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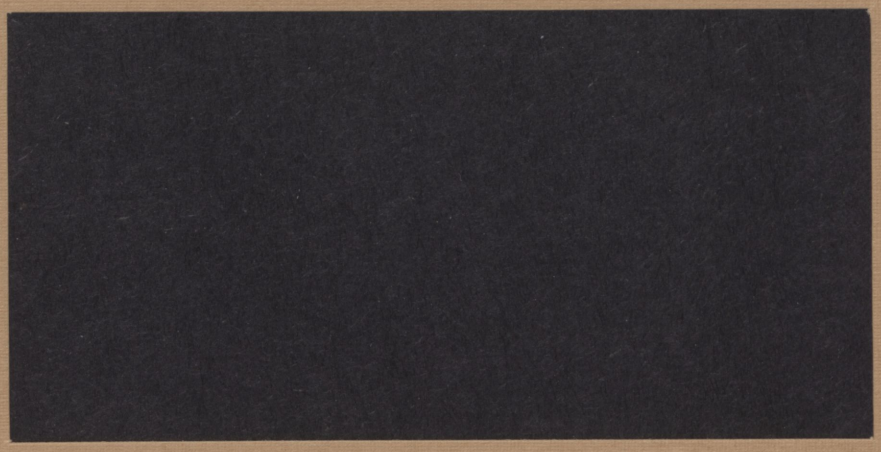

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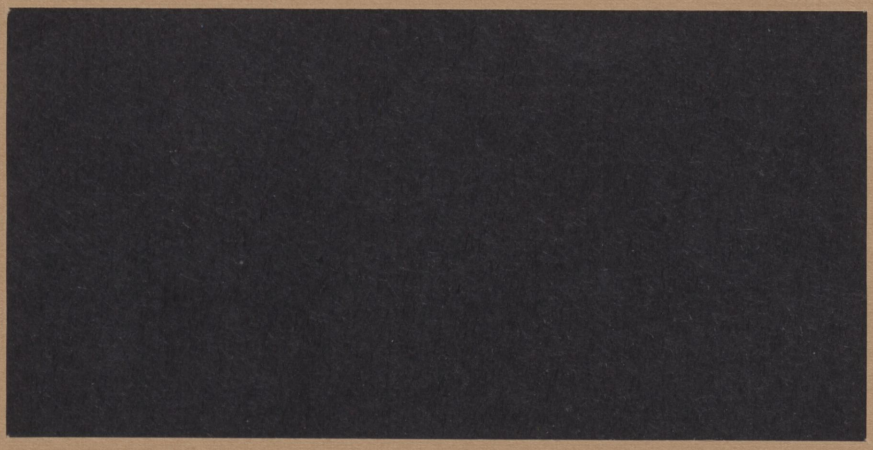

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CONCEPTS AND MEASURES OF FEDERAL DEFICITS AND DEBT AND THEIR IMPACT ON ECONOMIC ACTIVITY

by

Michael J. Boskin
Department of Economics
Stanford University
and
National Bureau of Economic Research

This paper draws heavily on the material developed for my project on more comprehensive and comprehensible federal government financial statements. I am grateful to John M. Roberts and Brad Barham for their valuable research assistance, and to participants at the International Economic Association Conference on the Economics of Public Debt, June 24-26, 1986, for valuable comments and suggestions, and to the Center for Economic Policy Research for support.

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ABSTRACT

This paper introduces extensions of the National Income Accounts to include a consistent treatment of consumer durables and government capital in the measurement of consumption and income, and explicitly tests alternative propositions concerning the effects of government financial policy on real economic activity.

The paper discusses adjustments to various measures of the budget deficit, national debt, or government "net worth". These include separating government tangible investment from consumption, accounting for government financial assets, inflation adjustments, etc.

The most important results estimate consumption functions in which government consumption is subtracted from income. I take this to be more in the spirit of the Ricardian equivalence hypothesis, asking: Given the level of government consumption, would a shift from tax to debt finance alter consumption? The various measures of the deficit produce virtually identical results in their impact on consumption: a tax cut holding government consumption constant, unambiguously increases consumption substantially, about 40 cents on the dollar.

Estimating separate coefficients on private wealth, net of government bonds and on private holdings of government bonds, yields a coefficient on government bonds virtually identical to that of regular private wealth, rather than zero as would be the case under Ricardian equivalence. The estimates of the net impact of Social Security wealth are consistent with recent research suggesting that the propensity to consume out of Social Security wealth is about half that of regular private wealth. The estimated impact of changes in net government explicit assets -- the value of government tangible capital over and above regular debt -- again is quite similar to the propensity to consume out of private wealth. This would suggest that government tangible assets substitute for private saving.

Reduced form estimates are presented on the impact of federal deficits on the composition of GNP. Various specifications lead to the conclusion that a $1 increase in the deficit, controlling for the level of economic activity, appear to be associated with about a 30 cent increase in private saving, about a 35 cent decrease in domestic investment and about a 25 cent decrease in net foreign investment.

Thus, the results reported in the paper, using alternative concepts and measures of deficits and debt tend to confirm the proposition that government deficits affect real economic activity.

1. Introduction

The relationship between budget deficits or public debt and real economic activity has sparked a tremendous debate. For example, various strands of thought argue that deficits are 1) inflationary, 2) expansionary, 3) alter the composition of output away from investment and net exports, or 4) do not matter. The mechanisms by which these effects occur are also widely debated.

The purpose of this paper is two-fold. First, drawing on a major research project that I have been engaged in for the last few years, on a more comprehensive and comprehensible set of accounts for the federal government of the United States, I wish to highlight movements in various components of spending, deficits, and debt, including items which are excluded in the traditional figures. I will also discuss how various major excluded items may affect real economic activity, evaluating the evidence (where it exists), and discussing the avenues by which real activity may be affected. In fact, it is likely that examining deficits or debt, as traditionally measured,[1] can be quite misleading, whether or not one views the private sector as seeing through "the government veil".

Second, we will present some new evidence on the likely impact of deficits and debt, and alternative measures of them, on real economic activity, primarily consumption and the composition of output.

Toward this end, Section 2 will present a cursory review of the

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1. An exciting recent development is the attempt by various government agencies to provide more comprehensive data than that traditionally used.

discussion of the economic effects of deficits and debt. It is not meant to be exhaustive, but merely illustrative of the theoretical and empirical research in recent years on the subject. We find Barro's Ricardian equivalence conjecture, while an important caveat to the traditional treatment, to rest on several assumptions which are likely to be violated in the real world, e.g., non-distortionary taxation and equal rates of discount in the private and public sectors. Further, a recent careful test by Boskin and Kotlikoff (1985) strongly rejects an implication of the debt neutrality hypothesis, namely that the age distribution of resources does not affect aggregate consumption.

However, most studies (with a few important exceptions) focus on officially reported nominal budget deficits. These would closely resemble the difference between real accrued government spending and real accrued government revenue only by accident. Various adjustments, ranging from correction for the endogeneity of income and the inflation erosion of the real value of the previously issued national debt, to inclusion of a substantial number of excluded items in the official accounts, to distinguishing between government investment and government consumption, are likely to lead to major problems in interpretating the effects of deficits. For example, Japan has had substantial budget deficits as a fraction of GNP for the last few years, but the fact is that the Japanese government is really a large net saver, i.e., government consumption in Japan is substantially less than revenues because the Japanese government is a large net investor. Thus, the conceptual experiments one has in mind in discussing the likely effects of deficits or debt on the level or composition of real economic activity must be carefully specified. Further, we have virtually no evidence on whether changes in the various components which comprise a sensibly measured deficit symmetrically affect consumption,

investment or net exports.

Section 3 discusses the major adjustments that one might make. We remain agnostic as to whether there is a "correct" budget deficit, or a "correct" national debt, or a "correct government net worth". The nature of the budget deficit, debt or net worth measure one wishes to use depends heavily upon the types of questions that one may wish to ask, one's view of the nature of the economy under study, and on empirical information concerning the likely differential impacts of various components in a fully adjusted deficit or debt or net worth figure. This section highlights the difference between government consumption and investment, and therefore, the relationship between deficits and government saving or dissaving. High employment or income endogeneity adjusted measures of the deficit (as stressed by De Leeuw and Holloway (1983)), inflation adjustment (as stressed so forcefully by Eisner and Pieper (1984) and Miller (1982)), Social Security unfunded liabilities (as stressed by Feldstein (1974) and others), government lending and guarantees (stressed by Boskin, Barham, Cone and Ozler (1987)), land and mineral rights (as developed by Boskin, Robinson, O'Reilly and Kumar (1985)), federal, and state and local, government investment in tangible capital (stressed by Boskin, Robinson, and Roberts (1985, and Boskin, Robinson and Huber (1987) and Eisner and Pieper (1984)), are also discussed. The vastly different measures of deficits, debt, and the debt/GNP ratio or deficit/GNP ratio, often changing signs as well as varying amounts, under alternative concepts are discussed. Specific examples are presented from the United States.

