986-88, with net private saving dropping from 8 3/4 percent of NNP in the earlier period to 5 percent in the last three years, while public sector dissaving widened by 2 1/2 percent of NNP (Chart 2).

The outcome of such a falling away in the economy's propensity to save is a decline in the system's future capacity to generate income. Either the stock of external assets is reduced (liabilities increased), or else net additions to the domestic capital stock are being accumulated less rapidly than otherwise. The data indicate that both effects have been evident in the 1980s; the external current account shifted from small surpluses to large deficits, leading to a rising stock of

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1/ Gross saving less capital consumption allowances.

2/ The sum of consumption, gross investment and government spending on goods and services in nominal terms.

external liabilities while at the same time net investment declined by 2 1/2 percent of NNP (see tabulation below).

	1950s	1960s	1970s	1980-1985	1986	1987	1988
	(In percent of net national product)						
Net national saving	8.1	8.6	7.9	4.0	1.7	1.7	2.9
Net foreign saving 1/	-0.1	-0.7	-0.3	1.0	3.6	3.7	2.7
Net domestic investment	8.2	7.7	7.6	5.1	5.3	5.3	5.4
Business fixed investment	3.4	3.7	3.7	2.8	2.1	1.8	...

2. Some measurement issues

The decline in U.S. public saving in the 1980s relative to historical averages noted above reflects a deteriorating federal fiscal position, somewhat mitigated by an increase in the combined surpluses of state and local governments (Chart 3). An important measurement issue concerning U.S. public saving relates to social insurance funds. The measured federal fiscal position would recently have been much worse but for the accumulation of substantial social insurance fund surpluses in the last few years that resulted largely from the reform of the social security system in 1983. Since social security cash flow surpluses are intended to provide a reserve against the substantial demographic changes expected next century, their use to finance deficits elsewhere in the government budget may not be appropriate. 2/ In a related vein, the bulk of the state and local government surpluses that have accumulated in the 1980s also consists of pension fund reserves, associated with future pension liabilities. When the social insurance fund surpluses of federal and state and local governments are separated out, the general and federal government fiscal situations appear even more serious (see tabulation below) and the improvements in the last two years are much less pronounced.

1/ Broadly equivalent to the external current account deficit.
2/ See Aaron et al. (1989) and Ebrill (1989b).

CHART 2

UNITED STATES

NET SAVING RATES

(In percent of Net national product)

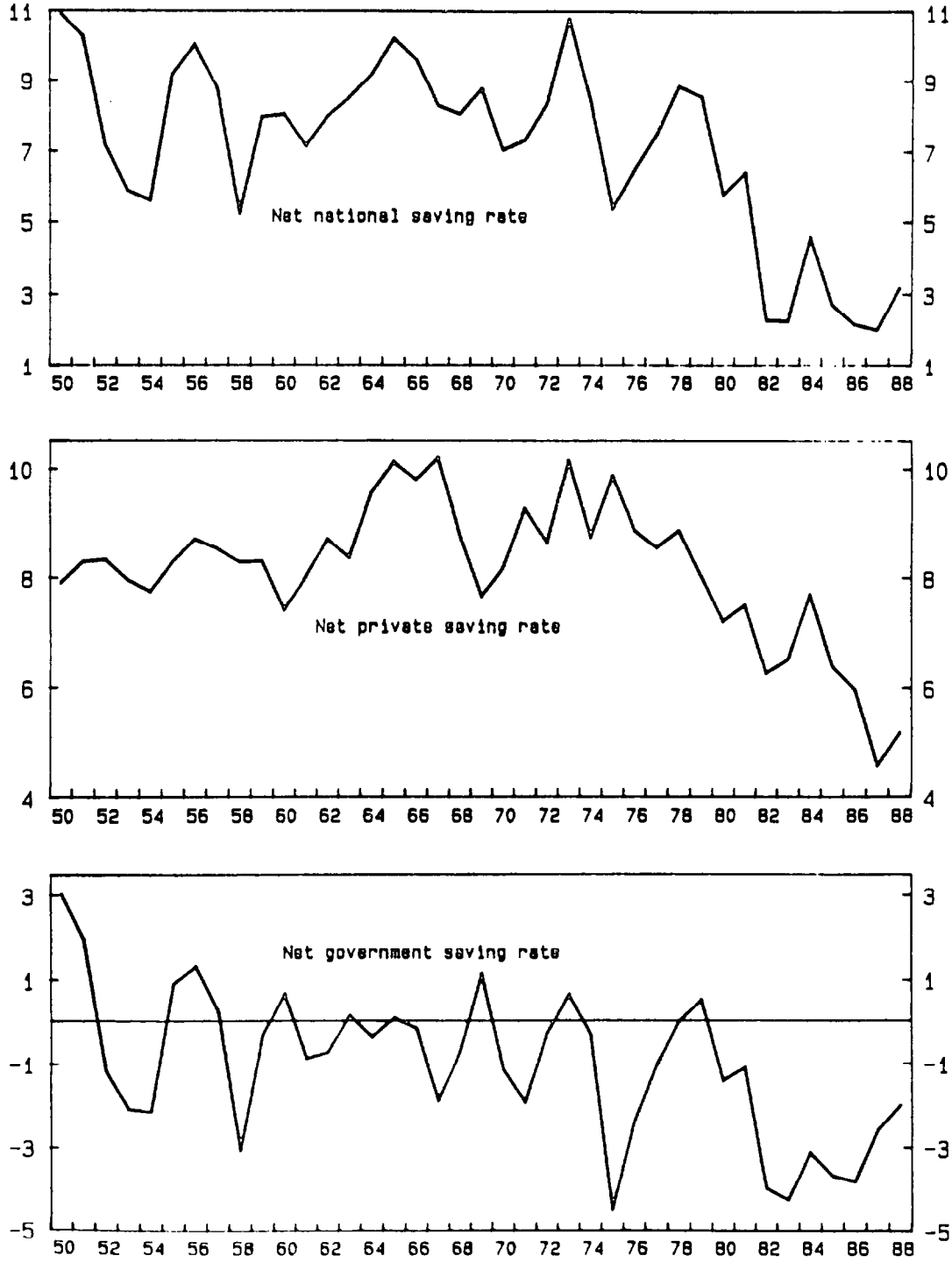
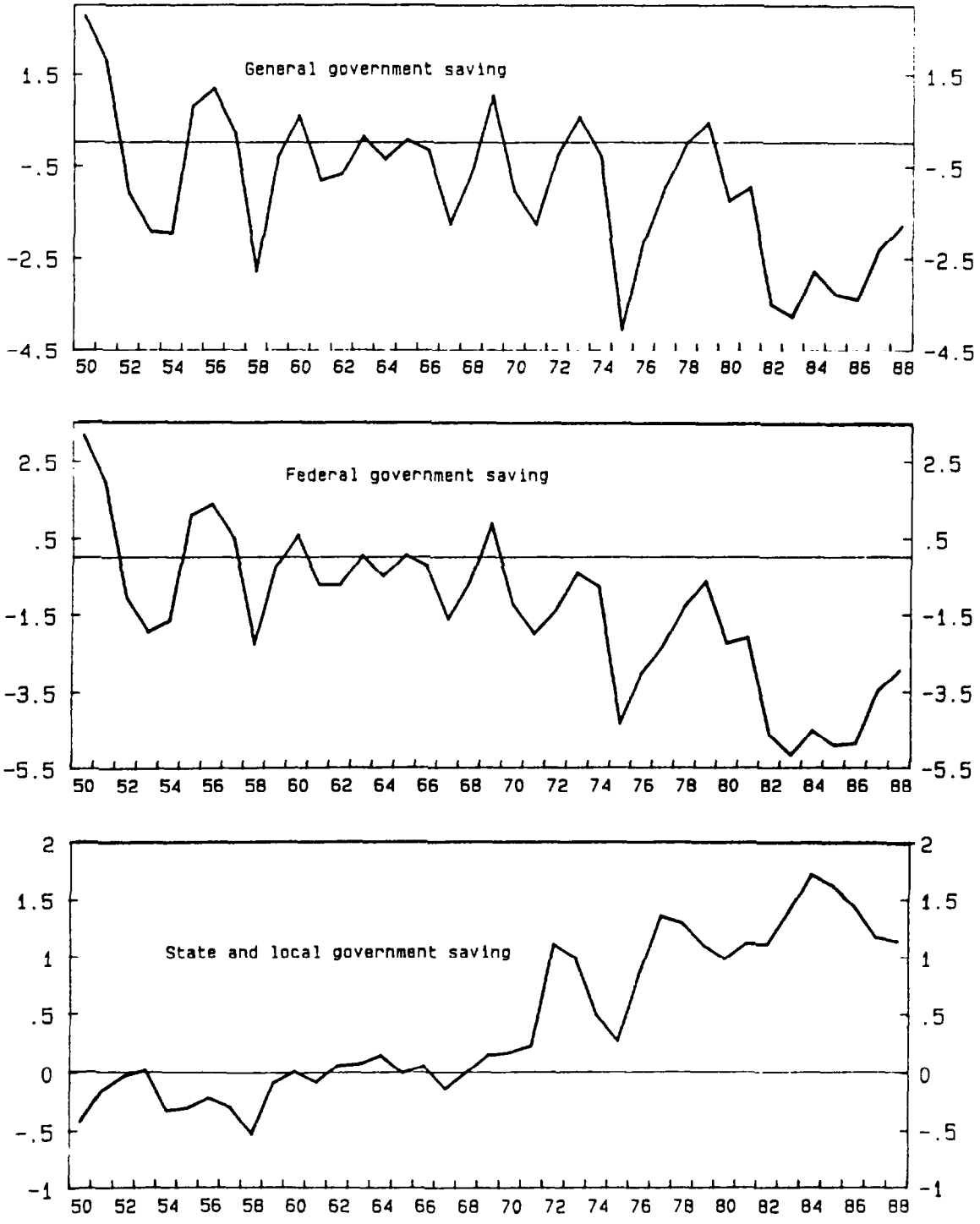


