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NEW ESTIMATES OF FEDERAL GOVERNMENT
TANGIBLE CAPITAL AND NET INVESTMENT

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ABSTRACT

Government capital formation raises a number of issues important to national economic well-being, yet the U.S., unlike most advanced countries, does not account for capital in its formal budget documents. We estimate depreciation of government capital using a methodology developed by Hulten and Wykoff which is based on used asset price data. We estimate a federal government net nonresidential capital stock of over \$800 billion in 1984, more than 20% higher than estimated by the BEA. We also find much larger net federal investment since World War II than the BEA. The behavior of military and civilian structures and equipment is also examined.

We analyze the potential importance of these results for measuring the net national savings rate, national wealth, the trend in government capital formation relative to private capital formation, and the relationship between net investment and deficits.

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1. Introduction

In all countries, the public sector, as well as the private sector, owns substantial amounts of capital, makes investment as well as consumption-type expenditures and transfer payments, and experiences depreciation in the value of its tangible capital. Most advanced economies incorporate this in their formal budget documents, generating separate capital and current services accounts. The United States is the most conspicuous exception. Fortunately, the Bureau of Economic Analysis (BEA) of the Commerce Department has generated substantial information on federal, and state and local, government investment, depreciation and capital stocks in the United States for the past 60 years. While one of the purposes of this paper is to generate alternative estimates, and these differ somewhat from those of the BEA, it is clear from even a cursory examination of the data that government capital formation is substantial. The sum of the federal, state and local government capital stocks is more than half as large as private non-residential capital in the United States. In many other countries it is a still larger fraction of the total national capital stock.

Government capital formation raises a number of issues important to national economic well-being. For example, government net capital formation can be a major component of net national saving. Also, it may be more appropriate to finance government capital formation than government consumption by borrowing rather than taxing. Obviously, some types of government capital formation are complementary to private activity and enhance productivity. But government capital formation does not have to meet the same kind of market test as private investment and we do not have an analogue to the stock market to value it. Thus, measures of government capital and investment may be

particularly useful information which cannot be inferred from other data. Measures of the productivity of the government investment are hard to come by. Further, because taxes are distortionary, the cost of these distortions must be included in proper social cost-benefit analyses and therefore the optimal public sector investment must have a larger marginal product than that in the private sector.

It may well be the case that government investment expenditures have different impacts on the economy than transfer payments or government consumption expenditures which add the same amounts to traditionally measured deficits. Further, it is unclear that the deficit on current account is the sole information one would want to use, for example, in short-run macroeconomic analyses. Do we really believe that shifting a dollar from government consumption to government investment, thereby reducing the current services deficit by a dollar has the same macroeconomic impact as a dollar decrease in spending and/or a dollar increase in taxes? Still, separating out capital and current expenditures, and generating sensible measures of depreciation and net investment, can be important inputs into various kinds of economic analyses, some examples of which are presented below.

First, such an endeavor would enable us to have a more accurate picture of how the government is really using the funds it raises. Second, it could help us get better measures of the productivity of this capital, by component or in the aggregate. Third, it is a necessary input into comprehensive measures of national wealth. Fourth, it may be valuable in establishing alternative budget procedures and/or in better understanding and implementing various fiscal policies. Fifth, it is also a necessary input in measures of net national saving, and indeed,

the United Nations system of national income accounts, implemented in most OECD countries, expressly incorporates net government saving in the measure of net national saving. Sixth, it can improve our understanding of fiscal history and help highlight emerging fiscal issues, such as the deterioration of the infrastructure or, alternatively, a rapid government investment buildup (as appears to be happening in Japan at the moment).

The purpose of this paper is to provide alternative estimates of federal government net investment and net capital stocks as potential inputs into such studies. It also tests the sensitivity of alternative approaches to depreciation in terms of their potential impact on aggregate measures of net capital stock and investment in the federal government sector of the United States, as we compare our numbers with those of the BEA. We estimate a federal government net nonresidential capital stock 20 percent higher than that estimated by the BEA's method, and hence, correspondingly higher government consumption, national income, and when the changes in net capital stock differ, net national saving. The results systematically differ with respect to structures, but are quite comparable with respect to equipment. A similar result was found using the same methodology for the private capital stock by Hulten and Wykoff (1981). It is likely that their pattern will be found for the state and local sector when we present those results in a sequel to this paper.

The paper is organized as follows: in Section 2, we briefly review other attempts to create government investment and capital stock estimates. These include the Bureau of Economic Analysis (BEA) (and several studies based on the BEA numbers), Goldsmith (1962) and Kendrick (1976), as well as special studies of the Office of Management

and Budget and the special analyses of the Budget of the United States. We describe each briefly, together with what we consider to be the strength and weaknesses of each study.

In Section 3, we present the methodology employed in this study for measuring investment, depreciation, and net capital stocks. We discuss various reasons why our approach to depreciation is likely to lead to somewhat different results in the time pattern of accumulation and depreciation, and also various strengths and weaknesses of the methodology we employ (which follows the approximation to a used asset price approach used by Hulten and Wykoff (1981)), relative to that of the BEA or other options.

Section 4 presents our principal results. Data are presented for gross and net investment, depreciation, and net capital stocks annually from 1927 to 1984 for all federal government capital using the BEA method, our depreciation method, and also for the sake of comparison, double declining balance. In aggregate we estimate a net capital stock more than 20 percent larger than the BEA, over \$800 billion of tangible capital compared to their \$650 billion in 1984.

Various charts and tables decompose the aggregate numbers into their components by type of capital and nature of its use. The focus is primarily on the distinction between military and non-military capital, and between equipment and structures. Interestingly, the bulk of the difference is in the treatment of non-residential structures, as our estimates are quite similar to the BEA for equipment in recent years.

Section 5 presents a series of interpretations and implications of our results. We analyse the potential importance of these results for measuring the net national saving rate, national wealth, the trend in

government capital formation relative to private capital formation, the relationship of net investment and traditionally measured government deficits, etc. It is evident that for a wide range of issues, improved measures of the government net capital stock, gross investment, depreciation and net investment can be quite important.

We conclude with some caveats, directions for future research, and the hope that by presenting our estimates, and comparing them to those of the BEA, we will stimulate further work on this potentially important set of topics.

2. Literature Review

The most noted early contributions to the estimation of the capital stock of the government were made by Raymond Goldsmith. As part of his project estimating national wealth for the period 1946-1958, Goldsmith (1962) creates series for the military and civilian capital stock and net investment by type of asset and level of government. The basic methodology was the perpetual inventory method, cumulating gross investment and subtracting estimated depreciation. For military capital, a 1946 benchmark for the stock from Reeve (1950) was used and depreciation was assumed to be geometric for the various components.¹ For federal civilian capital, Goldsmith took gross investment figures dating back to the 19th century from his earlier (1955) study and assumed straight-line depreciation over different service lives to obtain a net capital stock series.²

1. Goldsmith (1962), Tables B-169, B-175. Depreciation rates were assumed to be 45 percent for aircraft, 15 percent for ships, 22.5 percent for other equipment, and 7.5 percent for structures. With these rates, depreciation is several times more rapid in the early years than that assumed by the BEA (see Table 2).