Section 4 presents some preliminary empirical results on the effects of deficits, debt, and their components on real economic activity. We conclude that government financial policy may well affect real economic activity in

various ways.

Finally, we conclude the discussion with an agenda for future research.

2. A Cursory Literature Review

A. Measurement and Analysis of Deficits and the National Debt

Before discussing the potential economic effects of deficits and the national debt, it is important to realize that measuring, let alone forecasting, deficits and debt in the U.S. is not an easy task. For example, large numbers of items are excluded by law from the federal budget, various other federal government accounting procedures are not consistent with the general notion of accrual accounting, separate capital and current services accounting, and adjusting from par to market valuations.[2] Thus, for example, when we had a large defense build-down under President Carter, it was partially disguised by the fact that new investment in military hardware was falling short of the depreciation and obsolescence of the exisiting capital stock. Or, note that in 1980 the $59 billion nominal federal government deficit was offset by a still larger decline in the inflation-adjusted value of the previously issued national debt held by the public! Further, it is often the case that the combined state and local government sector of the United States runs a substantial surplus. We discuss some recent attempts to measure these effects in Section 3.

Further, deficits do not measure government dissaving. Goverment saving, S_g, is the difference between tax (or other) revenue, T, and

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2. See Michael J. Boskin, "Federal Government Deficits: Some Myths and Realities," American Economic Review, May 1982, and his forthcoming The Real Federal Budget, Harvard University Press.

government consumption, C_g. Thus,

(1) $S_g = T - C_g$.

If government consumption (including consumption of government fixed capital and durables) falls short of total government spending by a sufficient amount, government saving could be positive despite a deficit, e.g., there could be substantial net government investment.

Indeed, in the world's second largest economy, Japan, which is also the largest supplier of capital to the world capital market, the government sector has been a large net saver despite large deficits for many years. Table 1 presents national saving, private saving, government saving, investment and deficits for the U.S. and Japan annually for 1970-84. These data are adjusted to include purchases of consumer durables and government capital as saving and the rental flow from these items as consumption and income. Even the U.S. occasionally has had a substantial level of government saving despite a large combined federal and state and local government deficit. What should we make of this? Clearly, the economic impact of the current deficit depends heavily upon the nature of the substitutability or complementarity of private and public consumption and investment. Without a full specification of these factors, the impact of the deficit may range from increasing to decreasing private consumption,

saving or investment.[3]

A Simple Analysis

Ultimately, at full employment, large deficits, net of the interest component (the so-called primary deficit) run continuously for a very long period must be inflationary. To see this, the following equations indicate where the ratio of privately held national debt is headed given large deficits as a share of GNP (net of the interest component) and real interest rate and growth rate scenarios.

Let D represent the debt/GNP ratio, d the deficit (net of interest)/GNP ratio, r the real interest rate, g growth of real GNP. Then, by definition

$$\dot{D}_t = d_t + (r_t - g_t)dt, \tag{2}$$

for a fiscal program with constant d, and constant r and g, D will evolve toward an equilibrium D_e (if $g > r$) of

$$D_e = \frac{d}{g - r}. \tag{3}$$

The ratio of the federal government debt to GNP evolves through time depending upon this primary deficit and the relation between the real rate of interest and the growth rate. For example, if we start out with a positive national debt, and the real interest paid on the national debt

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3. These issues are recognized by researchers with mutually exclusive views on the impact of deficits and debt. See Barro (1985) and Feldstein (1982), as important examples.

exceeds the growth rate, then the interest payments will grow more rapidly than the GNP, and if nothing else has changed, eventually the interest payments will consume all of the budget, then all of GNP, then all of national wealth in an explosive pattern. In the more usual case of the growth rate exceeding the rate of interest the ratio of debt to GNP will evolve according to the equation above.

Table 2 presents some estimates of two recent major fiscal episodes in the United States. First, we see the substantial increase in the equilibrium debt/GNP ratio toward which we were headed if fiscal policy had not been changed, in the 1975-79 period, a period generally regarded as the beginning of the increase of the ratio of debt to GNP after the substantial postwar decline in this ratio. The second, and more important for our purposes, is where we were headed in the early Reagan Administration years. We can see that under the 1983-4 projections, the ratio of debt to GNP was heading toward an equilibrium which is many times, not only current GNP, but the ratio of the entire value of the capital stock of the United States to GNP. This latter number is around 3, so it is clear that either the private sector would have to increase its wealth/income ratio by an enormous increase in saving, or the rest of the world will have to buy up Treasury bills, or if neither of these alternatives is available and current fiscal policies persist for the indefinite future, the Federal Reserve will have to buy up the bonds as the lender of last resort, thereby eventually inflating the economy. Can we reasonably expect foreigners to continue to finance our deficits ad infinitum? It would be imprudent to operate on the assumption that this was possible, let alone desirable. Eventually, foreign firms and individuals will have a progressively higher fraction of their wealth in dollar-denominated assets, which will mean that further increases in dollar-

denominated assets will be even riskier for them. Thus, we can expect the flow of foreign capital into the United States, ceteris paribus, to slow down and real interest rates to rise. Nor is such a huge increase in our saving rate as to increase the capital/output ratio by such a large amount likely. In short, the recent fiscal policy was eventually either inflationary or unsustainable. Fortunately, in the last two budget cycles, substantial reductions have occurred in (primarily military) spending growth, and it is likely that the danger of an explosion in the debt/GNP ratio is over.[4]

Deficits or government debt may affect the real economy at less pernicious levels than just mentioned. While virtually all economists agree that an increase in government spending -- at least if it is unanticipated -- may affect real output and its composition,[5] the effects of a tax cut given government spending are more controversial. Certainly, the dampening effects of monetary feedbacks through higher real interest rates, reduced real money balances and changes in portfolio composition and also currency appreciation and net exports are by now well recognized (see Feldstein (1982, 1986), for example). However, recently, several economists have revived the notion that debt and taxes are equivalent and that government deficits therefore have no effect in aggregate demand. The argument is by now so well known that I will merely summarize it here. Each extra dollar of national debt must eventually be repaid or serviced by interest payments

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4. This simple analysis is in the spirit of the more detailed models presented in Buiter (1983) and Sargent and Wallace (1981).

5. See Barro (1981) and Brunner (1985). Barro focuses on temporary increases in government spending above trend or permanent levels, increasing interest rates and signalling the private sector to consume less and produce more.

with a present value of a dollar. Thus, there is no change in the present value of tax liabilities and private net wealth, so real decisions are unaffected.

Public debt policy, or intergenerational transfers towards older generations, can be and has been conducted in quite subtle ways. The unfunded financing of the U.S. Social Security System is by now a well understood, if nonetheless quite subtle, debt policy (Feldstein (1974)). Less well understood debt policies are changes in the tax structure that shift the burden of taxation from older to younger age groups (Summers (1981), Auerbach and Kotlikoff (1983a)) and changes in tax provisions that raise market values of financial assets and, thereby, transfer resources to older age groups who are the primary owners of such assets (Summers (1987)). An example of the former type of policy is switching from income taxation to wage taxation. An example of the latter policy is reducing investment incentives (Auerbach and Kotlikoff (1983b)). Since investment incentives in the U.S. are effectively provided only to new investment, old capital, capital that has been fully or partially written off, sells at a discount reflecting the differential tax treatment. A reduction in investment incentives means a smaller discount and a capital gain to owners of old capital. Younger and future generations are worse off as a result of such policies because they must now pay higher prices to acquire claims to the economy's capital stock.

In addition to these more subtle mechanisms of transferring to older generations, governments can engage in debt policies by reducing taxes levied on current generations and raising taxes levied on future generations. Intergenerational redistribution of this variety may eventuate in larger officially reported deficits. An example in which even this more

obvious form of redistribution does not necessarily alter official calculations is when such tax cuts and tax increases are coincident, respectively, with equivalent reductions and increases in the level of government consumption.

The fact that very significant intergenerational redistribution can be run without its ever showing up on government books suggest that officially reported deficits are at best a very poor indicator of underlying public debt policies.[6] This proposition notwithstanding, there has been an enormous public interest, especially in recent years, in officially reported deficits. Curiously, public attention has focused only on a subset of official liabilities of the federal government and has essentially ignored both the official assets of the federal government and the the official assets and liabilities of state and local governments. As discussed by Boskin (1982, 1987), Boskin, Robinson and Huber (1987), Eisner and Pieper (1984), and the 1982 Economic Report of the President, the market value of the U.S. federal government's official assets may currently equal if not exceed the market value of its official liabilities.