CHART 3

UNITED STATES

GOVERNMENT SAVING RATES

(In percent of GNP)



Public Saving

	1950s	1960s	1970s	1980-1985	1986	1987	1988
	(In percent of GNP)						
General government saving	-0.1	-0.3	-1.0	-2.6	-3.2	-2.4	-2.0
Federal	0.1	-0.3	-1.7	-3.9	-4.6	-3.6	-3.0
Excluding social insurance	-0.4	-0.7	-1.7	-3.5	-5.0	-4.2	-4.1
Social insurance	0.4	0.4	--	-0.4	0.4	0.6	1.1
State and local	-0.2	--	0.8	1.3	1.4	1.1	1.0
Excluding social insurance	-0.6	-0.5	--	0.2	0.1	-0.3	-0.4
Social insurance	0.3	0.5	0.8	1.2	1.3	1.4	1.5

Turning to private saving, some have argued that the economically appropriate categories of saving and investment may not be adequately captured by standard national accounts measures and that when various adjustments are made, the problem may look less severe. However, when suggested corrections are made to measured savings and investment data, the broad conclusion that rates of saving and capital formation have declined in the recent past emerges unaltered. 1/

For example, treating spending on consumer durables in a consistent way reduces year-to-year fluctuation in the saving series but the recent downward trend remains. Moreover, the saving/investment balance is unaffected since such spending needs to be added to the investment side of the ledger as well. In the tabulation below, movements over time in conventionally measured personal and private savings relative to GNP are compared with movements in adjusted series which regard consumer durable spending as savings and correspondingly treat depreciation on the stock of consumer durables as consumption. 2/ The not-too-surprising result--that the calculated savings rates are very similar across the alternative definitions--stems from the fact that the depreciation series--added back to pure consumption--is very similar in magnitude to the series for spending on durable goods--taken out of consumption and added to saving.

1/ Bovenberg and Evans (1989). The logical structure of this subsection dealing with measurement issues draws on the paper just cited.

2/ The calculations of pure consumption and corresponding savings concepts derived from the framework employed in the Federal Reserve MPS model of the U.S. economy. See Brayton and Mauskopf (1985).

Personal and Private Saving Rates

(In percent of GNP)

	1960s	1970s	1980-1985	1986	1987	1988
Personal saving	4.6	5.6	4.4	3.0	2.3	3.0
Adjusted personal saving 1/	4.8	5.8	3.6	3.1	2.1	2.7
Private saving	16.6	17.6	17.5	15.8	14.7	15.1
Adjusted private saving 1/	16.7	17.8	16.7	16.3	14.5	14.8

Treating changes in household wealth as the appropriate measure of saving--as advocated by Shoven (1984)--is an alternative approach which, however, produces highly volatile series for saving whose interpretation is difficult. Moreover, other analysts have suggested that saving in the form of unrealized capital gains should be viewed somewhat differently from saving out of current income, so that such an overall saving measure may not be appropriate. 2/ Such capital gains or losses would also need to be added to investment, so that the saving/investment balance would be affected only to the extent that there were effects on the net value of foreign holdings of U.S. assets.

A recent paper by Bradford 3/ argued that a measure of saving based on changes in wealth corresponds more closely to the relevant theoretical concepts, noting that the basic notion of wealth is the market value of household claims on future goods and services. Despite the well known measurement problems in the Federal Reserve balance sheet data, 4/ Bradford argued that this aproach was preferable. As with Shoven's earlier work, the resulting savings series were highly volatile. Nevertheless the trend decline in the aggregate saving rete was also evident in the wealth based measure (see tabulation below) so that the overall picture of a declining national savings rate was unaffected.

1/ National accounts personal (private) saving plus actual spending on consumer durables less imputed depreciation on and the service flow from the stock of durables.

2/ For example, unrealized capital gains from home ownership may be saved in advance of purchase of the next house.

3/ Bradford (1989).

4/ Including inter alia the fact that the household sector is the residual sector in the calculations, so that the effects of errors elsewhere feed into the household sector and the fact that the balance sheet accounts may not adequately separate out assets owned by nonresidents. See the discussion in Bovenberg (1989).

Aggregate Saving Measured by Changes in Wealth 1/

(In percent of GNP)

1950s	1960s	1970s	1980-85	1986	1987
11.6	9.7	7.4	5.9	10.5	5.9

Another proposed correction to measured saving rates concerns inflation. Inflation potentially distorts the measured saving rate of a sector, with the direction of its impact depending on whether the sector is a net creditor or net debtor in fixed nominal value financial securities. The net result of adjusting the saving data for inflation is that the decline in the national saving rate remains evident as before, but its attribution across sectors is somewhat altered. In particular an even larger proportion is attributed to shifts in the public sector balance. 2/

A further measurement issue concerns whether gross or net savings and investment data should be employed. From the perspective of economic theory, net savings and investment appear to be the relevant concepts since economic decisions are typically considered to be made in net terms. From a more pragmatic vantage point, however, gross saving and investment may also be seen as relevant constructs. First, accurate measurement of economic depreciation is difficult and national accounts measures may be subject to a considerable margin of error. Second, the more rapid recent decline in net savings relative to NNP than in gross savings relative to GNP reflects a rise in capital consumption allowances, associated with a shift over time to investment in shorter-lived capital goods, especially information processing equipment. 3/

As a result of this shortening of average service lives, an increasing proportion of gross investment has been devoted to replacement of the depreciating part of the capital stock rather than to making net additions. The fact that the capital stock is on average younger than before suggests that it may on average be more technologically up to date. The implications of the shift to capital goods with shorter economic service lives for the quantity and quality of capital services to be derived from a given addition to the capital stock are thus ambiguous. The conclusion would appear to be that both gross and net

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1/ The figure for each year was computed as the ratio of the change in the sum of household and government net worth to GNP. Decade averages were computed as the average of the ratios for individual years. Data were reported in Bradford (op cit.).