2. Goldsmith (1962), Tables B-158, B-159, B-161. Service lives used were

Kendrick (1976) also estimated the tangible capital assets of the government, though this was not the primary focus of his study. He also used the perpetual inventory method, with Goldsmith's estimates as benchmarks for the various components. Kendrick used different investment series and depreciation assumptions,³ but does not report separate series for the federal government.

The Bureau of Economic Analysis (1982), using improved estimates of current- and constant-dollar gross investment series in revisions of the NIPAs, also developed estimates of government capital using the perpetual inventory method. Gross investment figure for the various components prior to 1929 were taken from Goldsmith, in order to obtain the capital stock in 1925 and to estimate depreciation in later years. The service lives and depreciation assumptions made by the BEA are discussed in detail below. Goldsmith (1982) and Eisner and Pieper (1984) use the BEA estimates of net government fixed capital stock in their studies. A comparison between the net federal non-residential capital stock estimates of Goldsmith (1962) and the BEA is given in Table 1.

The Office of Management and Budget (OMB) has begun to include estimates of federal investment in the Special Analyses section of the Budget, as required by an act of Congress. These gross investment

30 years for highways and streets, 50 years for buildings, 80 years for conservation and development structures, and 12 years for most civilian equipment.

3. See Kendrick (1976), B1-20 to B1-29, for a detailed description of his methodology.

figures are much larger than those of the BEA, as shown in Table 1.⁴ In addition, the OMB also estimates investment based on a more comprehensive measure, such as including of loan programs, research and development and human capital investment.

These differences demonstrate a fundamental underlying dilemma: defining capital, and therefore estimating gross investment, raises conceptual difficulties. We use the BEA figures though others might prefer a more inclusive series. Further, the federal government finances substantial investment which is owned by others, particularly state and local governments. The BEA treats this as state and local investment and capital, which is fine, but must be distinguished from budget documents reporting the amount of investment financed by the federal government.

Since we differ from the BEA in our estimates of the depreciation of government capital, a brief review of depreciation theory is in order. The definition preferred by most economists, including ourselves, is that economic depreciation is the decline in the value of an asset through time.⁵ In equilibrium, the value of an asset is

4. Most of the discrepancy arises because the BEA does not include grants-in-aid to state and local governments in investment, except for a fraction of highway and street expenditures. This is only partially offset by OMB's lower estimates for civilian equipment, which are possibly due to OMB's restriction to acquisition of major equipment. In addition, OMB's estimate for military investment in 1970 is more than \$10 billion larger than the BEA's. See OMB (1985), particularly Table D-2.

5. A competing definition of depreciation is advanced by Young and Musgrave (1980). They state that depreciation as defined by the BEA in both its capital stock estimates and in the NIPA is based on the concept of productive efficiency. "NIPA depreciation" is the cost of the asset

the discounted value of the services it is expected to provide net of maintenance and repair plus its expected scrappage value.

Replacement, as defined by Christensen and Jorgenson (1973), is based on productive efficiency rather than economic value. It is the level of investment necessary to maintain the productive efficiency of the capital stock. If an asset provides equal services, net of maintenance and repair, over its life - like a light bulb or one-hoss shay - replacement is zero until retirement, when it is equal to the cost of the asset.

An example may clarify these concepts. Consider a one-hoss shay costing \$100 which will become totally obsolete in two years, though its physical life is three years, and suppose the real interest rate is 5 percent. Since the one-hoss shay must be producing services worth \$51.22 each year in order to sell for \$100, depreciation is \$49.78 in the first year and \$51.22 in the second.⁶ Replacement is zero in

allocated over the service life in proportion to the services net of maintenance and repair provided in a given year. Obsolescence is reflected by a one-time charge when the asset is retired prior to the end of its physical life, rather than spread over the economic life of the asset.

There are two important distinctions between economic depreciation (the definition used in the text) and "NIPA depreciation": the use of discounting and the treatment of obsolescence. Under economic depreciation, potential services from an asset after its retirement are irrelevant, since they are worthless. Obsolescence affects the value of the asset over its entire economic life, so there is no need for a special charge. This tends to increase (while the use of discounting reduces) economic depreciation in the early years of asset life relative to the NIPA definition.

6. "NIPA depreciation" is \$33.33 in the first year and \$66.67 in the second year, since the lost services of the third year are charged off at the end of the second year.

the first year and \$100 at the end of the second.

The appropriate definition of the capital stock depends on the use of the measure, as emphasized by Christensen and Jorgenson (1973). For questions of productivity and factor inputs, the appropriate capital stock is cumulative investment less cumulative replacement, since that gives the productive efficiency of the stock at any particular date. For measuring national wealth, the capital stock should be measured as cumulative investment less cumulative economic depreciation, since that gives the remaining market value of capital.

Replacement is equal to depreciation only when productive efficiency declines geometrically as the asset ages.⁷ The two measures - value and productive efficiency - of the capital stock are equal in magnitude only when depreciation takes the form of a declining-balance.

The BEA, in its estimates of government capital stock, assumes straight-line depreciation over the estimated economic service life of the asset. This would be an accurate measure of economic depreciation if the asset had no decline in productive efficiency as it aged (one-hoss shay) and the discount rate were zero.⁸ The one-horse shay assumption would mean that discards (retirements) measured by the BEA

7. See Jorgenson (1973) for a proof of this.

8. If, in addition to the one-hoss shay assumption, the physical service life was equal to the economic service life, the BEA measure would equal "NIPA depreciation". Since "NIPA depreciation" is appropriate for neither production nor valuation measures of the capital stock, we shall not consider it further.

would equal replacement.

The BEA defines the gross capital stock as cumulative investment less discards, while the net stock subtracts depreciation from investment. The BEA gross stock would be, therefore, the relevant measure for productivity calculations under the one-hoss shay assumption. Under the unrealistic additional assumption of a zero real discount rate, the BEA net stock is the correct measure for national wealth calculations.

Hulten and Wykoff (1981) have found that the declining-balance assumption for depreciation, in addition to being more convenient, is a more accurate approximation to the decline in value of some private-sector assets than the straight-line assumption. In the next section, we discuss their methodology and our application of their estimates to develop an alternative measure of the depreciation and replacement of the fixed capital stock of the federal government.

3. Methodology

Our new estimates of the net Federal capital stock are in the spirit of a used asset price approach. They are based, however, on BEA estimates of gross investment and economic service lives. We begin with a discussion of the treatment of service lives. We then turn to our use of the information obtained by analyzing used asset prices.