In light of the very significant if not overwhelming difficulties of gauging the extent of true debt policies from official reports, it seems safer to assess debt policy by asking the following question: were the

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6. Boskin (1982), and Boskin and Kotlikoff (1985) provide extensive discussions of the failure of officially recorded debt to measure underlying redistribution to older generations. One might argue that zero intergenerational transfers is an objective benchmark. There are at least two problems with such a benchmark. First, distinguishing negative intergenerational transfers from taxes required to finance government consumption is inherently somewhat arbitrary. Second, past intergenerational transfers imply (require) offsetting current or future intergeneration transfers. Hence, taking zero intergenerational transfers as the benchmark requires considering a world in which intergenerational transfers in the past had always been zero.

lifetime budget constraints of older generations expanded significantly as a consequence of government policy at the expense of contracted budget constraints for young and future generations? One might point, in this context, to the enormous expansion of the social security system which greatly increased the budget opportunities of the elderly. The problem, however, with considering any one component of government policy is that it may have been instituted to offset some other component; i.e., the postwar redistribution through social security to the elderly may simply represent the government's way of compensating the elderly for higher income taxes over their lifetimes or for their contribution to the nation during World War II. Just as there is no single correct way to measure official deficits, there is no single correct way of posing counterfactuals about observed government transfer policies. To put this point differently, intergenerational redistribution must always be assessed relative to some benchmark, and the choice of a benchmark seems inherently subjective. The implication of this point is that any calculation of the magnitude of intergenerational transfers will be somewhat arbitrary.

It is instructive to examine the likely effects of federal government deficits on the composition of GNP by examining the actual correlation between changes in the deficit and various components of GNP.

Since the federal government deficit is just the difference between federal government spending and taxes, it must equal the sum of private saving, and the state and local surplus, less domestic investment and net foreign investment. Simply put, if the level of GNP is held constant (the deficit may affect the level of GNP but we are concerned here with its composition) increases in the deficits must crowd out something. Will they lead to increased private saving or decreased domestic investment? Less net

foreign investment (i.e., more foreign capital inflows)? A provocative, but preliminary, analysis by Summers (1986) suggests that budget deficits call forth increased private saving of about 30 cents per dollar of deficit. This results from a combination of extra saving for future tax liabilities resulting from the deficits, the sensitivity of savings to higher real interest rates caused by deficits, and/or the crowding out of consumer durable expenditures due to higher interest rates. In addition, he estimates that deficits crowd out net exports by attracting foreign capital, in this case, about 25 cents on the dollar. He also estimates about a 5 cent increase per dollar of deficit in state and local surpluses, and a 40 cents per dollar decrease in net investment. Further, of course, the net business investment must be separated from residential investment which is crowded out at about 20 cents on the dollar. These estimates are highly preliminary and subject to many statistical problems.[7]

The two leading theories of private saving behavior are the pure life cycle theory of Modigliani (see Modigiliani and Brumberg (1954) and Modigliani and Ando (1963)) and the intergenerational altruism model of Barro (1974). In the former, government debt decreases private saving and in the latter it has no effect.

Various studies have attempted to demonstrate that life cycle behavior can explain several important phenomena concerning aggregate wealth accumulation in the United States (see Tobin (1967)). More recently, there has been an attack on the pure life cycle model (no bequest, average propensity to consume over the lifetime of one) by a variety of authors.

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7. Tanzi (1985) presents evidence of the effects of U.S. fiscal deficits on interest rates which would support this effect on the composition of GNP.

For example, Kotlikoff and Summers (1981) conclude that life cycle saving can account for only about 20 percent of the aggregate wealth in the United States. Unfortunately, a mathematical error in their derivation of the formulae is part of the explanation for their result, and corrected, the numbers would be about 50 percent. This is still a telling indictment of the extreme version of the life cycle hypothesis.

There have also been a number of studies attempting to examine the extent of dissaving after retirement. For example, Michael Darby (1979) demonstrated, using longitudinal household data, that there was surprisingly little dissaving post-retirement, and concluded these results were incompatible with the pure life cycle hypothesis. Mirer (1979), David and Menchik (1980), and King and Dicks-Mireaux (1982) also find either no dissaving or too little dissaving after retirement to be consistent with the pure life cycle model.

In recent work, Bernheim (1984) and Diamond and Hausman (1984), using panel data, do observe dissaving after retirement. In an important study just completed, Hurd (1986) makes several methodological and data improvments (e.g., a ten-year longitudinal panel study rather than a cross-section or shorter panel), and his conclusion is that the dissaving pattern of the elderly is quite consistent with the pure life-cycle model. Further, tests for a bequest motive show no evidence of one.

Rejection of the pure form of the life cycle model should not be taken to mean that there is no consumption smoothing over the life cycle, or that the propensity to consume is independent of age. It is the rejection of the assumption that the average propensity to consume over the lifetime is one, and that there is no bequest motive (even accounting for the fact that an uncertain date of death may require very slow dissaving in the absence of

actuarially fair annuities).

A variety of studies presume the pure form of the life cycle theory in analyses of public policy. We shall comment on several below, but it is important to point out that one of the major conclusions from the pure life cycle model is that public debt -- explicit or implicit -- crowds out private saving, and ultimately, therefore, capital formation. In an alternative model proposed by Barro (1974), extending work of Bailey (1961), and dating all the way back to Ricardo, a Say's law of public finance is developed in which increases in the supply of public debt call forth an increased demand for it.[8] The argument is simply that in a world where there are intergenerational altruism and operative bequest motives -- as well as many other assumptions such as lump sum finance, etc. -- the private sector can undo the government's attempt to redistribute resources across generations. The assumptions for this result to hold are quite restrictive.[9] The two least resonable assumptions required for the results to hold are non-distortionary taxation and equal discounting of public and private decision makers. The latter stems from the linking of all generations due to children's utility appearing as an argument in the parent's utility function. Thus, private decision makers act as if they are an infinitely lived dynasty, ignoring the mortality probabilities which would normally be added to subjective discount rates.

Many studies have tried to analyse the effect of some measure of deficits or public debt on consumption (e.g., Koremendi (1983), Feldstein

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8. Also see Kochin (1974) and Tanner (1979).

9. An excellent discussion of these points may be found in the paper by J. Stiglitz in this volume.

(1982), Barth, et.al., (1984) and the studies cited therein) or of unfunded liabilities in Social Security on the consumption/saving choice (see Feldstein (1974), Barro (1978), Feldstein and Pellechio (1979) among many). The conclusions are somewhat mixed. I believe that an accurate summary of the econometric literature is that Feldstein's original dollar for dollar estimate of the substitution of unfunded Social Security liabilities or public debt for private saving has been revised to 25 to 50 cents on the dollar and that the statistical evidence concerning the effects of deficits is mixed, but on balance suggests that (correctly measured) deficits do matter.

Since concepts such as deficits, public debt and unfunded Social Security liabilities are subject to vagaries of accounting procedures, more direct tests of the intergenerational altruism model are possible. To see this, note that in the intergenerational altruism model aggregate consumption depends only on aggregate resources, not on their age distribution. This forms the basis for the test developed by Boskin and Kotlikoff (1985). We develop a finite approximation to the intergenerational optimization problem for Barro-type behavior under earnings and rate of return uncertainty, and demographic change, for the U.S. economy, and test whether, given the level of consumption predicted by this model, variables measuring the age distribution of resources influence actual consumption. Data on the age distribution of resources is obtained from the annual Current Population Surveys. The results, presented in a variety of forms using various measures of the age distribution of resources, reject the hypothesis that aggregate consumption is independent of the age distribution of resources. They therefore cast considerable doubt on the pure intergenerational altruism model and on the contention that government debt policy -- explicit or implicit -- does not affect the

consumption/saving choice.

Thus, neither the pure life cycle model nor the pure intergenerational altruism model seems sufficient to explain aggregate saving behavior or the effects of policy on saving. Undoubtedly, different people in the economy could be described in their saving behavior by different models, including a Keynesian liquidity constraint consumption/saving model, and the convex combination that results in aggregate saving is some complicated combination of these models.

I do believe that it is important to realize, however, that there are substantial differences in the propensity to consume by age, some lifetime smoothing, and substantial bequests in aggregate capital formation. Thus, elements of both the bequest model and the original pure life cycle model are important in explaining saving behavior, despite the fact that each of the models in its most pure form is rejected in the data.