2/ For a discussion of issues related to inflation adjustment see Jump (1980) and Bovenberg (1989).

3/ For a more detailed discussion, see Corker et al. (1989), de Leeuw (1989), and Evans (1989).

saving concepts contain relevant information and that neither should be the exclusive focus of attention.

III. Factors Behind Lower U.S. National Saving

This section discusses some of the reasons that may underlie the declines in gross and net national saving in recent years outlined in the previous section. With regard to public saving, the fact of a deterioration in saving performance is clear. This outcome should probably be viewed as reflecting the political process and as not easily amenable to analysis in economic terms. 1/

The decline in gross and net private saving rates has been attributed to a variety of factors. The approach adopted here assumes that there are several motivations for saving, including precautionary, life cycle (that is saving for retirement), inheritance, and target saving for purchase of housing and/or large durable goods. In analyzing the behavior of private saving, the issue of whether to view household and corporate saving as jointly or separately determined needs to be addressed. If households see through the so-called corporate veil, then they may reduce their own saving when saving at the corporate level increases. And indeed, the private saving rate exhibits a greater degree of stability over time than either of the personal or corporate components taken individually. Even if households only partially see through the corporate veil--and there are plausible reasons why this might be the case 2/--an increase in corporate savings is likely to induce a revaluation of corporate equity, which through a wealth effect on consumption, would lead to a decline in household saving. Available empirical studies appear to indicate that while dollar-for-dollar offset does not exist, there is some degree of substitutability between household and corporate saving, with the offset coefficient in the neighborhood of 0.25 to 0.5. The upshot is that while there may be a degree of substitutability between corporate and household saving, the extent of the offset appears to be far from complete. Accordingly, the following discussion treats the two elements as separate, but related.

1/ There is, however, a segment of the public choice literature which argues that the shift to large U.S. federal deficits reflects changes in the nature of political incentives and constraints eroding the political need for fiscal discipline. See Buchanan, Rowley, and Tollison (1986).

2/ First, piercing the corporate veil assumes a very high level of skill in analyzing and processing information on the part of households. Second, differences in tax policy between the household and corporate sectors may cause households to value a dollar of corporate retained earnings substantially less than a dollar of their own saving. Third, the separation of corporate control from ownership may also result in households viewing corporate savings differently from saving on their own account, even though households are the ultimate owners of the corporate sector.

Private Saving

	1950s	1960s	1970s	1980-1985	1986	1987	1988
	(In percent of GNP)						
Gross private saving	16.2	16.6	17.6	17.5	15.8	14.7	15.1
Household	4.7	4.6	5.6	4.4	3.0	2.3	3.0
Business 1/	11.4	11.9	12.0	13.1	12.9	12.4	12.2
	(In percent of net national product)						
Net private saving	8.2	8.9	8.9	6.9	5.6	4.4	5.2
Household	5.2	5.1	6.2	5.0	3.3	2.5	3.3
Business 2/	3.1	3.8	2.7	2.0	2.2	1.9	1.8

The recent decline in the gross private saving rate has been associated both with a large reduction in gross personal saving relative to GNP and also a drop in gross business saving in 1987 and 1988 from an unusually high level in the first half of the 1980s (Chart 4). The decline in net private saving relative to net national product from previous decades to 1987 and 1988 amounted to about 4 percent of net national product, with the personal and business components playing roughly equal roles. The greater importance of business saving in explaining the behavior of private saving when the data are viewed on a net basis reflects the increase over time in the importance of capital consumption allowances--the wedge between gross and net business saving.

With regard to reasons for the decline in the household saving rate, 3/ the increase in the value of household wealth in the 1980s prompted by substantial revaluations of assets--such as holdings of equities and the housing stock--is one factor that has tended to diminish saving out of current income. According to the estimates presented in Bovenberg and Evans (1989), the rise in the wealth/income ratio may have subtracted 1/2 to 2/3 percentage point from the household saving rate in the 1980s.

1/ Undistributed corporate profits with inventory valuation and capital consumption allowances plus total capital consumption allowances (including those of unincorporated business). The inclusion of total capital consumption allowances in what is defined here as gross business saving contains an element of arbitrariness.

2/ Gross business saving less total capital consumption allowances.

3/ An empirical analysis of household saving behavior is provided in Bovenberg and Evans (1989), with the largest weight placed on demographic developments in explaining the decline in the household saving rate. Kotlikoff (1989) provides a comprehensive review of alternative models and reasons for the decline in the savings rate.

Another factor that may have contributed importantly to the decline in household saving is the increased proportion of income going to older groups in the population, attributable both to the increasing proportion of older people and to changes in the social security system. An increasing proportion of older people could by itself contribute to a decline in the household saving rate. Moreover, the social security system influences saving behavior in several ways. One is by redistributing income to the elderly who are likely to have higher marginal propensities to consume according to the life cycle model. 1/ A second is by reducing the need to save for retirement by those currently working, 2/ and a third is by curbing the need for precautionary saving to cover the contingency of living longer than expected. 3/

A third factor which may have contributed to the fall in the household saving rate in the 1980s relates to private pension plans. U.S. national accounts data treat contributions to pension plans and income earned in such plans as personal income. Most private pension plans are on a defined benefit basis, which means that when returns in the bond and stock markets surged in the early 1980s, such plans reduced required contributions since benefit levels were already mandated. Because these contributions account for a considerable proportion of household saving, the result was a drop in the household saving rate. 4/ In effect, pension funds act like pure target savers so that when the rate of return increases there is a negative income effect with no offsetting positive substitution effect.

Another important factor may have been the increased availability of various kinds of insurance (such as health insurance, life insurance, disability insurance, and unemployment insurance) that has provided households with a greater ability to guard against uncertainty, thus gradually reducing the need for precautionary saving. Much of this increased insurance has been provided through the public sector. Under certain (not very restrictive) theoretical conditions, a reduction in the degree of uncertainty about the future income stream can be shown to lead to a decline in saving, with other factors equal. 5/ Kotlikoff (1989) discusses ways that improved access to various kinds of insurance--particularly health insurance--may substantially reduce the need for precautionary saving.

1/ This mechanism was emphasized in Evans (1983).

2/ The mechanism emphasized in the literature spawned by Feldstein (1974).

3/ An excellent survey of the time series evidence on the effect of social security on private saving is provided in Aaron (1983). A more recent review is provided in Bernheim and Levin (1989).

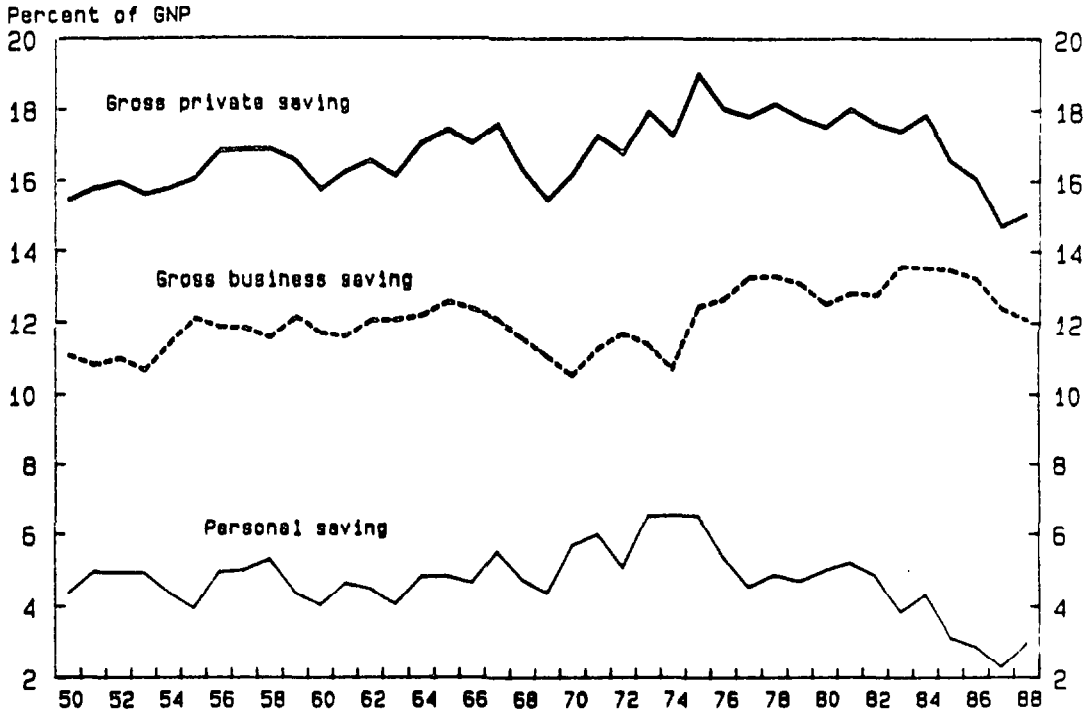
4/ Bernheim and Shoven (1985) estimate this effect at about 2 percent of disposable income from 1982 to 1984.