The BEA takes two approaches to estimating economic service lives for the federal sector. For some categories, mostly structures, the approach is the same as that used in the private sector. The BEA applies the bell-shaped "Winfrey" distribution to the investment, assigning service lives varying from 45 to 155 percent of the central value to various fractions of the investment for a given year. A

variety of sources are used for the central service lives, including agency data and comparisons with the private sector.⁹

For some categories, including all military equipment and much of nonmilitary equipment, discards can be inferred from accounting records, and so detailed service life estimates are available. These vary across years, and can vary within a single year. For example, the service lives of most types of military equipment are shortened during wartime. Since any variation in service life is captured, a Winfrey distribution is not used. We are able to reproduce military equipment estimates exactly in recent years from detailed service life data kindly provided by John Musgrave.

To adjust for intersectoral transfers and for other possible statistical discrepancies,¹⁰ we added the difference between the BEA's estimate of the net stock of a component and our attempt to reproduce them to our estimates. The discrepancy peaks at three billion 1984 dollars in 1965 and drops to about 1.2 billion in 1984. The results described in Section 4 use the actual BEA estimates, and our figures are adjusted for the discrepancy.

9. For some categories, we were able to reproduce the depreciation and capital stock estimates of the BEA from the gross investment figures. Other categories, though, were slightly overestimated relative to the BEA. John Musgrave of the BEA alerted us to the presence of "intersectoral transfers", that occur when Federal buildings are sold to the private sector. Since the categories we reproduce exactly include highways and dams, and those we overestimate include industrial and office buildings, this seems a plausible explanation, and an adjustment, described in the text, was made to our estimates to compensate.

10. We were not able to reproduce BEA's estimates for nonmilitary equipment exactly, possibly because more detailed service life information was needed for these categories also.

We attempt to use the best available technique for estimating economic depreciation, and apply it to the federal government. Young and Musgrave (1980) argue that the BEA approach may be a good approximation to the economic approach. It is our view, however, that the used asset price approach is preferable, because it attempts to take into account market data. The most well-known and, we believe, thorough attempt to implement the used asset price approach in the private sector is that of Hulten and Wykoff (1981). While not perfect, we feel that the Hulten-Wykoff approach is the best available, and it forms the basis for our estimates of the Federal capital stock.

An important facet of the implementation of a used asset price approach is the treatment of assets for which market information is not available. Since we do not attempt to utilize new market information in this study, we review the method of Hulten and Wykoff.

The use of market data to arrive at estimates of economic depreciation involves a number of econometric problems. Two problems that Hulten and Wykoff address directly are those of functional form, and the censored sample problem. As mentioned above, the question of the "shape" of the depreciation path is a critical one, which can only be settled empirically. In order to allow their market data sufficient freedom to determine the shape of the depreciation path, they used a Box-Cox transformation, which nests the major functional forms. They found that all of the major forms, such as geometric or one-hoss-shay, are rejected by the data. By visual inspection, however, they conclude that for each case, the fit is "nearly" geometric, and proceed accordingly.

The censored sample problem is the an upward bias to used asset values based on observed prices, since only the prices of "survivors"

are available. To correct for this bias, the prices are adjusted to take into explicit account the censoring problem by weighing the observed price by the survival probability. These probabilities are based on the BEA estimates of economic service lives and the Winfrey distribution, which were discussed earlier.

There are a number of additional potential problems with the used asset price approach. Some critics of the used asset price approach argue that most used asset markets will be dominated by lemons, biasing the observed price downward. Hulten and Wykoff (1981) defend their approach against the lemons critique by pointing out that the lemons problem arises out of asymmetric information, and that in the market for business assets that they study, most of the participants are specialists, minimizing misinformation.

A "shopping mall" problem can introduce a downward bias to depreciation through an upward bias in the prices of structures. If it is difficult to disentangle the value of land from the value of the structures on the land, the value of a structure earmarked for demolition, which may be zero, will be ascribed a positive value. This is true even if a structure of the same vintage on another piece of land still has many years of useful life in it.¹¹ By ignoring this source of bias, we are implicitly putting great confidence in the ability to separate the value of land from that of structures.

The existence of an investment tax credit can introduce an upward

11. DeLeeuw (1981) argues that the shopping mall problem introduces an upward bias to depreciation, because still "useful" buildings are counted as having no value. However, obsolete buildings, like obsolete equipment, have no value, net of scrappage.

bias to depreciation rates to the extent that new investment goods are treated more favorably than old ones. New goods will sell at a premium, so that prices drop not because of a drop in productive efficiency, but because actual costs to users are in post-tax prices. DeLeeuw (1981) suggests adjusting new asset prices for the tax advantages as a correction.

Yet another concern of Hulten and Wykoff is that as real interest rates and tax regimes vary, the pattern of used asset prices for a good with a fixed pattern of services might vary. They find, however, that for office buildings, time paths of prices do not vary significantly over subsamples, suggesting that a single geometric rate is appropriate, regardless of the prevailing tax regime or real interest rate. De Leeuw (1981) points out that this is rather more distressing than consoling, since we would expect market participants to take such information into account. One factor in the stability that Hulten and Wykoff find may have been the constancy of real interest rates over their sample. This suggests that their stability result may be sample-specific. On the other hand, since the assets we are concerned with are governmental, tax considerations are unimportant. Lacking a systematic guide for deviating from them, we will accept Hulten and Wykoff's constant rates, with the caveats here mentioned.

Having concluded that used asset price behavior can be described by a single geometric depreciation rate, Hulten and Wykoff turned to the problem of what geometric depreciation rates are appropriate for assets for which no resale data exists. They find the number R such that the ratio of R to the BEA service life equals the depreciation rates reflected in used asset prices (for the components for which they did

not have data), and to use the average value of R to find depreciation rates for the other categories. For four categories of equipment, they found an average R of 1.65; for two types of buildings, the average is 0.91.

We have adopted this distillation of the relation between market depreciation and BEA services lives in our calculations rather than attempting to relate the categories for which market depreciation rates exist to various government categories. We have used this approach chiefly because private and government assets may differ in their pattern of service flow, even when private-sector counterparts to government assets appear to exist. This is suggested by the differences in BEA service lives for various assets, depending on whether they are held by the federal government or the private sector, as shown in Table 2. Rather than attempting to second-guess these comparisons, we have followed the approach of Hulten and Wykoff and accepted the BEA assessments of the appropriate service lives for various items, and used these lives to infer depreciation rates. The depreciation rates we use are those consistent with Hulten and Wykoff's approach for their non-market data cases, namely, 1.65/BEA service life for equipment, and 0.91/BEA service life for structures. The service lives that Hulten and Wykoff use for the private sector are the "central" ones, so that no Winfrey retirement pattern is used. For those assets for which detailed service lives are available, however, we have utilized this detail. This allows our estimates, like those of the BEA, to account properly for the rapid "depreciation" of military equipment in wartime and its aftermath.¹² These problems and approximations suggest that our

results should be interpreted with some caution; they are a first step, not definitive.

The Hulten-Wykoff depreciation rates are consistent with observations of Young and Musgrave (1981), and of Hulten and Wykoff (1981) in summarizing earlier studies: Equipment depreciates faster than straightline in the early years, and structures depreciate more slowly. These depreciation rates are certainly significant topics for future research. We feel that they are the best depreciation estimates available which are consistent with the spirit of the asset-price approach.