Finally, the results of Eisner and Pieper (1984) and Feldstein (1982) suggest that deficits, particularly when adjusted for measurement problems such as those due to inflation, lead to an increase in aggregate demand and real GNP. While I have mentioned above several caveats to this story limiting the likely size of the impact of a pro-deficit tax cut on real GNP, it is important to point out that some fiscal stimulus still remains after one has made all these adjustments. Further, it should be realized that the debt neutrality hypothesis assumes a given level of government spending. An increase in government expenditures is likely to raise total aggregate demand somewhat, (the extent depending upon the nature of monetary policy) and therefore can affect interest rates as well.

In summary, it should not be surprising that there are many avenues by which deficits, government spending, and various forms of taxes can affect

interest rates and the composition of GNP, as well as the level and growth rate of nominal GNP and its division into real and inflation components. However, the alleged "bang-for-the-buck" in fiscal stimulus is undoubtedly much less than had been supposed by the closed economy Keynesian finetuners who dominated economic policymaking in the 1960s and 1970s.

3. The Potential Significance of Various Adjustments to Measures of Federal and State and Local Government Deficits, Debt, and/or Net Worth

As discussed above, the impact of government budget deficits or debt may well depend on the nature of the spending programs (e.g., whether they are consumption or investment), revenues (especially the effective marginal tax rates on various factors of supply and commodity demands), and on items traditionally not measured in U.S. government budgets, especially the federal budget. To repeat, few would argue with the proposition that changes in the real value of government purchases of goods and services may affect economic activity, especially if they are unanticipated. Even those working in the rational expectations tradition believe that a temporary increase in government spending above its expected or trend value will lead to a rise in interest rates, a postponement of consumption, and increased short-run supply. It is often the case that government investment is financed by borrowing, especially at the state and local level in the United States. However, the Ricardian equivalence theorem is most readily seen as applying to changes in the mix of tax and debt finance, given a certain level of government consumption, rather than government spending. This is because for a given level of government spending, changes in the mix between consumption and investment may send very different signals to the private sector concerning future income and tax liabilities. For example, a

temporary public sector investment boom (such as the building of the interstate highway system in the United States) may signal increased productivity and a subsequent decline, ceteris paribus, in future taxes below what they otherwise would have been, if the investment is not financed completely by borrowing. Further, it is now widely recognized that government consumption may either be a substitute or a complement to private consumption, and through this mechanism may alter private consumption and saving (e.g., see for example Feldstein (1982), Barro (1985)).

The purpose of this section is to discuss recent attempts to measure various components of a more complete balance sheet for the federal government, and various attempts to provide better measures of deficits, debt, assets, investment, and consumption. The various attempts discussed here are only a subset of those that have been made. This is partly because some of the papers I will mention draw on the careful data work of others. To economize on space, I will not go into detail on the latter, but these authors do not get the credit they deserve for attempting to rework the basic data more carefully.[10]

This section is divided into four parts. First, we discuss various issues in measuring government assets. Second, we discuss various attempts to get more comprehensive or economically meaningful measures of government deficits, debt, and net debt, and the potential problems as well as advantages thereof. Third, we discuss and present evidence on a net worth concept for the government sector. It is unclear whether those who have attempted to generate greater information on goverment assets and

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10. See the references in Boskin, Robinson and Huber (1987), and Eisner and Pieper (1984) for examples.

liabilities really believe that a net worth variable is the appropriate one (whether adjusted for inflation or cyclical conditions) to enter as a measure of the government's economic impact. Eisner and Pieper (1984) tend to hint at this, but it is my opinion that such estimates are useful primarily to provide measures of national wealth and to place concern about government liabilities in better perspective.

Finally, the last subsection discusses reasons why addition across various types of spending, revenues, assets, or liabilities, may be inappropriate. Not only are different components subject to wide variations in their reliability, but fully rational forward looking behavior would account for the differential riskiness of the various components with regard to expected future government consumption, impact on private productivity, and likely future tax liabilities in assessing real private permanent net-of-tax income. Nor is it correct that one should discount the various components by different risk-adjusted rates. This is correct only in cases where the differential risk involves mortality probabilities. Instead, a risk charge (or bonus if the riskiness is negatively correlated with other components of income) should be applied to the various components in each period before discounting. Perhaps this is harping since the degree of rationality and foresight involved is even less obviously reasonable than that attributable to the basic Ricardian equivalence proposition.

A. Government Assets

Various recent studies have attempted to document the quantitative importance of government assets (e.g., Hulten and Peterson (1984); Boskin, Robinson, and Roberts (1985); Eisner and Pieper (1984); Boskin, Robinson, Kumar and O'Reilly (1985); Boskin, Robinson and Huber (1987)). Federal, and state and local, governments in the United States own substantial amounts of

land, mineral rights, buildings, inventories, equipment, gold, and other financial assets. The Federal Reserve Flow of Funds Division's National Balance Sheets for the United States estimate various components (Federal Reserve (1986)). The U.S. Department of Commerce, Bureau of Economic Analysis publishes detailed estimates of federal, state and local government capital stocks, investment, and depreciation (BEA (1982)). These data form the starting point for many attempts to expand upon or improve, these data. There are problems with these initial attempts to measure government assets, but they represent an important and under utilized resource, and attempts to improve upon them should not lose sight of this fact. For example, the FED records the value of bonds (whether assets or liabilities) at par; the BEA uses depreciation methods which would only approximate economic depreciation by accident, etc. Whether using the FED or BEA numbers or attempts to improve upon them (such as in Boskin, Robinson, and Huber (1987)), the conclusion seems to be that, until recently, federal government assets substantially exceeded regular federal government liabilities (additional federal government liabilities will be discussed below). Table 3 provides some data from my work in this regard. It compares federal, state and local government tangible capital with their outstanding debt. The development of these estimates of federal, state and local net investment and net capital differ from the BEA estimates and attempts to incorporate improved measures of economic depreciation based on estimates of used asset prices. They are far from definitive, but in general, they exceed the BEA estimates by about 20%. Figure 1 portrays pictorially that despite the recent explosion in federal government official debt, federal and state and local tangible capital apparently exceeds the corresponding official obligations by a substantial amount.

There are additional problems in measuring assets. Loans made by the

government to the private sector are carried on the books as assets. But a very poor treatment of the market value of such loans is included. In fact, the budgetary process makes no attempt to reserve for bad loans, and hence, grossly overstates the market value of federal government accummulated loans (to be discussed further below).

One of the most important assets held by the federal government is the substantial amount of land and mineral rights. In a recent paper (Boskin, Robinson, Kumar and O'Reilly (1985)), I estimated the market value of the federal government's oil and natural gas rights to exceed $500 billion as of 1981. Of course, the federal government debt held by the public has doubled since then, and oil and gas prices have plummetted. Still, the value of these resources are substantial. Table 4 highlights that in several recent years the change in the value of oil and gas rights held by the federal government exceeded the nominal deficit.[11]

Federal government assets or changes in their value may affect the real economy in a variety of ways. A large increase in the value of mineral rights, for example, may imply substantial increases in future revenue from royalties and bonuses. This may signal either an increase in government investment or consumption, or a tax decrease is in the offing. National wealth will have increased. It is unlikely, of course, that private consumers will respond instantaneously to changes in these values and in corresponding forecasts of expected future changes in fiscal variables. But eventually, there will be potential substantial changes in

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11. The basic estimates in Boskin, Robinson, O'Reilly and Kumar (1985) are derived from a model of expected present value of bonuses and royalty payments on economically recoverable reserves as estimated by the U.S. Geological Service, both on and off shore. See the paper for details.

taxes due to swings in the value in mineral rights affecting private decision making. We are unused to thinking of this on the national level in the United States despite the fact that income from mineral rights is the second largest revenue source (after taxes) for the federal government. But the states of Alaska and Texas have had their state fiscal policies dominated by oil and gas revenues. Of course, there are several nations whose fiscal policy is primarily driven by oil revenues.

B. Debt and Deficits

A variety of adjustments should be made in examining debt and deficits, depending upon the use one wishes to make of these figures. Attempts to measure national wealth or the sectoral balance sheets for the federal government certainly should include an inflation and par to market adjustment of outstanding liabilities (Eisner and Pieper (1984), Miller (1982)). While a standardized employment, high employment, or mid-expansion path adjusted deficit may be used to correct for the endogeneity of spending, and especially revenue, due to cyclical conditions (as discussed in De Leeuw and Holloway (1983)), the construction of such a series is subject to substantial disagreement concerning the appropriate employment benchmark. There can be no doubt that correcting for income endogeneity is potentially important, but the recent upward revision of the high employment rate to 6% from slightly over 5% suggests that even the government statisticians disagree on the exact formulation of the high employment

concept.[12]

The use of an inflation-adjusted deficit either by itself or in conjunction with a cyclically adjusted deficit to measure the short-run impact of fiscal policy on the real economy has been proposed and implemented, for example, by Eisner and Pieper (1984). While the inflation-adjusted measures appear to provide a better explanation than the nominal figures, inflation-adjusted deficits -- the deficit less the decline in the real value of the previously issued national debt held by the public -- presumes that consumers are rational and foresightful enough to calculate this decline in the real value of their wealth and respond to it in exactly the same way as other components of wealth changes. The effect of the decline in the real value of the previously issued debt on the real economy depends heavily upon the extent to which investors realize this decline and adjust to it completely by restoring their real portfolio positions (for mixed reactions to this proposition, see Cagan (1981)). I present some evidence on this issue below.