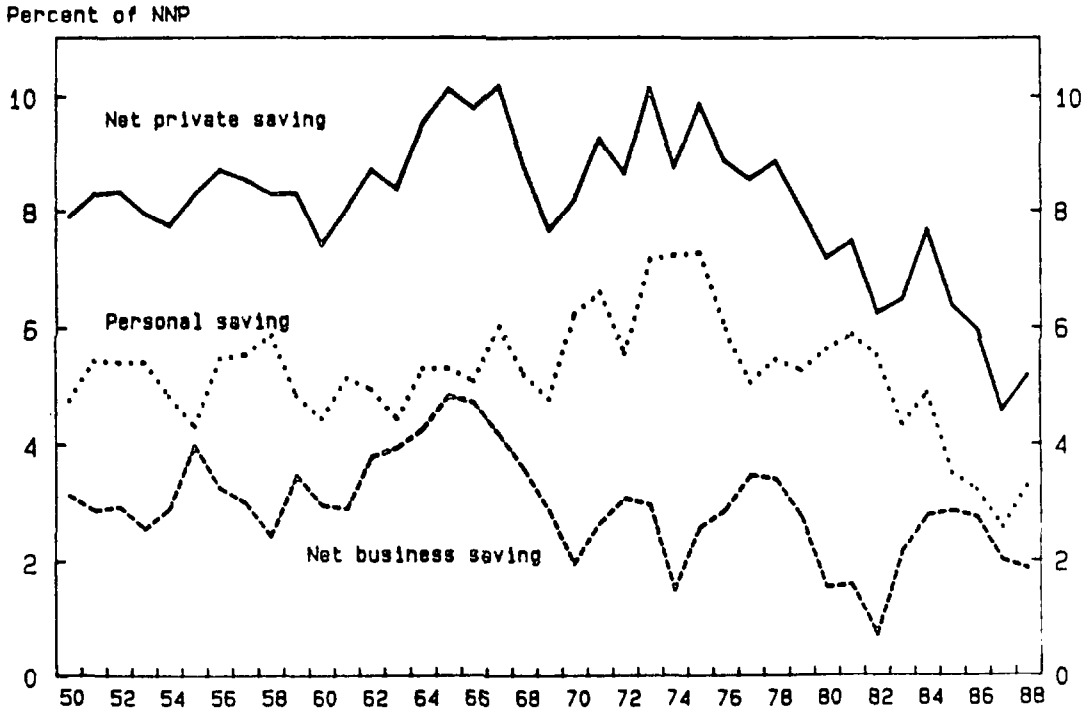
5/ Dreze and Modigliani (1972) and Sandmo (1970).

CHART 4

UNITED STATES

PRIVATE SAVING RATES





Financial innovation and increased efficiency of financial markets also may be contributing to a decline in household saving. In earlier decades, purchase of large durable goods--such as houses and cars--required substantial saving to accumulate a downpayment. More recently, it has become possible to make large durable purchases with smaller downpayments, implying a reduced need for target saving. 1/ Recent financial innovations also have made it easier for households to draw on their accumulated equity in the housing stock to support consumption, by means of home equity loans. 2/ Bayoumi and Koujianou (1989) provide empirical evidence in a cross-country setting consistent with the view that financial innovation may have contributed to lower saving rates. In addition, the pace of corporate restructuring activities quickened markedly in the 1980s--partly as a result of financial market innovation--which by producing large windfall gains for households may have contributed to a fall in the saving rate. 3/

A final feature of the recent literature on household consumption and saving is the research by Boskin and Lau. 4/ This research analyzes panel data for individual households and finds strong statistical support for the proposition that households headed by individuals born after 1939--with economic and financial factors held constant--save substantially less than do those headed by individuals born before 1939. Thus there appears to be a vintage effect in saving--that is, as time passes and the proportion of households headed by people born before 1939 diminishes, the private saving rate would decline substantially over time, even if its macro-economic determinants were unchanged. While Boskin and Lau are cautious in explaining these results, one interpretation could be that heads of U.S. households with a recollection of the depression of the 1930s and the second world war might feel a greater need to build a stock of wealth as a buffer against risk. By contrast, younger households may be conditioned to the public sector providing insurance against various risks and thus find less need for precautionary saving.

With regard to business saving, recent developments are less easy to characterize than those of household saving. As an earlier tabulation indicated, gross business saving is now at about the same level relative to GNP as in earlier decades, albeit somewhat lower than in the early 1980s. Net business saving, however, has fallen sharply relative

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1/ High real estate prices in Japan together with the need for a large downpayment have often been cited as a reason for the very high Japanese household saving rate. There is also a growing literature which argues that the recent decline in household and private saving rates in several European countries may be attributable in part to financial innovation, in combination with some aspects of tax policy. See for example Andersson (1988).

2/ See the discussion in Skinner (1989).

3/ See the discussions in Fries (1989) and Hatsopoulos et al. (1989).

4/ Boskin and Lau (1988a and 1988b).

to net national product, reflecting the proportionate rise in the capital consumption allowance. If households are believed to see fully through the corporate veil then movements in business saving can be viewed as essentially stemming from household decisions. If the veil is only partially pierced--as argued earlier--then a separate role exists for factors affecting corporate profitability, such as for example trend wage and productivity developments, supply shocks and the like.

Moreover, if personal and corporate saving are only partial substitutes, changes in the distribution of the tax burden between the household and business sectors could significantly influence the overall private saving rate. For example, the Tax Reform Act of 1986 sought to be revenue neutral in an overall sense, while raising the corporate tax burden and correspondingly reducing it for households. Some recent studies have suggested that this tax change may have had the unintended consequence of lowering the gross private saving rate substantially 1/, perhaps by as much as 1 percent of GNP.

IV. Government Policy and National Saving

The question addressed in this section is what approach government should adopt concerning national saving. 2/ One polar viewpoint argues that government should balance its own budget and accept whatever private saving rate emerges as a result of market decisions. A related view recognizes the existence of various distortions to private saving decisions; proposes that those distortions should be eliminated, and argues that the Government should then balance its budget. A second approach suggests that not all of the existing impediments to private saving decisions can or should be eliminated and that as a result, the government should aim for a surplus to offset the loss of private saving caused by these impediments--a second-best approach. A third view notes in addition that market decisions regarding saving may not produce a desirable overall result since the interests of future generations may not be adequately taken into account. The view taken here is a combination of the second and third approaches, for reasons outlined below. The nature of the possible policy response is then discussed.

1. The role of impediments to private saving

The first qualification mentioned above was the existence of various government interventions which may cumulatively work to reduce private saving. The U.S. tax system for example, treats owner-occupied housing favorably in several ways, including the absence of a tax on imputed rental values, the generous exemptions on capital gains, and the

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1/ See for example Evans and Kenward (1988) and Poterba (1987).