4. Results

Our estimates of the net investment and net stock of federal non-residential capital in constant 1984 dollars are reported in Tables 3 and 4, which also include those of the BEA. Appendix Table 1 shows the same results in current dollars.

12. One drawback of any geometric approach is that some of the investment of any year is always present in the capital stock. For some items, this may not be plausible. Following World War II, there was a large overhang of Federal capital, mostly in military categories. Much of the stock of Federal military structures of 1945, with a service life of fifty years, is still remaining: 48 percent, comprising 6 percent of the total 1984 Federal nonresidential capital stock. By the BEA's measure, investment from the early 1940's retains less than 20 percent of its value, contributing only about 1.4 percent to the 1984 total. The equipment of that era, though, has long ceased to making a significant contribution to the total. Aircraft of that era had service lives as short as three years, and these have depreciated to less than one billionth of their original value. Some equipment, though, has been more long-lived, particularly ships, (eg, the New Jersey), so that World War II era equipment constitutes about 0.3 percent of the total 1984 Federal nonresidential capital stock.

We estimate that the net federal capital stock is at an all-time high of more than \$800 billion after growing steadily since 1950. The broad trends in our estimates are roughly consistent with those of the BEA - with a sharp peak during World War II and growth after 1950 - which is not surprising given our use of BEA figures for gross investment and service lives. Nevertheless, as shown in Figure 1, we obtain a strikingly different level and pattern for the net federal capital stock. Whereas our value is more than 17 percent below that of the BEA at the end of World War II, our estimate is currently 20 percent higher. The net stock of the federal government in 1984 is 10 percent above the World War II peak according to our estimates, while the BEA's 1984 figure is still 13 percent below its 1945 value.

We also estimated the net federal capital stock using a frequently-used alternative to straight-line depreciation, double-declining balance. This series is also shown in Table 3. The double-declining balance assumption yields a net stock which is always below the estimates of the BEA, by as much as a third in 1945, but 15-20 percent for most of the postwar period. Clearly, it is not only the form - declining-balance or straight-line - of depreciation which matters, but also the rate.

Since we start with a much lower net stock but end substantially higher, our estimates of net federal non-residential investment are, of course, larger than the BEA's over the post-war period. As shown in Figure 2, however, the two series track quite closely over the last thirty years. Note that the BEA estimates that net investment was negative in seven years in that period, while, according to our estimates, there was net disinvestment only in 1957.

Disaggregated net capital stock and investment series for military

and civilian equipment and structures are presented in 1984 dollars in Tables 5 through 8.¹³ Our estimate of the net stock of structures is always above that of the BEA, as shown in Figure 3. Straight-line depreciation is always greater than 0.91-declining balance depreciation. The difference between our aggregate net stock estimates and those of the BEA in recent years is almost completely the result of differences in the stock of structures. This can be seen in Figure 4, which compares the two estimates of the net stock of equipment. The two series are quite close after 1950. The more rapid early depreciation of 1.65-declining-balance relative to straight line is approximately balanced by its thicker tail. The more rapid early depreciation of equipment during World War II more than outweighs, however, the slower depreciation of structures. Equipment, which had fallen to less than 40 percent of the net stock during the mid-70's after being two-thirds in 1945, is now 46 percent of the net stock.

Figure 5 pictures the division of the aggregate federal capital stock between military and non-military. It is interesting that, until the 1980's, most of the postwar surges in the net stock of military capital have corresponded to similar increases in civilian capital. We estimate military capital comprised 56 percent of the net federal non-residential capital stock in 1984.

5. Interpretations and Implications

The results reported above amply document an important fact of life in the U.S. economy: the federal government's capital is large and

13. Appendix Tables 2-5 show these data in current dollars.

growing, and federal government investment is an important part of national capital formation. While the investment and capital stock series exhibit interesting trends and movements of their own, the facts that the federal capital stock is large and net investment quantitatively important, irrespective of depreciation methods, are the most important findings of this paper. In order to highlight the importance of improved measures of federal government investment, net capital formation, and depreciation, let us try to put these estimates in perspective.

First, Figure 6 compares our estimate of federal government net investment with the federal government budget deficit. Obviously, the federal government fiscal deficits currently swamp both gross and net investment. In more normal budgetary times, however, failure to separate capital and current expenditure accounts not only can cause a mis-statement of the deficit, but in fact reverse its sign. A cursory examination of Figure 6 reveals that for the bulk of the post-war period through 1970, with an occasional exception, federal government net investment exceeded the size of the federal government budget deficit, implying that a federal government current expenditures budget would actually have been in surplus. Numerous other adjustments need to be made to make sense of federal government budget deficit figures, such as adjusting for the decline in the real value of the federal government's previously issued debt, inclusion of a variety of items left out of the official budget figures, etc.¹⁴ Thus, we do not propose merely to

14. See Boskin (1982) and Boskin (1986).

subtract federal government net investment expenditures from total outlays in order to arrive at a final current expenditures budget deficit figure, but it is one important component to more comprehensive and accurate budget reporting.

Second, various historical episodes are of interest in the composition of federal government net investment. These are displayed pictorially in Figure 7. Of particular interest is the substantial rate of military investment in the late 1950s and early 1960s, followed by a reduction in military net investment to virtually zero (with an occasional 2 or 3 year exception) until the Jimmy Carter and Ronald Reagan years. Beginning in 1977, net military investment increased substantially, and really took off in 1981. Non-military investment grew from the late 1950s to a peak in 1966, and then began a substantial decline until a trough at a trivial level from the late 1960s through 1976. Net non-military investment then grew substantially until 1980, but has since declined.

Next, consider measures of national wealth. While it is not our purpose here to discuss various measures of the private capital stock, we report in Figure 8 the BEA estimates of federal and private tangible nonresidential capital, together with our estimates of federal capital along with the Hulten/Wyckoff (1981) estimates of private capital through 1974, the last year for which their data are available. Whether one takes the BEA estimates or ours combined with Hulten/Wyckoff, it is clear that federal government capital is a substantial fraction, approximately one-quarter, of private tangible capital. If we unified accounts for all levels of government, including state and local governments, which have much larger capital stocks in the aggregate than does the federal

government, the government share of total tangible capital in the United States would be substantially larger. Thus, our national wealth is seriously understated if we ignore federal capital and estimates of the growth of this tangible capital can also be misleading when growth rates differ between government and private capital, as appears to have been the case from a cursory examination of Figure 8. Note that, by either measure, the federal capital stock has been growing less rapidly than the private. While this trend is noteworthy, we draw no normative conclusions.

A comparison of gross and net federal investment with federal expenditures on goods and services is given in Table 9. Gross investment has returned to the level of the early 1950's -- more than 20 percent of federal expenditures -- after falling below 15 percent in the late 1960's. It is interesting that the current share is approximately the same as is gross private domestic investment in the private domestic product.