There are a variety of other items excluded from the official deficit and debt figures. For example, the federal government guarantees a substantial amount of lending and is subject to future payment to cover default. In either a market clearing or credit rationing regime, the likely effect of federal loans and guarantees on real investment depends upon the elasticity of the supply of funds into the system, the marginal source of

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12. Other problems with this concept exist. For example, the change in unemployment contemplated may bring with it a host of other changes (e.g., in inflation) that may affect the size of the deficit.

finance, the nature and number of loan programs, etc., (Gale (1986)). Table 5b presents some recent data on loans and loan guarantees outstanding and new commitments thereof. In previous work (Boskin, Barham, Cone and Ozler (1987)), we estimated that each dollar of new loan guarantee commitment carried with it an expected present value of future expenditures of about 12 cents.

Deposit insurance operates in a similar manner. While deposit insurance provides various types of benefits, the institutional arrangements in the United States generate a situation where banks have a put option on the FDIC and excessive risk is probably incurred because of the lack of risk-related premiums. A sensible forward looking budget document would treat deposit insurance (and by analogy, other types of loan guarantees and lending programs) with a forward looking bad debt reserve reserve (see Boskin, Barham, Ozler, and Cone (1987)).

Perhaps the most important, if controversial, liabilities involve future unfunded expected benefits in Social Security and related retirement programs, such as civil service retirement, military retirement, state and local government retirement, Medicare, etc. The excess of the present value of expected benefits over the expected present value of tax revenue under the Social Security Administration actuaries intermediate assumptions over the next 75 years is presented in Table 5a, as augmented in Boskin (1986). Clearly, these sums are enormous. Something will undoubtedly have to be done about Social Security and Medicare. The 1983 Amendments to Social Security were a major step in this regard reducing by almost two trillion dollars the actuarial deficit in the retirement and disability part of the program. Since then, the deficit has increased to about a quarter of its previous level based on changes in assumptions and events. But there is a much larger deficit in Medicare, amounting to several times the regular

national debt. I know of no explicit tests of the likely impact of the Medicare program on consumption and saving decisions, but there are certainly a variety of ways in which it could affect those decisions. Provision of such insurance may decrease the precautionary incentive to save, and Medicare provides insurance against the most important risk faced by the elderly -- ill-health and substantial medical expenditures. In any event, as discussed above, the empirical evidence of the effects of Social Security on the consumption/saving choice is somewhat mixed, although I tend to side with those that contend Social Security's unfunded obligations have had about one-quarter to one-half dollar per dollar offset on private saving. Consider the 1983 Social Security Amendments. These decreased the unfunded actuarial debt in Social Security retirement and disability program by almost two trillion dollars. If it is true that Social Security wealth offsets private saving, we should have seen a substantial plunge in consumption and increase in saving pursuant to this enormous decline. But it is perhaps reasonable to expect that it will take years for people to understand fully that taxes will increase and benefits decrease via a gradual increase in the age of eligibility for full retirement benefits. Also, in the United States, we face the virtually unprecedented scenario of the retirement and disability programs building up a trust fund from 1990 to 2020 which will approach the value of the regular national debt (see Boskin (1986)). While this is currently forecast, I do not know of anyone who really expects it to happen. It is likely that the Social Security retirement surplus will be used to bail out Medicare, to raise benefits, or to reduce taxes (see Boskin (1987) for a discussion of the potential impact of these financing alternatives on national saving). Thus, the signals are mixed, but the discreet change in the Social Security laws enacted in 1983

have far greater potential impact on the lifetime resources of persons below the age of 45 than the much more hotly debated tax reforms currently under consideration (see Boskin, Kotlikoff, Puffert and Shoven (1987)).

C. Net Worth

Government net worth is a concept that has been used to parallel the balance sheet for private companies. Certainly, the federal government accounting procedures would be illegal if used in the private sector and would produce some very strange results on private balance sheets and profit/loss statements. But governments are not firms. They can print money, borrow, and tax, in a manner that private firms cannot. While some people would argue these privileges can be abused and at times they have been, how does one value the right or option to exercise them? Further, while the government sector's net worth is a concept relevant to measures of national wealth, particularly in modern times when the government sector is a non-trivial fraction of the entire economy, it is unclear that any addition of assets and subtraction of all liabilities to get a net worth figure would leave one with a measure that has any significance for short or long-term real economic activity.

There are a variety of problems with the net worth figure as a measure of the government's net economic impact or changes in net worth as a similar measure. As noted above, different components of assets and liabilities may affect the real economy differently. This may be because of differential risks involved in future revenues or consumption resulting from assets, payments resulting from liabilities, and the differential correlation of these components with other components of income in the private sector; the ability of the private sector to measure and analyze the fiscal signal that is being sent by various changes in the asset or liability side or correspondingly on the spending or revenue or borrowing side of the

government budget. In fact, if we want to take it to its logical conclusion, rational consumers will be forming expectations not only on their future incomes, but also of the entire stream of future government consumption, investment, taxation, and borrowing. Changes in government spending, taxes, transfers, borrowing, or the values of various assets and liabilities may change that subjective distribution and that change may be based on the entire previous history of these variables (contrary to some recent specifications of consumption behavior). Thus, government net worth estimates, despite their measurement problems, appear to be most valuable to provide some indication of the relative importance of government debt and improved measures of national wealth. They are unlikely to replace deficit, debt, and/or their composition, or changes therein as sensible measures of fiscal impact.

D. Government Consumption and Investment

Finally, it is important to distinguish between government consumption and investment. Government consumption may substitute or complement private consumption and therefore, a dollar increase in government consumption, leading to a dollar increase in government deficit, may have opposite effects on private consumption, private saving, and national saving, depending upon the substitutability or complementarity of private consumption and government consumption. Government investment may be temporary, such as building an infrastructure (maintaining it should be much less costly than building it in the first place), etc. This may signal a decline in future taxes if the government investment is not fully debt financed, or it may signal the early stages of an increased round of expanded government consumption. We really have very little evidence upon which to evaluate these matters, but the private sector's perception of them

can be important with regard to how changes in government spending -- especially unanticipated ones -- affect the real economy. Figure 2 presents an interesting pictorial comparison of the recent history of the relationship between government net investment and deficits in the United States. As can be seen, the government sector in the United States is sometimes a net saver when it is running deficits, since its net investment exceeds the value of those deficits.

With these provisos, and the cursory survey of recent attempts to expand and improve measures of government financial statements and fiscal impacts in mind, let us turn to some new evidence concerning the impact of fiscal policy on the real economy.

4. New Empirical Results on the Effects of Government Deficits and Debt on Real Economic Activity and Its Composition

This section reports new tests using updated, expanded, and improved data to test alternative propositions concerning the impact of deficits and public debt on real activity and on the composition of GNP.

These tests go through several stages and incorporate several data improvements. Most important, we adjust private consumption and income to treat purchases of consumer durables as saving and the imputed rental flow from the durables as consumption and an analogous adjustment is made for treating the imputed flow of services from government capital as government consumption in addition to direct government consumption. Our results reported below with C*, adjusted consumption, contain this expanded definition (and Y* is the expanded definition of national income). For purposes of comparison, we present results using NIPA consumer expenditures and standard national income account concepts.

Since various previous studies have estimated consumption functions using various measures of permanent income, using national income, disposable income, or labor income, and various lags thereof to proxy permanent income, we present in equations 1) - 4) what might be called traditional consumption functions. Equations 1), 2) and 4) present alternative specifications using our expanded definition of consumption and income, including the public's holding of government bonds. Equation 3) presents analogous results for NIPA consumer expenditures. All of these equations, and those discussed below are estimated by ordinary least squares with first-order serial correlation adjustment.