2/ The discussion relates only to the Federal Government. State and local governments are assumed to make independent fiscal decisions, unrelated to national saving considerations.

deductibility of mortgage interest. 1/ These tax preferences have boosted the market value of housing and through a wealth effect on consumption may have lowered the household and private financial saving rates. The optimal response would perhaps be to adopt tax policies to eliminate the distortions, presumably in a phased way, to minimize distributional effects and short-run disruptions. However, to the extent that eliminating the source of the distortion is not viewed as feasible, a second best alternative could be for the government to raise the level of public savings.

A second distorting feature of the tax system which may influence the overall private saving rate is the fact that corporations may deduct interest but not dividends when computing profit for tax purposes. Combined with the effects of financial innovation discussed above, this feature has facilitated the restructuring of the U.S. corporate sector (and the associated increase in leverage) and may have contributed to a decline in the private saving rate. The optimal response would be to reform the distorting features of the tax code contributing to this process. To the extent that this is not viewed as feasible, a second best alternative could be to compensate by raising public saving. While other distorting features of the tax system could be examined, 2/ the general point has been made with these two examples--that if first best changes to eliminate distortions are not feasible, a second best approach may be to augment public saving to offset the effects on private saving.

Turning to social security, there is a body of evidence indicating that the U.S. social security system may lead to a decline in the private saving rate, as noted earlier. Thus a case can be made for larger public saving to offset reduced private saving, particularly in light of the forthcoming demographic transition toward an aging of the U.S. population. 3/

Provision of insurance against risk, as noted earlier, is another feature of government policy that may well reduce private saving. One interpretation of the Boskin and Lau finding of a vintage effect in consumption and saving behavior cited above is to link it to the observation that the present generation in the United States may have been conditioned to expect the public sector to provide such insurance. The appropriate policy response might not be to eliminate this provision of insurance in various spheres by the public sector. 4/ However, recognizing that these public sector activities may lead to an otherwise unintended reduction in private saving, an offsetting adjustment in the public saving rate may be called for.

1/ Andersson (1989).

2/ The impact of the U.S. tax system on private saving was reviewed in Bovenberg (1989).

3/ See the discussion in Aaron et al. (1989) and Ebrill (1989b).

4/ This is of course not to argue against well-designed reforms in these areas.

According to the Ricardian equivalence proposition, however, changes in public sector saving will not influence the national saving rate because offsetting shifts in private saving will be induced. If this argument were true, and augmenting national saving were the objective, then adjustments in public saving as advocated above would be fruitless. However, the available empirical studies show little evidence in favor of a significant degree of Ricardian equivalence in the United States, so that the problem does not seem to arise. 1/ If the desirability of using the fiscal balance to target national saving was accepted and if partial Ricardian equivalence characterized the U.S. economy, then the case for raising public saving would--perhaps surprisingly--be strengthened, not weakened. 2/

2. The interests of future generations

A final and crucial argument for the public sector to play a role in the national saving decision concerns the interests of future generations. The neoclassical growth model suggests that competitive economies may tend to approach steady-state balanced growth paths, characterized by a constant growth rate of output, a constant capital-output ratio, and a constant rate of return to capital. 3/ In such a model, the long-run growth rate of output is determined by the rate of growth of the labor force and the rate of technical progress, both generally assumed to be determined outside the economic system. While the long-run growth rate is independent of the saving rate, the capital/labor ratio and the level of consumption per capita do depend on the saving rate.

The central question to be posed is how much saving is sufficient. If a neoclassical steady state growth path is a reasonable approximation of the long-run tendency of the U.S. economy, can some steady states be viewed as preferable to others? One possibility is the steady state growth path which maximizes per capita consumption. This path can be shown to be one on which the net rate of return on capital equals the sum of population growth and the rate of technological progress--the so-

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1/ See Ebrill and Evans (1988) and Bernheim (1987).

2/ The following example makes the point. Imagine that the national saving rate is 1 percent of GNP below a desired level, and zero Ricardian equivalence applies. Then, an increase in public saving by 1 percent of GNP achieves the target. However, if 50 percent Ricardian equivalence applies--that is, a dollar increase in public saving leads to a 50 cent decline in private saving--then a 2 percent of GNP increase in public saving is required to achieve the desired 1 percent of GNP rise in the national saving rate.

3/ Useful expositions are available in Solow (1980) and Enzler et al (1981).

called golden rule. 1/ If the rate of return on capital exceeds the growth rate, then by saving more and sacrificing consumption in a transition period, steady state consumption per capita can be raised for all future generations. 2/

The golden rule analysis makes no allowance for time preference. If one assumes a constant rate of social time preference, then a modified golden rule proposition emerges in which the welfare superior steady state path is that in which the rate of return on capital minus the rate of pure time preference equals the sum of the population growth rate and the rate of technological progress. 3/

In an economy characterized by effective intergenerational altruism, as under Ricardian equivalence, and given various other subsidiary assumptions, utility maximimization by the current generation will take into account the interests of future generations, and the economy will be driven to a modified golden rule position. 4/ However, if reality is better approximated by the assumptions of the life-cycle model--there being a lack of effective intergenerational linking of preferences--then there is no guarantee that the steady state toward which the system might move would satisfy any particular welfare requirements. 5/ Consequently, it is possible--even in the absence of government induced distortions--that there might be insufficient provision for the future and too low a national saving rate in this sense.

While a strong qualitative case can be made for the public sector to play a role, decisions concerning that role inevitable involve difficult judgements of intergenerational equity. Lack of action by the public sector entails an implicit equity judgement just as much as intervention would. One argument has been that since future generations may be likely in any event to be better off than the current generation, there is no reason for the current generation to make sacrifices for the sake of its descendants. An alternative argument has been that there is a kind of implicit contract between generations, and that just as the parents of the present generation made sacrifices to build a better

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1/ That is $r = n + g$ in an obvious notation. See for example Robinson (1964) and Solow (1962). If the rate of return is lower than this sum, then the system in a sense is dynamically inefficient--that is, a portion of the capital stock could be consumed and consumption per capita would then be higher in the new (golden rule) steady state.

2/ Note that this is not a Pareto optimal shift since the initial generation sacrifices consumption possibilities for the benefit of future generations.

3/ That is $r - p = n + g$, in an obvious notation.

4/ See Sidrauski, et al. (1969), Foley and Sidrauski (1971), and Blanchard and Fischer (1989), especially chapters 2-4.

5/ The so-called "market failure" from which this result stems is simply that unborn agents are not represented and consequently the full set of Arrow/Debreu markets is not operative.

future, so in turn the present generation should do the same for its children. The recent sharp decline in U.S. national saving is--from this perspective--viewed as a renunciation of this implicit contract. Thus, Penner (1989) wrote:

> "... the budget deficit is primarily a moral issue. Combined with our low net private savings rate, it implies that per capita wealth in the United States is growing slowly. The basic moral question is whether we should increase national saving by reducing Government dissaving and do as much for our descendants as our ancestors did for us. They believed in the Golden Rule, but we do not seem to." 1/

Although disagreement is likely on issues of intergenerational equity, the golden rule may have some merits as a benchmark. If the current generation fully internalized the welfare of future generations in its own decisions, then absent other distortions, a golden rule solution would emerge without government intervention. The golden rule case can thus be viewed as the benchmark in which the interests of all generations are viewed as equally important. 2/ Such an approach to issues of intergenerational equity can inter alia be defended on the basis of the considerations underlying the Rawlsian theory of justice. 3/

3. What kind of policy response?

If it is accepted that policy should seek to augment the national saving rate, the question arises as to how that objective should be pursued. One alternative would be to adopt measures of tax policy aimed at stimulating private saving, while a second would be tax and spending measures designed to achieve a public sector balance consistent with the objective for national saving.