Finally, we note in Table 10 a comparison of net federal government investment to the traditional NIPA net national saving figures as a share of NNP. On average, from 1951 to 1980, total net national saving averaged between 6 percent and 7 percent of NNP. That figure has plummeted in the 1980s, falling below 2 percent in 1982 and 1983. Thus, in these years when the net investment of the federal government was 0.7 percent of NNP, the net national saving rate could be underestimated by more than a third by excluding net investment in federal government tangible capital. As mentioned earlier, most of the net federal investment in the 1980s has been military. On average, net federal investment ran about 10 percent of NIPA net saving. Of course, there are other problems with the NIPA measures of net saving. We

prefer to include consumer durables as saving, and the rental flow from them as consumption; and we would also impute services to the tangible capital of state and local governments as consumption, while adding net investment of this sector as part of net saving.

While federal government net investment is a relatively modest share of NNP, it is a substantial share of our very low traditionally measured net national saving rate. It has also been growing during this period of substantial nominal budget deficits on combined current and capital accounts.

Finally, ignoring net federal government investment and tangible capital, failing to impute a service flow to the consumption from the large net capital stock, etc., lead to mismeasurements of net national product, consumption, and net saving and investment. For example, a federal government capital stock of \$800 billion would imply a consumption out of that capital stock at current real interest rates of one percent of net national income and therefore a 1.5 percent understatement of consumption.¹⁵

It is clear that for a variety of purposes, from properly measuring net national income, consumption, saving, and national wealth to understanding the uses of government funds, improved estimates of government investment, depreciation, and capital stocks are potentially valuable information. We hope in this paper that we have helped to

15. Ideally, national product accounts would include an income imputation to all forms of capital not currently counted, including consumer durables and state and local government capital, as well as federal capital. Since we do not present comparable estimates of the stock of state and local capital or consumer durables, we do not attempt to make a partial adjustment here.

elevate the discussion of these issues to a position of greater prominence and have begun to provide some very preliminary answers to these important questions.

Table 1

Comparison of Goldsmith, BEA, and OMB Estimates,
Selected Years

Net Federal Non-Residential Capital Stock
(billions of current dollars)

	<u>Goldsmith</u>	<u>BEA</u>
1946	92.3	108.4
1958	126.0	123.7

Gross Federal Non-Residential Investment
(billions of current dollars)

	<u>OMB^a</u>	<u>BEA</u>
1970	33.2	13.8
1983	88.6	71.3

^aFiscal years; investment would be even higher on a calendar year basis.

Sources: BEA (1982), Tables A19 and B12. Goldsmith (1962) Tables B-150, B-155, and B-172. OMB (1986), Table D-2.

Table 2
Service Lives
Used by the BEA, Selected Assets

	<u>Private</u>	<u>Federal Government</u>
Aircraft	16	12 ^a
Ships	22	30 ^a
Vehicles	8-10 ^b	20 ^a
General Industrial Equipment	14	19
Industrial Buildings	27	32
Electric and Gas Facilities	30	50
Hospitals	48	50

Source: BEA (1982), Table B, T-17 to T-19.

^aService life varies over time.

^bAutos: 10, Trucks and Buses: 9, Tractors: 8.

Table 3

Estimates of Net Federal Nonresidential Capital Stock
(billions of 1984 dollars)

Year	Net Stock			Net Investment			Gross Investment
	BEA	BRR	DDB ¹	BEA	BRR	DDB	
1939	101.3	115.5	87.7	5.1	6.0	4.7	9.3
1942	387.3	316.0	248.5	193.4	130.8	104.6	224.9
1945	991.0	794.1	646.9	65.5	68.8	50.4	321.0
1948	469.1	476.8	353.5	-109.3	-61.4	-52.5	14.6
1951	374.1	410.1	302.0	1.6	2.0	4.4	47.0
1954	478.8	503.6	388.5	23.0	20.2	17.1	70.7
1957	485.6	516.8	393.5	-3.9	-0.5	-3.1	41.5
1960	492.7	536.1	404.7	6.1	10.1	7.2	48.1
1963	530.0	581.2	439.2	12.8	14.9	11.2	53.5
1966	556.6	614.7	460.7	8.8	11.6	7.7	51.3
1969	555.9	627.7	462.1	-2.8	2.1	-1.6	41.4
1972	549.4	637.1	461.1	1.8	6.6	3.3	46.0
1975	548.4	649.4	463.8	2.7	6.8	3.8	46.3
1978	565.3	678.3	483.2	10.7	14.3	11.1	55.2
1981	606.5	726.4	520.3	10.2	12.2	8.5	57.4
1984	675.0	795.6	576.1	19.6	19.7	15.2	72.6

1. BEA - BEA estimates using straight-line depreciation.
Source: BEA (1982) and updates from BEA.
- BRR - "Boskin-Robinson-Roberts", using declining balance depreciation rates based on used-asset-prices.
Sources: Authors' calculations (see text).
- DDB - double declining balance depreciation.
Source: Authors' calculations (see text).

Table 4

TOTAL FEDERAL NONRESIDENTIAL CAPITAL STOCK
(millions of 1984 dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	68808	73601	-1649	-1128	2812	2290	1163
1928	67296	72726	-1480	-847	2797	2164	1317
1929	66202	72345	-1065	-365	2780	2081	1716
1930	65664	72556	-514	223	2785	2048	2270
1931	66626	74278	960	1711	2801	2050	3761
1932	68974	77407	2318	3083	2854	2089	5173
1933	72581	81790	3585	4345	2936	2177	6521
1934	77511	87449	4904	5619	3119	2405	8023
1935	82730	93480	5199	5999	3307	2507	8506
1936	87540	99144	4792	5621	3509	2680	8301
1937	91410	103906	3855	4736	3699	2818	7554
1938	96108	109489	4667	5530	3930	3067	8597
1939	101270	115514	5109	5959	4240	3390	9350
1940	109619	124144	8236	8510	4959	4685	13195
1941	181951	178360	68550	51874	14493	31170	83044
1942	387342	315959	193391	130756	54512	94175	224931
1943	691098	515901	283953	187834	136833	187008	374842
1944	920686	720145	213537	190450	215139	215253	405704
1945	990996	794120	65541	68837	255431	252134	320972
1946	761813	645098	-212707	-137937	233418	158649	20712
1947	587323	543135	-161276	-94267	173420	106410	12143
1948	469094	476794	-109324	-61449	123935	76060	14611
1949	405267	436142	-59070	-37506	80597	59033	21527
1950	372937	408430	-29698	-25388	53516	49207	23819
1951	374122	410094	1634	1956	45360	45039	46995
1952	416660	448757	40320	36717	47126	50730	87446
1953	454321	482376	35809	32079	48325	52056	84135
1954	478781	503560	23026	20170	47710	50566	70736
1955	485786	511601	6854	7967	47892	46779	54747
1956	489591	517398	3390	5474	47351	45267	50741
1957	485610	516806	-3916	-533	45437	42054	41521
1958	484324	519346	-1244	2547	43671	39881	42428
1959	486291	525555	1977	6108	42637	38506	44614
1960	492667	536112	6053	10095	42054	38012	48107
1961	503821	550518	10652	13836	41400	38216	52052
1962	516503	565690	12013	14496	40857	38374	52870
1963	529976	581163	12824	14856	40707	38676	53532
1964	540833	593825	10295	12182	40969	39081	51264
1965	547555	602821	6713	9010	41646	39348	48359
1966	556565	614668	8809	11612	42496	39693	51305
1967	558101	620199	1729	5566	43395	39557	45123
1968	558991	625725	1042	5458	43968	39552	45010
1969	555948	627726	-2754	2053	44183	39376	41429
1970	551723	628862	-3928	1181	44239	39130	40311
1971	547277	630042	-4055	1298	44304	38951	40249
1972	549424	637124	1814	6582	44203	39436	46018
1973	548253	640586	-1125	3379	43887	39384	42763
1974	545763	642525	-2395	1924	43580	39261	41185
1975	548440	649400	2734	6825	43560	39469	46294
1976	551912	657021	3347	7394	43935	39889	47283
1977	554449	663841	2342	6523	44270	40093	46612
1978	565263	678289	10699	14255	44451	40896	55151
1979	581383	697016	15744	18336	45031	42439	60775
1980	595770	713647	13932	16175	46183	43939	60115
1981	606522	726391	10175	12181	47268	45263	57443
1982	628508	749117	20808	21646	48403	47564	69210
1983	654477	775086	24585	24717	51363	51231	75948
1984	674956	795604	19581	19743	53036	52874	72617