Results in Equations 1) - 4), estimated on the sample period 1947-1984 are quite similar to typical results (see Table 6). The short-run marginal propensity to consume out of income varies from 0.6 to 0.8, depending upon the specification and measure of the variables. The marginal propensity to consume out of private wealth, including the public's holding of government bonds, ranges from about .02 to .04. Note that this would imply that a one dollar increase in outstanding government debt would increase consumption by 2 to 4 cents. No explicit test of debt neutrality or the efficacy of fiscal policy is conducted in this framework, since the specifications presume that the impact of changes in debt policy are identical to other changes in private wealth, i.e., that government bonds are part of private wealth. A one dollar tax cut would increase disposable income and therefore consumption by 60 to 80 cents in the short-run, while decreasing private saving by a few cents eventually via the wealth effect. Since about 30 cents on the dollar out of the tax cut is saved, wealth will be increased and a dynamic process will continue until the wealth effect leads to further increases in consumption.

A new set of regressions, presented in Table 7, adds to the

archetypical consumption functions just discussed various measures of the deficit. Regressions such as these have been used by various authors (Kochin (1974), Barro (1978), Feldstein (1982)) in the debate over the effects of government deficits on real economic activity. Note first that in the various specifications the marginal propensity to consume out of disposable income is about .75, while the marginal propensity to consume out of private wealth is about 0.015. These estimates are quite precise. The equations perform quite well by the usual summary measures. The nominal deficit, presented in equation 5) appears to decrease consumption by 22 cents per dollar of deficit, holding disposable income constant. An alternative explanation of this result is that this is the impact of increased government spending on consumption since disposable income is being held constant. Alternatively, a one dollar cut in taxes would have several effects. It would increase the deficit by a dollar and directly decrease consumer spending by 22 cents, but also raise disposable income sufficiently to increase consumption by 75 cents, increase saving substantially, and eventually increase consumption through the increased wealth. Of particular interest is the fact that alternative measures of the deficit, cyclically adjusted (equation 6), the real deficit, accounting for the decline in the real value of the previously issued national debt (equation 7) and the real cyclically adjusted deficit combining these two effects (equation 8), produce coefficients which are extremely small and statistically insignificant.

However, equations 9) - 12), probably the most important findings presented here, come to quite different conclusions. Here, rather than subtracting taxes from income as a measure of disposable income, we subtract government consumption. This is much more in the spirit of the

Ricardian equivalence hypothesis and we are basically asking: given the level of government consumption, what would a shift from tax to debt finance (or vice versa) do to consumption? With these improved measures of consumption and income, and the better specification of the income variables given the Ricardian equivalence proposition, all four measures of the deficit produced virtually identical results in their impact on consumption. The tax cut, holding government consumption constant unambiguously increases consumption substantially, about 30 to 40 cents on the dollar. Each of the equations perform quite well by traditional summary measures. The propensities to consume out of private wealth increase to about 0.04, whereas the propensity to consume out of expanded income less government consumption (a concept not usually mentioned nor directly comparable to that of disposable income) is about 0.5. The size, statistical significance, and robustness to alternative specifications of the deficits are a strong rejection of the proposition that government financial policy is irrelevant.

Table 8 presents alternative estimates of expanded fiscal impacts on consumer expenditures. Equation 13) nets out government bonds from private wealth, treating them in full accord with Ricardian equivalence as if they are not a part of private wealth and estimates a separate coefficient on government wealth holdings (note that since we keep a separate sectoral account for the government, these are treated as liabilities, and therefore their sign would be opposite to what one would normally expect). Once this is done, the estimated coefficients on the regular private wealth term and the government bond term are virtually identical, and while the former is quite statistically significant, the latter is marginally so. Again, it appears as if bonds are perceived as private wealth. The other features of the equations remain quite robust, with a marginal propensity to consume of

about 0.7 out of short-run income and about .03 out of wealth.

Equation 14) tries to estimate the impact of Social Security wealth. Various authors have concluded that Social Security wealth offsets private saving dollar for dollar and should be treated like other government obligations. The results reported here with our augmented definitions of income, including the substantial revisions in the Social Security wealth series pursuant to the 1983 Amendments for the last couple of years in the sample, still leave us with a propensity to consume out of Social Security wealth of about 2 cents on the dollar, about half of that relative to private wealth. Thus, this is consistent with the notion that there is some offset to private saving caused by Social Security, but substantially less than dollar for dollar.

Finally, equation 15) reports an expanded definition of government capital. We examine the potential impact on private consumption of the value of government tangible capital over government regular debt. The propensity to consume out of what might be called net government explicit assets is about 0.04, quite similar to the propensity to consume out of private wealth found in other specifications, but slightly larger than the propensity to consume out of private wealth in this specification. This would suggest that government tangible assets, i.e., government saving, is a substitute for private saving and allows individuals to expand their consumption. The propensity to consume continues to hover around the 0.7 range.

Table 9 reports results examining the effects of deficits, variously defined, on the composition of GNP. From the national income identity, changes in the federal deficit must show up as changes in net foreign investment, domestic investment, private saving, or the state and local

surplus. These equations regress these variables as shares of GNP on a constant, a measure of the federal deficit, and to control for the cycle, current and lagged capacity utilization. The sample period is 1952-84, but in equations 5) and 10), I estimate separate coefficients on the deficits for the periods 1952-72 and 1973-84 to examine the impact of deficits on net foreign investment in the flexible exchange rate period. Each of the specifications suggests that deficits have powerful impacts on the composition of GNP given the level of GNP. Each $1 increase in the federal deficit appears to be associated with about a 30 cent increase in private saving, about a 35 cent decrease in domestic investment, and about a 25 cent decrease in net foreign investment. These results are similar to those reported by Summers (1986).

While this is a reduced form of a larger structural model, and we should not overstate the explanatory power of these results, they do suggest that the debt versus tax finance decision, and/or government spending decisions can substantially affect the composition of GNP.

5. Conclusion

Despite theoretical and empirical controversies and alternative interpretation of historical episodes, the analysis and results reported above tend to confirm that fiscal policy can affect real economic activity. We discussed numerous avenues by which these effects occur, and that broad aggregates, especially the officially reported nominal aggregates, may be quite misleading in measuring either short-run fiscal stimulus or long-run effects on the composition of output.

The major contribution of the paper is to introduce extensions of the national income accounts to include a consistent treatment of consumer

durables and government capital in the measure of consumption and income, updating the data (relative to previous studies) by several years, a period of substantial swings in the relevant variables, and explicitly testing alternative propositions concerning the effects of government financial policy on real economic activity. By far the most important conclusion is that holding government consumption constant, deficits appear to increase private consumption. Numerous explanations of this result are possible, and I do not distinguish among them, e.g., liquidity constraints, myopia, fiscal signals, etc. Further, the impact of increases in federal deficits on the composition of GNP, given GNP, is a modest increase in private saving and a substantial decrease in domestic investment and net foreign investment (i.e., increase in net inflow of capital).

Much of the work alluded to or briefly summarized in this paper is still in progress. Indeed, the substantial attention being placed on improved measures of government fiscal activity attests to its potential importance.

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Table 1

Japan and U.S., Public and Private Net Saving Rates
Based on the net national savings concept, adjusted for consumer durables, government investment, and appropriate rents (column (6) of Table (2)

Japan

Year	National Saving	Private Saving	Government Saving	Government Investment	Deficit
1970	31.45	22.91	8.54	8.17	-0.37
1971	29.20	21.43	7.77	8.98	1.21
1972	28.54	21.65	6.89	9.57	2.69
1973	28.89	21.13	7.75	9.31	1.56
1974	26.68	19.54	7.14	8.16	1.03
1975	22.83	19.26	3.57	7.83	4.25
1976	23.03	20.80	2.23	7.35	5.12
1977	23.00	20.45	2.54	7.63	5.09
1978	23.39	21.83	1.56	8.45	6.88
1979	22.26	19.55	2.71	8.46	5.74
1980	21.31	18.40	2.91	7.84	4.93
1981	21.39	18.04	3.35	7.66	4.31
1982	19.90	16.68	3.22	6.89	3.67
1983	18.84	16.16	2.68	6.22	3.54
1984	19.89	17.37	2.52	5.36	2.85
1970-1979	25.93	20.86	5.07	8.39	3.32

United States

Year	National Saving	Private Saving	Government Saving	Government Investment	Deficit
1970	9.97	9.18	0.80	1.94	1.15
1971	11.12	11.25	-0.13	1.81	1.94
1972	12.30	10.82	1.49	1.79	0.31
1973	14.39	12.12	2.27	1.63	-0.64
1974	10.73	9.42	1.30	1.67	0.36
1975	7.90	10.72	-2.81	1.67	4.48
1976	9.39	10.29	-0.90	1.11	1.01
1977	10.33	10.23	0.10	1.11	1.01
1978	11.72	10.27	1.44	1.40	-0.04
1979	11.15	9.17	1.98	1.34	-0.65
1980	7.58	7.60	-0.02	1.26	1.28
1981	8.57	8.66	-0.09	0.91	0.99
1982	4.80	7.79	-2.99	1.16	4.15
1983	5.65	8.93	-3.28	1.20	4.49
1984	8.37	10.94	-2.57	1.11	3.69
1970-1979	10.90	10.35	0.55	1.58	1.02

Source: M. Boskin and J. Roberts, "A Closer Look at Saving Rates In the U.S. and Japan," AEI, 1986.