Whether tax policy measures could be used to stimulate private saving to a significant extent depends in part on the responsiveness of private consumption and saving to changes in real after-tax interest rates--long a matter of debate. Some empirical studies (for example, Boskin (1978)) have suggested a significant positive effect of real after-tax interest rates on household saving while others (for example, Friend and Hasbrouck (1983)) find an effect close to zero. On balance, the evidence from empirical consumption studies appears to favor only a small positive interest responsiveness of household and private saving

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1/ In a similar vein, Peterson (1989) observed that, "with our pathetically small savings and investment for the future, we have already decided whose living standard should suffer: our children's."

2/ Equivalent to a zero rate of social time preference.

3/ In this approach to equity questions, social arrangements are deemed just if they would be accepted by hypothetical individuals who did not know in advance what their position in society would be, what generation they would be borne into, and so on.

(see for example Bovenberg and Evans (1989)), although the subject remains a matter of controversy. Thus the evidence from macroeconomic consumption studies suggests that tax policy can perhaps play only a limited role in boosting private saving. However, studies of the impact of structural tax changes specifically designed to encourage household saving--for example, individual retirement accounts (IRAs)--indicate that a significant proportion of IRA saving in the early 1980s was new, and did not stem from a reshuffling of portfolios. 1/ Consequently, such measures can contribute to a strategy to raise national saving. While tax policy measures thus have some role to play, it appears that if large increases in the national saving rate are called for--as will be argued subsequently--then increases in public saving are nevertheless likely to be central to the approach.

Some caveats to this view should be mentioned. If public saving can be enhanced only through increases in distortionary taxation, then the efficiency costs of such increases would need to be taken into account. However, it should be recalled that very large amounts of revenue could be raised by curbing tax preferences, which could at the same time enhance efficiency. 2/ Another concern is that if national saving were boosted by means of a significant government surplus, the political temptation to interfere in the efficient allocation of this surplus would be substantial. In this view, a large government surplus is less helpful than increased private saving because the latter should in reality reap a higher rate of return. In response to this concern, it can perhaps be argued that if the political system were sufficiently disciplined to generate a substantial surplus--a large supposition in itself--then the additional discipline required to avoid interference in the disposition of that surplus might well be forthcoming.

4. Some illustrative calculations based on the golden rule

In considering where the U.S. economy may stand relative to the benchmark provided by the modified golden rule, only the rate of time preference is not amenable to measurement. There is, however, an extensive literature on the choice of an appropriate social time preference rate to be used by governments when making decisions with intertemporal ramifications. For example, Sen (1967) notes that provision for future generations has a public good aspect, and suggests that this provides a rationale for a lower social time preference rate than that evident in private behavior. Arrow and Lind (1970) argue that to the extent that private time preference rates represent risk premia, they should not be incorporated into public decisions, as the public sector may be able to pool risks more effectively. A related argument suggests that to the extent that private time preference rates represent an allowance for individual mortality probabilities, they should not be incorporated into government intertemporal decisions. In sum, there is a case to be made

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1/ Venti and Wise (1986 and 1988) and Feenberg and Skinner (1989).
2/ See Ebrill (1989a).

that the social rate of time preference used by the public sector in intertemporal calculations should be less than private sector time preference rates and could even be close to zero.

If a particular social time preference rate is taken for purposes of illustration, then some implications can quickly be sketched, again using the modified golden rule as a benchmark. 1/ According to some calculations, the rates of population growth and technological progress for the U.S. sum to about 3 percent per annum. 2/ Combined with an assumed social time preference rate of 1 percent, this would imply that, on an optimal balanced-growth path, the real net rate of return to capital should be close to 4 percent. If the technology of production is Cobb-Douglas, and a labor share of about .7, and a depreciation rate of 5 percent are both assumed, then the optimal capital-output ratio is about 3.3. Given this capital-output ratio, the implied gross saving rate that is required is about 26 percent of gross output while the corresponding net saving rate would be about 12 percent of net output. 3/

If the assumed rate of technological progress were 1 percent instead of 2 percent, and other assumptions as before, the modified golden rule capital-output ratio would be 3.75 and the associated net saving rate 9 1/4 percent. The results from other parameter combinations are presented in the tabulation below. The optimal saving rate is an increasing function of the rate of technological progress and a decreasing function of the assumed rate of social time preference. Using a framework similar to that employed here, Boskin (1986) addressed the issue of the optimal national saving rate for the United States and found a range clustering from 11 percent to 14 percent. He concluded that the U.S. national saving rate in the 1980s has been well below the desirable range, by this criterion.

1/ A helpful exposition along related lines can be found in Johnson (1981).

2/ The rate of population growth has averaged in the neighborhood of 1 percent in recent years. The rate of multifactor productivity growth in the nonfarm business sector averaged about 2 percent annually in the 1950s and 1960s, but only 1 percent over the period 1950-87. For the present exercise the rate of multifactor productivity growth in the nonfarm business sector is taken as representative of the rate of technical progress for the economy as a whole.

3/ The algebra and the assumptions are laid out formally in an attachment.

Optimal Net National Saving Rates Under Alternative Parameter Values 1/

Labor Share 2/	Rate of Technical Progress 2/	Rate of Social Time Preference 2/				
		0	1	2	3	4
		(In percent of net national product)				
70	0.5	9.0	7.5	6.4	5.6	5.0
	1.0	10.9	9.2	8.0	7.1	6.3
	2.0	13.8	12.0	10.6	9.5	8.6
75	0.5	7.1	6.0	5.2	4.5	4.1
	1.0	8.7	7.4	6.5	5.7	5.1
	2.0	11.1	9.7	8.6	7.7	7.0

The calculations just laid out are of course only illustrative. However, the parameters were chosen to be broadly consistent with the stylized facts of the U.S. economy, and further sensitivity tests indicated that the broad thrust of the results was robust. For example, a higher assumed depreciation rate (reflecting the shift to shorter lived capital goods) would lower the optimal net national saving rate, but not by so much as to alter the qualitative direction of the results. 3/ It is noteworthy that the current U.S. net national saving rate--2 percent to 3 percent of NNP--is below the entire range presented, even with an assumed social rate of time preference of 4 percent a year. If the appropriate social rate of time preference is lower--perhaps zero--and a modified golden rule provides an approximate benchmark, then the results indicate that a sustained increase in the U.S. net national saving rate from its current level of 2 to 3 percent of net national product could

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1/ The calculations assume a depreciation rate of 5 percent annually, and labor force growth of 1 percent annually. The algebra is presented in the attachment.

2/ In percent.

3/ In the case highlighted in the text, with a 70 percent labor share, 2 percent technical progress, 1 percent labor force growth, a 1 percent rate of social time preference, and a 5 percent depreciation rate, the optimal net national saving rate was 12 percent. With other assumptions unchanged and a 10 percent depreciation rate--well above a reasonable range--the optimal net national saving rate would be 8 1/4 percent. Over the period 1950-88, the depreciation rate on the gross business sector capital stock average 4.9 percent using national accounts data; from 1980-87 it averaged 5.4 percent.

substantially improve living standards for future generations, and possibly for the current generation after a transition period. 1/

There are several respects in which the framework presented above may be overly simplified. For example, technological progress is taken to be exogenous and constant. If instead, technological progress is positively related to the processes of saving, investment, and production then increasing the saving rate would yield an additional potentially large benefit not captured here. There is a growing literature in which the rate of technical progress is treated as endogenous, and potentially susceptible to influence by economic policy. In these models, shifts in saving or investment can contribute to sustained shifts in the rate of output growth, so that (as noted) increasing the saving rate has a more powerful effect on future living standards. 2/

A second limitation to the analysis is the assumption of a closed economy. However, such an assumption may not be too large a limitation given the apparent robustness of the Feldstein/Horioka result that domestic saving appears to constrain domestic investment in industrial countries. 3/ If open economy considerations were incorporated, then additional saving could be invested either domestically or abroad, depending on relative rates of return. As a result, the pace at which the rate of return would be driven down by extra saving would be more gradual than in the closed economy case, and the optimal U.S. saving rate might be higher still. 4/

To conclude this section, the simple algebra of the golden rule together with an assumed social time preference rate of zero implies an optimal net national saving rate in the United States of close to 10 percent. If such an objective were to be achieved entirely by increased public sector saving and if Ricardian effects were absent, then federal government saving would need over time to shift from a deficit of 3 percent of net national product to a surplus in the order of 3 percent of NNP or more. 5/ To the extent that tax policy measures

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1/ Whether living standards would be enhanced for the current generation by a shift to a higher national saving rate depends on the magnitude of the sacrifice to current consumption and the sacrifice time--the length of time over which current consumption is lower than it would have been under the initial saving rate. A recent paper suggests that the sacrifice time may be as low as half a decade. See Lewis and Seidman (1988).