Table 5
NONMILITARY EQUIPMENT
(millions of 1984 dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	2176	1942	-289	-131	409	250	119
1928	1940	1852	-234	-87	379	232	145
1929	1852	1877	-87	25	333	221	246
1930	1924	2023	71	142	303	232	374
1931	2132	2257	207	234	280	253	487
1932	2240	2358	108	101	250	257	358
1933	2666	2726	423	365	239	296	662
1934	4028	3942	1353	1208	306	450	1659
1935	4370	4180	340	237	377	480	717
1936	5251	4922	875	737	439	577	1314
1937	6120	5646	864	719	521	666	1385
1938	7220	6578	1093	926	618	786	1711
1939	7329	6545	108	-32	737	878	845
1940	8436	7075	1100	526	1050	1624	2150
1941	13266	10150	4799	3055	2332	4075	7131
1942	34650	23848	21247	13613	7326	-8013	5601
1943	66706	44122	31851	20142	16944	-17291	2851
1944	75852	46046	9088	1911	26078	10282	12194
1945	64396	41154	-11383	-4861	32253	25731	20870
1946	42455	33714	-21800	-7392	25097	10689	3296
1947	31832	28579	-10556	-5102	12141	6687	1585
1948	26428	25245	-5369	-3315	7142	5088	1773
1949	23425	23069	-2984	-2162	4921	4098	1937
1950	21946	22487	-1470	-577	4466	3572	2996
1951	22045	23330	99	838	4119	3379	4218
1952	26246	27584	4174	4227	3705	3653	7879
1953	30999	31698	4723	4087	3313	3949	8036
1954	34123	33977	3104	2265	3062	3901	6166
1955	36980	35984	2839	1994	3046	3891	5885
1956	37466	35806	482	-177	3092	3751	3574
1957	36745	34643	-717	-1158	3120	3561	2403
1958	35910	33573	-829	-1061	3170	3402	2341
1959	35353	32941	-554	-629	3225	3301	2672
1960	36143	33700	786	753	3306	3338	4091
1961	36481	34095	335	393	3391	3333	3726
1962	36890	34557	407	459	3466	3414	3873
1963	38118	35845	1220	1280	3613	3554	4833
1964	39517	37323	1390	1468	3820	3742	5210
1965	42099	39900	2566	2561	4045	4050	6611
1966	45163	42883	3044	2966	4287	4365	7330
1967	46298	44014	1128	1121	4498	4505	5626
1968	46686	44439	386	423	4622	4585	5008
1969	46090	43983	-593	-453	4702	4562	4110
1970	45306	43445	-779	-535	4732	4489	3953
1971	44839	43262	-464	-184	4735	4454	4270
1972	42661	41565	-2164	-1684	4746	4266	2582
1973	41450	40939	-1204	-623	4744	4163	3540
1974	39762	39838	-1677	-1093	4762	4179	3085
1975	38455	39313	-1298	-519	4751	3972	3453
1976	36925	38661	-1521	-648	4645	3772	3124
1977	37124	39579	198	910	4457	3744	4654
1978	39729	42643	2589	3044	4420	3965	7009
1979	45479	48453	5713	5773	4553	4493	10266
1980	49881	52649	4374	4169	4739	4944	9113
1981	49333	51981	-544	-664	4868	4987	4323
1982	48642	51167	-687	-809	4872	4994	4185
1983	48811	51107	168	-62	4902	5132	5070
1984	49229	51306	416	198	4971	5189	5387

Table 6
MILITARY EQUIPMENT
(millions of 1984 dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	13284	11698	-768	-849	890	970	122
1928	12529	10969	-740	-714	895	869	155
1929	11811	10365	-704	-592	903	792	199
1930	11204	9937	-595	-419	911	735	316
1931	10732	9697	-463	-238	926	701	463
1932	10212	9449	-510	-241	942	673	432
1933	9718	9258	-484	-189	949	655	466
1934	9282	9145	-427	-111	960	644	533
1935	8720	8926	-551	-212	965	626	414
1936	8055	8630	-652	-292	973	613	321
1937	7445	8403	-598	-220	975	598	378
1938	7453	8773	8	362	1004	649	1012
1939	8348	9958	877	1162	1076	792	1953
1940	9126	10993	763	1014	1182	931	1945
1941	47450	33221	35180	20500	7772	22453	42953
1942	183916	109731	125691	70827	39193	94057	164884
1943	430225	261543	227248	140427	109101	195921	336349
1944	644156	453747	198083	178648	177391	196826	375475
1945	725643	527989	76640	69166	211135	218609	287775
1946	526080	389989	-183428	-127069	197060	140701	13632
1947	367693	295696	-145397	-86723	151555	92880	6157
1948	257988	233800	-100945	-57094	108324	64473	7378
1949	197922	194640	-55393	-36071	68028	48706	12635
1950	166228	165448	-29108	-26892	41801	39585	12693
1951	161265	159024	-4420	-6015	33979	35574	29559
1952	188952	181423	25703	20705	35979	40977	61682
1953	212031	199462	21453	16747	37077	41783	58530
1954	226453	209522	13145	9228	36345	40262	49490
1955	226977	209900	445	408	36462	36499	36907
1956	227904	211490	534	1315	35919	35138	36453
1957	222399	207702	-5432	-3685	33876	32130	28444
1958	218965	206049	-3376	-1592	31888	30104	28512
1959	217866	206861	-1063	779	30649	28807	29585
1960	219412	210127	1263	2894	29870	28239	31133
1961	225286	216738	5420	6132	29067	28355	34487
1962	232412	223865	6505	6537	28368	28337	34874
1963	239154	230095	6158	5721	27966	28403	34124
1964	243720	233883	4062	3407	27890	28545	31952
1965	243193	233034	-478	-730	28188	28440	27710
1966	244917	235008	1569	1827	28685	28427	30253
1967	243359	234736	-1367	-189	29230	28053	27864
1968	242511	235699	-700	934	29559	27924	28859
1969	240676	235921	-1587	285	29646	27774	28059
1970	238688	236145	-1757	249	29680	27673	27923
1971	234717	234621	-3617	-1388	29700	27471	26083
1972	238814	240217	3719	5098	29544	28165	33263
1973	238046	240525	-749	246	29223	28228	28474
1974	236679	239997	-1305	-527	28878	28100	27573
1975	239839	243601	3198	3589	28886	28495	32084
1976	244014	248109	4026	4308	29382	29099	33407
1977	244989	249742	784	1388	29892	29291	30676
1978	250880	255921	5808	6067	30082	29823	35890
1979	260295	265017	9056	8763	30498	30791	39554
1980	269126	273469	8398	8053	31354	31699	39752
1981	279040	282657	9342	8673	32191	32859	41533
1982	301151	302785	20920	19070	33571	35421	54491
1983	326761	325783	24230	21787	35711	38155	59942
1984	346363	342797	18709	16281	37744	40171	56453