Table 2

Some U.S. Fiscal Episodes

	1975-1979	1984-1989	
D_o	23.4%	37% CBO baseline	37% Administration
d, average	3.7	1.8	1.4
g, average	3.5	3.8	4.0
i (net of monetization)	6.0		
GNP deflator	7.2		
r	-1.2	3.6	2.4
g-r	4.7	0.2	1.6
D_e	79%	900%	88%

Note: D_t declined steadily from World War II to 1974.

Source: M. Boskin, "Conceptual and Measurement Issues in the Analysis of Deficits and Debt," paper presented at the NBER Taxation program meeting, Palo Alto, CA, March, 1983.

Table 3

Government Tangible Capital and Federal Debt Held by Public,
Selected Years, in $1982 billions

Year	Tangible Capital		Federal Debt
	Federal	State and Local	
1950	477.2	482.4	1,018.7
1960	662.9	753.6	721.0
1970	752.6	1,224.7	664.1
1980	810.2	1,542.8	825.8
1984	936.8	1,611.3	1,213.1
1985	999.2	1,634.7	1,353.0

Source: Tangible capital: Boskin, Robinson and Huber (1987).
Debt: Economic Report of the President, selected years.

Table 4

Change in the Value of Federal Oil and Gas Rights
in billions of current dollars

Year	Change in Value	Nominal Federal Deficit
1974	+43.7	6.1
1976	+16.1	53.2
1978	+11.8	59.2
1979	+60.8	40.2
1980	+131.5	73.8
1981	+142.5	78.9
1982	+27.9	127.9
1983	-16.5	207.8
1984	-12.3	185.3
1985	-28.8	212.3
1986	-156.7	220.7

Sources: Boskin, Robinson, O'Reilly, Kumar (1985); updated and corrected in Boskin, Robinson and Huber (1987); Economic Report of the President (1987).

Table 5

Some Contingent and Potential Liabilities of
the Federal Government

A. Social Security (OASDI)
Projected Revenues, Benifits and Deficit as percent of taxable payroll

	25 year period			75 year period
Prior to 1983 amendments	1982-2006	2007-2031	2032-2056	1982-2056
Income	12.01	12.40	12.40	12.27
Outgo	11.35	14.08	16.79	14.07
Surplus	0.66	-1.68	-4.39	-1.80
Post 1983 amendments	1983-2007	2008-2032	2033-2057	1983-2057
Income	12.50	12.95	13.15	12.94
Outgo	10.66	12.64	15.23	13.35
Surplus	1.83	0.32	-2.08	-0.41

source: M. Boskin (1986)

B. Loans and Guarantees ($ billions)

	Direct Loans		Loan Guarantees		Federal Sponsored Enterprises
year	New Commitments	Total Outstanding	New Commitments	Total Outstanding	Total Outstanding
1966	7	33	24	99	19
1975	29	74	50	189	85
1983	41	223	97	364	309

source: U.S. budgets Special Analysis F.

Table 6

Private Consumption Functions

Eq. #	Dep. Var.[a]	Const.	YN	YN(-1)	YD	YD(-1)	YL	YL(-1)	WPRIV(-1)	ρ	DW	SSR	R^2
1	C*	.572	.421	.137					.040	.480	1.6	.237	.988
		(.111)	(.044)	(.053)					(.008)	(.146)			
2	C*	.701			.485	.281			.0129	.320	1.9	.142	.996
		(.065)			(.046)	(.054)			(.0060)	(.165)			
3	CNIPA	.183			.597	.191			.0202	.255	1.8	.206	.995
		(.072)			(.057)	(.067)			(.0067)	(.166)			
4	C*	.779					.627	.057	.0383	.472	1.6	.182	.991
		(.092)					(.060)	(.070)	(.0074)	(.149)			

[a] C^* is adjusted consumption as described in the text. CNIPA is NIPA consumer expenditures. The income variables correspond to the consumption definition (adjusted & NIPA). The income variables refer to national (YN), disposable (YD) and labor (YL) income, respectively.

Table 7

Tests of the Effect of Deficits on Consumption,
alternative definitions of deficits

Eq$^{n\#}$	Const.	YD	YD(-1)	DEF	DEFC	RDEF	RDEFC	WPRIV(-1)	ρ	DW	SSR	R^2
5	.691	.484	.283	-.219				.0132	.314	1.9	.141	.996
	(073)	(.047)	(.055)	(.072)				(.0061)	(.169)			
6	.831	.457	.286		-.010			.0154	.242	1.9	.123	.994
	(.103)	(.058)	(.067)		(.133)			(.0064)	(.196)			
7	.810	.456	.283			-.045		.0160	.215	1.9	.121	.995
	(.093)	(.058)	(.067)			(.076)		(.0062)	(.197)			
8	.816	.455	.288				.014	.0154	.240	1.9	.123	.994
	(.096)	(059)	(.068)				(.102)	(.0063)	(.197)			
		YXG	YXG(-1)									
9	2.27	.449	-.023	.327				.053	.964	1.7	.188	.859
	(.44)	(.050)	(.050)	(.089)				(.013)	(.033)			
10	2.72	.402	.006		.340			.046	.976	1.4	.162	.891
	(.597)	(.051)	(.069)		(.151)			(.017)	(.029)			
11	1.73	.516	.089			.403		.038	.859	1.8	.126	.969
	(.296)	(.049)	(.065)			(.089)		(.014)	(.092)			
12	2.49	.403	.044				.342	.046	.970	1.5	.151	.909
	(.550)	(.049)	(.070)				(.123)	(.016)	(.034)			

N.B. All equations use adjusted consumption and income. YXG is income less government consumption. DEF is the nominal deficit, DEFC is the cyclically-adjusted deficit, RDEF is the inflation-adjusted deficit, and RDEFC is the inflation and cyclically- adjusted deficit.

Table 8

Effects of augmented government and private wealth on consumption

EQ^n#	CONST	Y	Y(-1)	WPRIV(-1)	SSW(-1)	WTOT(-1)	WGOV(-1)	NWGOV(-1)	Rho	DW	SSR	R^2
13	1.46 (.43)	.443 (.067)	.257 (.071)			.027 (.0077)	.037 (.062)		.641 (.129)	1.6	.431	.960
14.	1.15 (.19)	.572 (.059)	.022 (.069)	.036 (.0085)	.017 (.0075)				.592 (.142)	1.5	.160	.988
15.	.972 (.103)	.438 (.046)	.269 (.048)			.016 (.0031)		.046 (.021)	.046 (.171)	2.0	.104	.998

13- National income - government consumption.

14- Labor income.

15- Disposable income.

Table 9

The Effects of Deficits on the Composition of GNP

Dependent Variable	C	DFED/GNP[a]	CAP[c]	CAP(-1)[c]	DW	R^2
1. I/GNP	0.067 (0.048)	-0.357 (0.142)	1.64 (0.41)	0.43 (0.27)	1.64	.85
2. NFI/GNP	0.049 (0.033)	-0.269 (0.010)	-0.88 (0.29)	0.392 (0.210)	1.63	.35
3. SPG/GNP	0.137 (0.042)	0.310 (0.124)	0.359 (0.375)	-0.013 (0.261)	1.99	.78
4. SLDEF/GNP	0.016 (0.017)	-0.034 (0.047)	0.377 (0.137)	0.120 (0.090)	1.86	.30
5. NFI/GNP[d]	-0.045 (0.034)	-0.289 (0.118) -0.243 (0.115)	0.876 (0.301)	0.397 (0.218)	1.62	.35
		DFED1/GNP[b]				
6. I/GNP	0.054 (0.043)	-0.376 (0.132)	1.76 (0.35)	-0.32 (0.26)	1.63	.85
7. NFI/GNP	0.031 (0.031)	-0.226 (0.088)	-0.74 (0.27)	0.45 (0.21)	1.56	.34
8. SPG/GNP	0.167 (0.027)	0.398 (0.089)	-0.01 (0.25)	-0.05 (0.24)	2.08	.75
9. SLDEF/GNP	0.007 (0.014)	0.016 (0.054)	-0.33 (0.12)	0.17 (0.09)	2.08	.75
10. NFI/GNP[d]	0.031 (0.031)	-0.257 (0.116) -0.215 (0.093)	0.74 (0.28)	0.46 (0.22)	1.56	.34

Standard errors in parentheses. All equations estimated with first-order serial correlation adjustment. Sample period is 1952-84 except equations 5 and 10 which are estimated for 1973-84.