2/ See for example Lucas (1988), Romer (1986 and 1987).

3/ Feldstein and Horioka (1980). A recent paper suggests that this constraint has remained important in the 1980s, albeit somewhat less than before. See Frankel (1989).

4/ Given that the United States is not a small economy, the rate of return would still be influenced by changes in U.S. saving behavior.

5/ Assuming that the net private saving rate remained close to 5 percent of NNP, and that the state and local surplus was close to 1 percent of NNP.

could boost private saving, the required fiscal adjustment would be smaller.

While the precise magnitude of the needed shift of course depends on the other assumptions, it nevertheless appears that most calculations based on welfare-theoretic grounds of this kind would be likely to conclude that the U.S. national saving rate is well below a desirable level and consequently that a substantial federal budget surplus could be an appropriate medium-term objective for U.S. federal policy.

VI. An Alternative Approach to Medium-Term Fiscal Targets

This section presents an alternative approach to the quantification of medium-term objectives for U.S. federal fiscal policy. The framework is based on assessment of current savings and growth performance relative to historical averages. Unlike the discussions in section V, there is no optimality criterion underlying the analysis. 1/ Rather, the approach aims to find the national saving rate--and the associated federal fiscal position--needed to support the path for the capital stock that is judged to be consistent with a target growth rate of output.

In order to develop the framework, some simple equations need to be presented. First, the net national saving rate may be viewed in terms of the uses of saving from a flow of funds vantage point.

$$\frac{NS}{NY} = \frac{IF}{NY} + \frac{IV}{NY} - \frac{NFI}{NY} \qquad (1)$$

where:

NS = net national saving

IF = net fixed investment

IV = inventory investment

NFI = net foreign investment 2/

NY = net national product

and all variables are in nominal terms.

1/ The framework employed is similar to that employed in a recent paper by Schultze (1988). A related methodology was employed in earlier unpublished IMF staff analysis.

2/ If NFI is positive, there is an inflow of foreign saving into the United States.

The identity (1) states that net national saving plus any inflow of foreign saving equals domestic investment (fixed plus inventories). At the same time, the share of net fixed investment equals the product of the growth in the net capital stock, the capital-output-ratio, and the relative price of capital goods. That is,

$$\frac{IF}{NY} = (\dot{K}).(K/Y).(P_k/P_y) \qquad (2)$$

where:

$\dot{K}$ = growth of the real net capital stock

K = level of the net capital stock

Y = real net national product

P_k = deflator for net fixed investment

P_y = deflator for net national product

A third useful identity is that the growth in the capital stock is the sum of growth in employment and growth in the amount of capital per worker. That is,

$$\dot{K} = \dot{E} + (\dot{K/E}) \qquad (3)$$

where:

E = total employment, with other notation as before.

The fourth equation in the system is a production function, assumed to be of Cobb-Douglas form.

$$Y = A.\ K^{\alpha}\ L^{1-\alpha} \qquad (4)$$

From the production function, one can derive that the rate of growth of productive potential equals the sum of multifactor productivity growth plus the growth of the labor force weighted by its share of output $(1-\alpha)$ and the growth rate of capital weighted by its share (α). That is:

$$\dot{Y} = \dot{A} + (1 - \alpha)\ \dot{L} + \alpha\ \dot{K} \qquad (5)$$

Given these equations and some other assumptions, it is possible to solve for the path of the capital stock, net investment, and net national savings over a projection period. The important assumptions relate to the following variables:

- projected growth of employment
- the behavior of total factor productivity
- the behavior of the relative price of investment and output
- the share of inventory investment
- the behavior of net foreign saving (the current account balance)
- the growth of output with which the projections are to be made consistent.

A broad consensus exists that labor force growth in the period ahead is likely to be in the neighborhood of 1 1/4 percent. 1/ If, as is generally believed, the U.S. economy is currently close to full capacity, employment should grow at a similar rate to the labor force. Because the appropriate assumption regarding total factor productivity is a subject of much more controversy, 2/ in the experiments reported a range of alternative assumptions was employed.

The appropriate assumption concerning the relative price of investment to output is also problematic, as this price has declined in the 1980s, reflecting the drop in the price of high technology equipment. 3/ The deflator for net fixed investment relative to NNP dropped by 10 percent from 1982 to 1987, or by about 2 percent annually; a similar trend decline is assumed in the calculations to be presented here.

Inventory investment averaged 1 percent of NNP from 1959 to 1979, but only 0.5 percent from 1980-88, with the decline perhaps reflecting the introduction of improved inventory management practices. A figure of 1/2 percent of NNP is assumed in the calculations. As regards net foreign investment, any specific numerical assumption has an undoubted element of arbitrariness. In the calculations presented here, it is

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1/ In its medium-term projections (see Chapter 3 of Budget of the U.S. Government: FY 1990), the Administration assumes growth of labor input of 1 to 1 1/2 percent; the CBO appears to be using a figure of 1.2 percent in its projections (see CBO (1989)); the U.S. Department of Labor projects labor force growth of 1.2 percent annually over the rest of this century (see Saunders (1987). See the discussion in Adams and Coe (1989).

2/ The behavior of productive potential and productivity was studied in Adams and Coe (1989).

3/ See the discussion in Evans (1989).

assumed that there is no reliance on net foreign saving and that domestic investment is fully financed by domestic saving. The view underlying this assumption that it would be desirable for the U.S. current account deficit to be brought down over time is generally accepted.

In his paper, Schultze (op. cit) used a similar framework to that just presented to find the net national saving rate needed to support medium-term growth of 2 1/4 percent, in line with the projections of the Congressional Budget Office. His principal assumptions were zero reliance on foreign saving and multifactor productivity growth of 0.7 percent annually, with other assumptions similar to those outlined above. The result was a required net national saving rate of 5 percent on average which in turn would permit an average federal budget deficit equivalent to 1 1/4 percent of NNP. 1/

This framework can also be used to evaluate the medium-term projections presented by the Administration in January 1989 2/ in the context of its own target of budgetary balance over the medium term. These projections envisaged growth averaging 3 1/4 percent annually with the labor force increasing by about 1 1/4 percent. 3/ If other assumptions are taken as above, and in addition a net private saving rate of 5 1/2 percent of NNP and a state and local surplus equivalent to 1 percent of NNP are assumed, then the system can be solved for the national saving rate and the required federal budgetary balance (see tabulation below).

Assumed Multifactor Productivity Growth	National Saving Rate	Federal Budget Balance
(In percent)	(In percent of NNP)	
1.4	7.3	0.8
1.1	9.4	2.9
0.7	12.2	5.7

For growth of 3 1/4 percent annually to be achieved without reliance on foreign saving and assuming multifactor productivity growth of 1.4 percent annually--well above its average in the 1970s and 1980s--the appropriate net national saving rate would be about 7 percent of NNP,

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1/ This would be a medium-term budget target, and thus should be thought of in cyclically adjusted terms.

2/ The Administration's medium-term economic projections were revised in the mid-session review of the budget for FY 1990, released in July 1989. In that document, projected medium-term output growth was reduced to about 3 percent.