Table 7

NONMILITARY, NONRESIDENTIAL STRUCTURES
(millions of 1984 dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	19583	23550	250	426	571	395	821
1928	19889	24038	307	487	578	397	885
1929	20392	24731	502	689	600	412	1101
1930	21076	25607	682	872	621	431	1304
1931	22838	27557	1742	1932	641	451	2383
1932	26127	31035	3239	3424	702	517	3941
1933	30338	35441	4173	4365	780	588	4953
1934	34818	40128	4445	4650	877	672	5322
1935	40849	46376	5991	6206	984	769	6975
1936	46142	51922	5252	5498	1110	864	6362
1937	50393	56451	4218	4495	1209	932	5427
1938	54374	60740	3950	4249	1311	1012	5261
1939	58305	64994	3900	4224	1413	1090	5313
1940	63834	70732	5457	5668	1689	1477	7146
1941	79594	85922	15410	14858	3189	3740	18598
1942	109914	115767	29562	29106	6446	6902	36008
1943	119723	127639	9571	11588	8866	6849	18437
1944	122479	133441	2683	5659	9516	6539	12199
1945	120167	134869	-2258	1396	9788	6134	7530
1946	113687	131819	-6302	-2954	8958	5610	2656
1947	109545	129937	-4010	-1802	7405	5197	3395
1948	108076	129770	-1391	-111	6147	4868	4757
1949	109046	131461	1002	1715	5332	4619	6333
1950	111373	134270	2336	2812	4937	4460	7273
1951	116127	139487	4686	5144	4923	4464	9609
1952	123653	147638	7378	8000	5017	4396	12396
1953	130773	155634	6977	7841	5415	4551	12393
1954	136089	162082	5208	6325	5709	4592	10917
1955	136985	164194	896	2089	5715	4522	6611
1956	136904	165258	-54	1076	5582	4452	5528
1957	137235	166827	355	1574	5593	4374	5948
1958	137981	168961	768	2131	5683	4321	6451
1959	139191	171660	1227	2693	5750	4285	6977
1960	141204	175209	2017	3522	5785	4280	7802
1961	144189	179668	2977	4425	5770	4323	8748
1962	147949	184849	3740	5144	5765	4361	9505
1963	152531	190846	4543	5934	5804	4413	10347
1964	157563	197312	4980	6398	5899	4481	10879
1965	162759	204014	5144	6625	6030	4548	11174
1966	167994	210807	5189	6724	6126	4591	11315
1967	171174	215587	3166	4739	6247	4674	9413
1968	173514	219601	2328	3977	6359	4709	8686
1969	173866	221669	370	2061	6401	4710	6771
1970	174004	223564	167	1902	6394	4660	6562
1971	175280	226583	1287	3001	6434	4720	7720
1972	176490	229602	1222	3005	6464	4682	7686
1973	178295	233229	1805	3607	6466	4665	8272
1974	180198	236979	1900	3723	6489	4666	8389
1975	182098	240691	1891	3673	6479	4697	8370
1976	183733	244105	1634	3391	6457	4700	8091
1977	186349	248476	2589	4325	6465	4729	9054
1978	189776	253650	3391	5112	6505	4784	9896
1979	192109	257708	2327	4034	6549	4841	8875
1980	194270	261561	2148	3827	6675	4996	8823
1981	197002	266007	2698	4389	6804	5113	9501
1982	198485	269239	1474	3206	6560	4828	8034
1983	199141	271657	644	2390	7364	5618	8008
1984	200068	274363	916	2676	6947	5187	7863

Table 8
MILITARY STRUCTURES
(millions of 1984 dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	33765	36412	-842	-574	942	675	101
1928	32937	35866	-812	-533	945	666	133
1929	32147	35372	-775	-487	945	656	169
1930	31461	34989	-672	-373	949	650	277
1931	30925	34768	-526	-217	954	645	428
1932	30395	34565	-519	-201	961	643	441
1933	29859	34364	-526	-197	968	638	441
1934	29383	34234	-467	-128	977	638	510
1935	28791	33998	-581	-231	981	631	400
1936	28094	33669	-684	-323	988	627	304
1937	27452	33406	-629	-258	993	622	364
1938	27061	33399	-384	-7	997	620	613
1939	27289	34017	224	606	1013	631	1237
1940	28222	35344	915	1301	1038	652	1953
1941	41640	49068	13161	13461	1201	901	14362
1942	58862	66614	16892	17210	1546	1228	18438
1943	74444	82597	15284	15677	1921	1528	17205
1944	78199	86911	3683	4232	2155	1606	5837
1945	80790	90108	2541	3136	2255	1661	4796
1946	79591	89577	-1176	-522	2303	1649	1128
1947	78253	88924	-1313	-640	2319	1647	1006
1948	76602	87979	-1619	-929	2322	1631	702
1949	74874	86972	-1695	-988	2317	1610	622
1950	73390	86226	-1455	-732	2312	1590	858
1951	74685	88252	1269	1988	2340	1622	3609
1952	77810	92112	3065	3785	2425	1704	5490
1953	80517	95582	2656	3404	2521	1773	5176
1954	82117	97979	1569	2351	2594	1812	4163
1955	84843	101524	2674	3477	2669	1866	5343
1956	87317	104844	2427	3259	2758	1926	5185
1957	89232	107633	1878	2736	2848	1990	4726
1958	91468	110763	2194	3070	2930	2054	5124
1959	93882	114093	2367	3266	3012	2113	5380
1960	95908	117076	1988	2925	3092	2155	5080
1961	97865	120016	1919	2887	3172	2205	5092
1962	99252	122418	1361	2356	3257	2262	4618
1963	100173	124377	903	1921	3323	2306	4227
1964	100033	125308	-137	910	3360	2312	3223
1965	99504	125872	-519	554	3383	2310	2864
1966	98492	125970	-993	96	3399	2310	2406
1967	97270	125863	-1199	-105	3420	2326	2221
1968	96279	125986	-972	124	3429	2333	2457
1969	95316	126152	-945	160	3433	2328	2489
1970	93725	125709	-1560	-435	3433	2308	1873
1971	92440	125576	-1260	-130	3436	2306	2175
1972	91459	125739	-963	162	3449	2324	2486
1973	90463	125893	-977	149	3454	2328	2477
1974	89124	125711	-1313	-178	3452	2317	2139
1975	88047	125795	-1057	82	3445	2306	2388
1976	87240	126145	-791	343	3452	2317	2660
1977	85988	126045	-1228	-101	3456	2328	2228
1978	84878	126075	-1089	32	3445	2324	2356
1979	83500	125839	-1352	-233	3431	2312	2079
1980	82492	125968	-988	126	3415	2301	2427
1981	81147	125746	-1320	-217	3406	2303	2086
1982	80230	125926	-899	178	3399	2322	2500
1983	79764	126539	-457	602	3385	2326	2928
1984	79295	127138	-460	588	3374	2326	2914