[a]Nominal federal deficit

[b]Inflation adjusted federal deficit

[c]Estimated coefficients and standard errors should be multiplied by 10^{-3}

[d]First set of coefficients and standard errors for 1952-72 period; second set for 1973-84.

Figure 1

TOTAL GOVERNMENT DEBT AND TOTAL GOVERNMENT REPRODUCIBLE FIXED NET CAPITAL STOCK

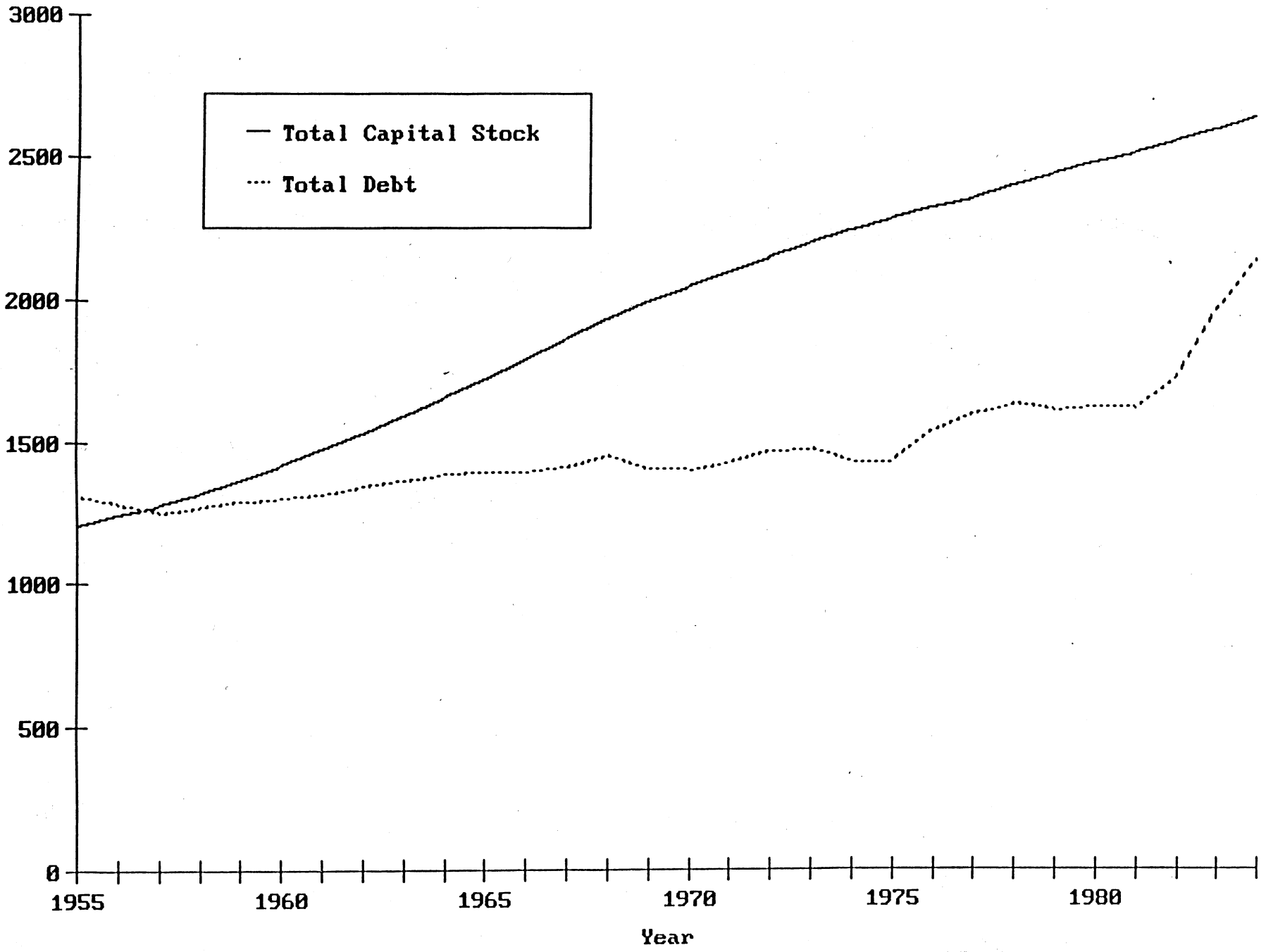
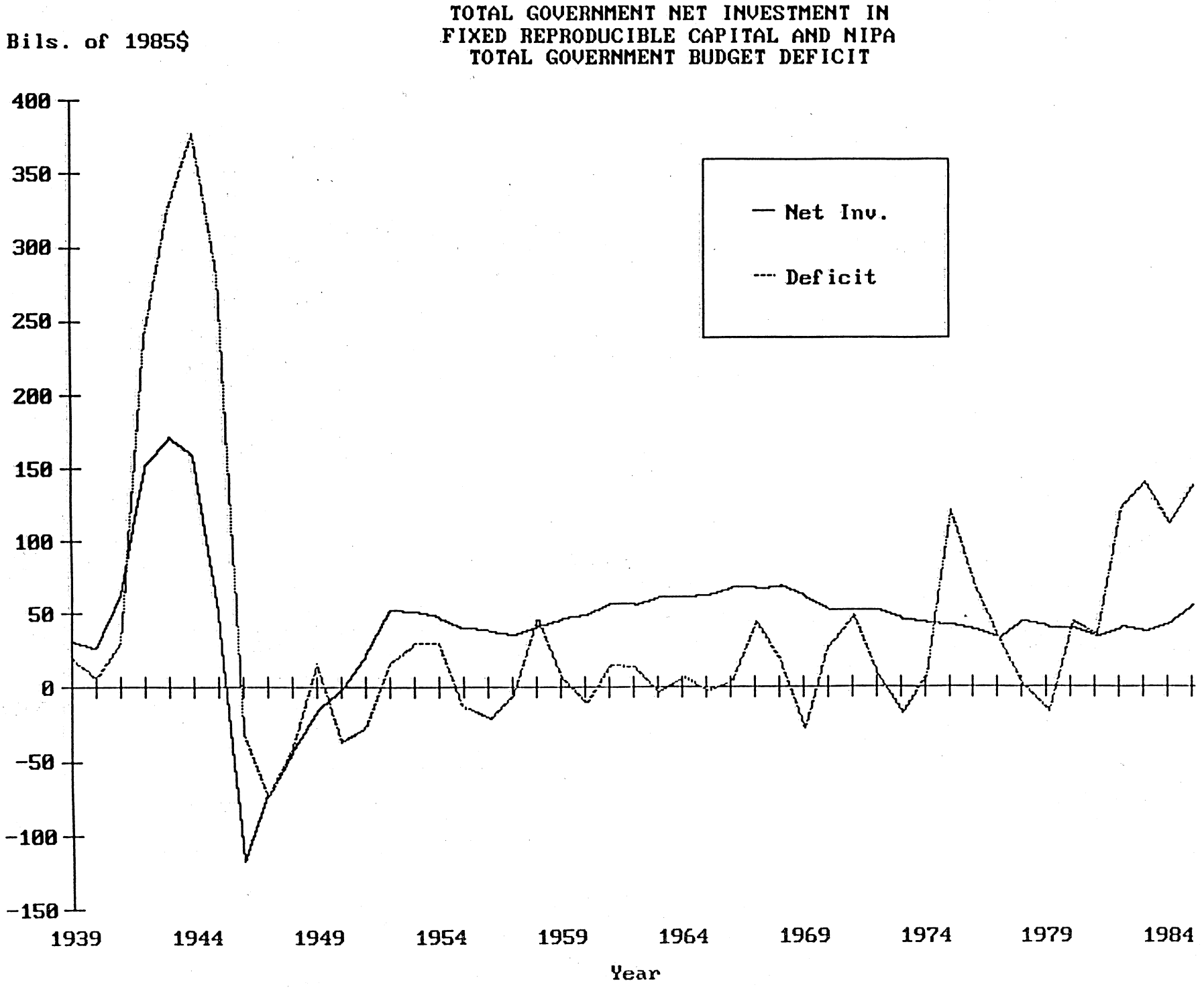


Figure 2


TOTAL GOVERNMENT NET INVESTMENT IN
FIXED REPRODUCIBLE CAPITAL AND NIPA
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