3/ The average annual growth of U.S. real GNP from 1950-88 was also 3 1/4 percent.

requiring a federal budgetary surplus of almost 1 percent of NNP. 1/ Thus, even with an extremely optimistic multifactor productivity assumption, a federal surplus would appear to be necessary to provide sufficient domestic saving to support the desired growth path from the Administration's January medium-term projections--equivalent to growth in line with the postwar average in the United States--without resort to foreign saving. A more realistic multifactor productivity assumption would be growth of 1.1 percent annually, which would imply that a net national saving rate of 9 1/2 percent of NNP and a federal surplus of almost 3 percent of NNP would be required. A pessimistic multifactor productivity growth assumption--0.7 percent annually--would suggest the need for net national saving equivalent to 12 percent of NNP and a federal surplus of almost 6 percent of NNP.

If the various other assumptions are held unchanged and the target output growth rate is set at 3 percent per annum--in line with the revised medium-term projections presented in the mid-session budget review in July 1989--then the implied net national savings rates and federal budget balance decline somewhat. Multifactor productivity growth of 1.1 percent annually would indicate the need for a federal budget surplus averaging 2 percent of NNP, while a more pessimistic productivity assumption (0.7 percent annually) would suggest that a federal surplus of 4 1/2 percent of NNP could be required to support output growth at an average annual rate of 3 percent.

To conclude this section, the approach developed provides a way of calculating the national saving rate and federal budgetary balance consistent with a target growth rate of output over the medium term, given a host of other assumptions. If output growth of 3 1/4 percent annually is viewed as desirable--as in the Administration's January 1989 medium-term projections and in line with the U.S. postwar average--then even a very optimistic assumption regarding multifactor productivity growth would indicate the need for a small federal surplus as the medium-term fiscal objective. If multifactor productivity growth is assumed to rebound somewhat from its performance in the 1970s and 1980s, but to remain below the levels of the 1950s and 1960s, then a federal budgetary surplus of significant proportions--3 percent of NNP--would seem to be needed to support output growth of 3 1/4 percent annually, without reliance on foreign saving. A more pessimistic assumption on multifactor productivity growth would imply the need for an even higher federal budgetary surplus. If the target output growth were reduced to 3 percent, then the calculations indicate that a significant federal budget surplus would still be needed. The calculations of course assume, among other things, an unchanged private saving rate. To the extent that tax policy changes could boost private saving, the required fiscal adjustment--though still substantial--would be smaller.

1/ As noted earlier, multifactor productivity growth in the U.S. nonfarm business sector averaged about 2 percent annually in the 1950s and 1960s, but only about 1 percent annually from 1950-87.

VII. Conclusion

The U.S. national saving rate has dropped markedly in the 1980s reflecting declines in both the public and private components. Many of the factors that may be behind the decline in the private saving rate appear difficult to reverse in a major way through public policy. While carefully selected tax policies could play some role in boosting private saving, the magnitude of their likely contribution may be limited. An alternative strategy would be for the federal government to aim for the achievement of budgetary surpluses to offset reduced private saving. Such an approach would be justified by the fact that some part of the decline in private saving may reflect unintended consequences of public sector interventions into private market decisions--such as the provision of social security and various aspects of tax policy--and more fundamentally because private sector decisions may not adequately take account of the interests of future generations.

Two alternative frameworks aimed at quantifying medium-term objectives for the federal fiscal balance were then developed. The first was based on an explicit optimality criterion--namely finding the neoclassical steady state path on which per capita consumption was maximized. Illustrative calculations indicated that the current U.S. national saving rate appeared to be well below the optimal level by this criterion and suggested that a net national saving rate of close to 10 percent of NNP might be called for. The associated target for the federal fiscal balance might be in the neighborhood of a 3 percent of NNP surplus.

The second approach calculated the net national saving rate consistent with a target output growth rate, assuming no reliance on foreign saving (and a host of other assumptions). A key parameter in this framework is that related to multifactor productivity growth; one way to proceed is to assume that the latter rebounds in the projection period above its performance in the 1970s and 1980s, while remaining below the rapid growth rates of the 1950s and 1960s. On this basis, output growth of 3 1/4 percent annually--in line with average growth from 1950-88--without reliance on foreign saving would require a net national saving rate of almost 10 percent of NNP and a federal budgetary surplus of close to 3 percent of NNP. If the target growth rate for output is reduced to 3 percent, then a federal surplus equivalent to 2 percent of NNP would still be indicated.

Thus two alternative frameworks of calculation yield the result that a net national saving rate equivalent to 10 percent of NNP and a federal budgetary surplus in the neighborhood of 3 percent of NNP may provide appropriate medium-term objectives. The precise numerical results of course depend on the specific frameworks presented and the assumptions that are made. In particular, if tax policy measures could boost private saving, the needed fiscal adjustment would be correspondingly reduced, though it would remain very substantive. In sum, a strong case exists for a large federal budget surplus to be an objective of U.S. fiscal policy.

Appendix

Modified Golden Rule Calculations

1. The simple heuristics of the golden rule 1/

Assume a one-sector closed economy in a steady state growth path, with a population growth rate of "n" and an exogenous technological progress rate of "g". The steady state growth rate of the system is "n + g." The net rate of return on capital is "r". Compare this steady state to one with slightly more capital. The gain in output is given by r ΔK compared with the previous steady state. However, in this second steady state additional output must be devoted to investment to keep the (larger) capital stock growing at the steady state growth rate. The additional investment requirement is given by $(n + g)\Delta K$.

If in the initial steady state, "r" exceeds "n + g" then a shift to a more capital intensive steady state raises consumption possibilities since the output gain exceeds what needs to be reinvested. If in the initial steady state "r" is less than "n + g", then additional investment yields an output gain that is less than the amount needed for reinvestment and consumption possibilities are lowered. However, in this situation, a shift to a less capital-intensive steady state releases resources for consumption equal to "n + g" which exceed the output loss from lower capital intensity, of r ΔK. Consequently, the steady state path on which consumption possibilities (defined as per capita consumption with no allowance for time preference) is that on which the net rate of return on capital equals the sum of the growth rates of population and technological progress. That is,

$$r = n + g. \tag{1}$$

When a pure time preference rate of p is incorporated into the structure, the steady state growth path along which consumption possibilities are maximized (adjusted for time preference) satisfies a modified golden rule condition, namely that

$$r - p = n + g. \tag{2}$$

2. Some simple algebra behind the calculations in the text

The economy is assumed to be one-sector, closed, and characterized by a Cobb-Douglas production function.

1/ A similar exposition is provided in Solow (op. cit.)

$$Y = AK^{\alpha}L^{1-\alpha} \tag{3}$$

where

Y is gross output

K is the gross capital stock

L is the labor force.

Then the marginal product of capital is given by

$$R = \alpha\ Y/K \tag{4}$$

and equals the sum of the net rate of return on capital "r" and the rate of depreciation "d". That is,

$$r + d = \alpha\ Y/K \tag{5}$$

From equation (2), at the modified golden rule position, "r" is given by the sum of g, p, and n. Consequently, the capital output ratio consistent with the modified golden rule is

$$K/Y = \alpha/\ (d + p + g + n). \tag{6}$$

Now since the increase in capital equals gross saving less depreciation, we can say

$$\Delta K = S - dK \tag{7}$$

which on rearrangement leads to

$$S/Y = \left(\frac{\Delta K}{K} + d\right) \frac{K}{Y} \tag{8}$$

In the steady state, capital grows by "n + g", and thus

$$S/Y = (n + g + d)\ \frac{K}{Y} \tag{9}$$

Equations (6) and (9) permit the gross saving rate in a modified golden rule path to be calculated. The net saving rate is given by the identity.

$$\frac{NS}{NY} = \frac{S - dK}{Y - dK} \tag{10}$$

where NS is net saving and NY is net output.

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