Table 9

Federal Non-Residential Investment as a Percentage
of Federal Expenditures on Goods and Services, Selected Years

<u>Year</u>	<u>Gross</u>	<u>Net</u>
1939	16.9	10.7
1944	50.7	24.3
1949	16.6	-25.2
1954	26.7	7.9
1959	18.3	3.0
1964	19.3	4.8
1969	12.7	0.7
1974	15.9	0.8
1979	22.7	7.1
1984	22.0	6.0

Sources: Federal Expenditures on Goods and Services, The National Income and Product Accounts 1929-1974, Tables 3.2 and 3.7. and Economic Report of the President, 1985 Tables B-76 and B-3. Gross and Net Federal Non-Residential Investment, Table 4.

Table 10

Contribution of Net Federal Nonresidential Investment
to Net National Saving

Percent of NNP

	NIPA Net National Saving	Net Federal Nonresidential Investment	Net Federal Civilian Non-Residential Investment
1951-1960	7.6	.9	.4
1961-1970	8.2	.4	.3
1971-1980	6.8	.2	.1
1981	5.9	.3	.1
1982	1.8	.7	.1
1983	2.0	.7	.1
1984	4.5	.5	.1

Sources: NNP - Economic Report of the President, 1985, Tables B-19 and B-3. Net Federal Non-Residential Investment - Tables 4,5, and 7.

Figure 1
Comparison of BEA and BRR Net Federal
Nonresidential Capital Stock

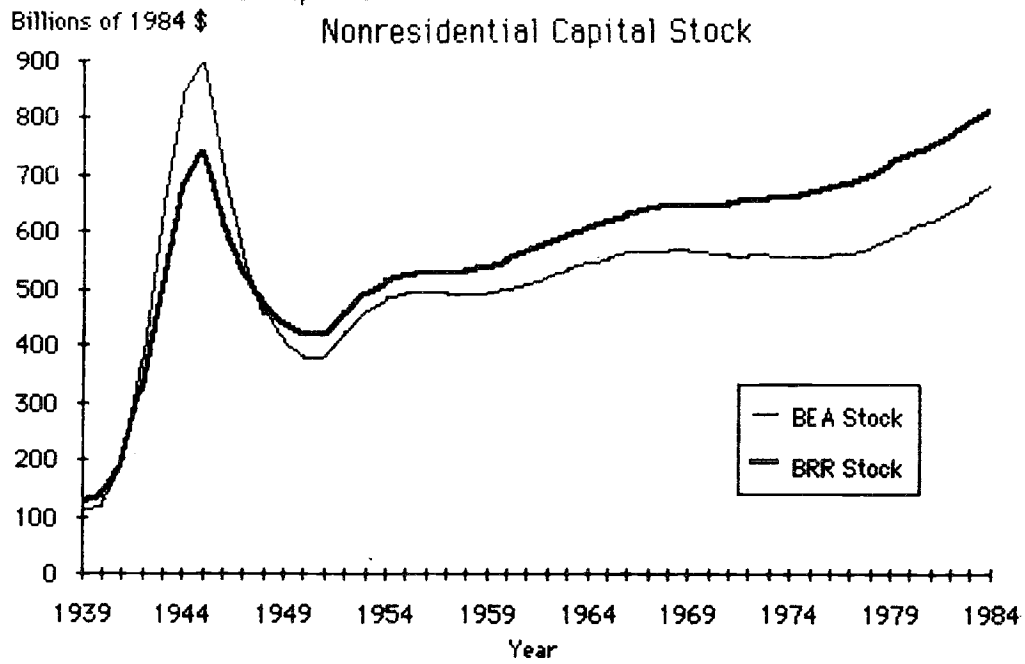


Figure 2
Comparison of Net Federal Nonresidential
Investment

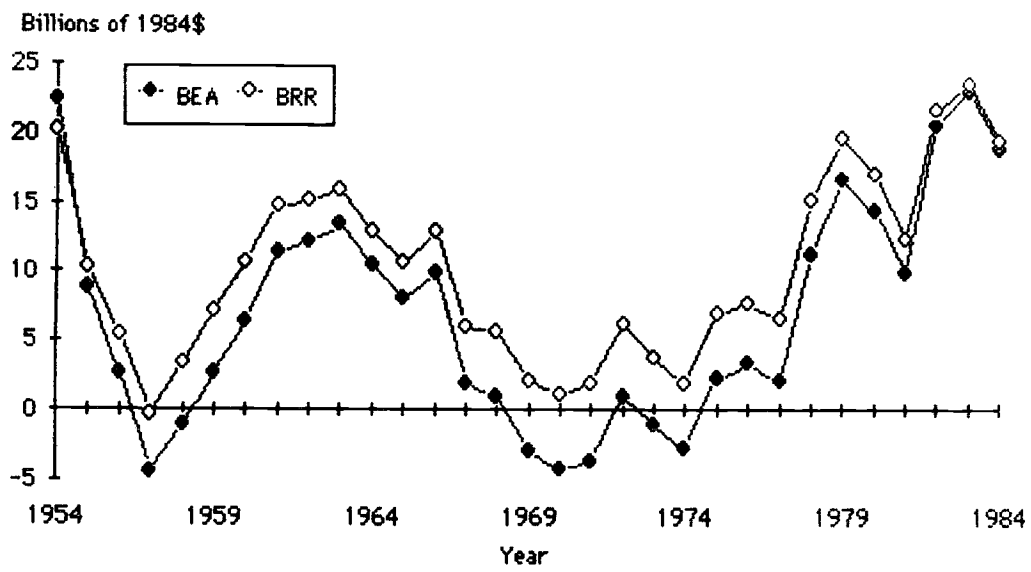


Figure 3
Comparison of Stocks of Federal
Nonresidential Structures

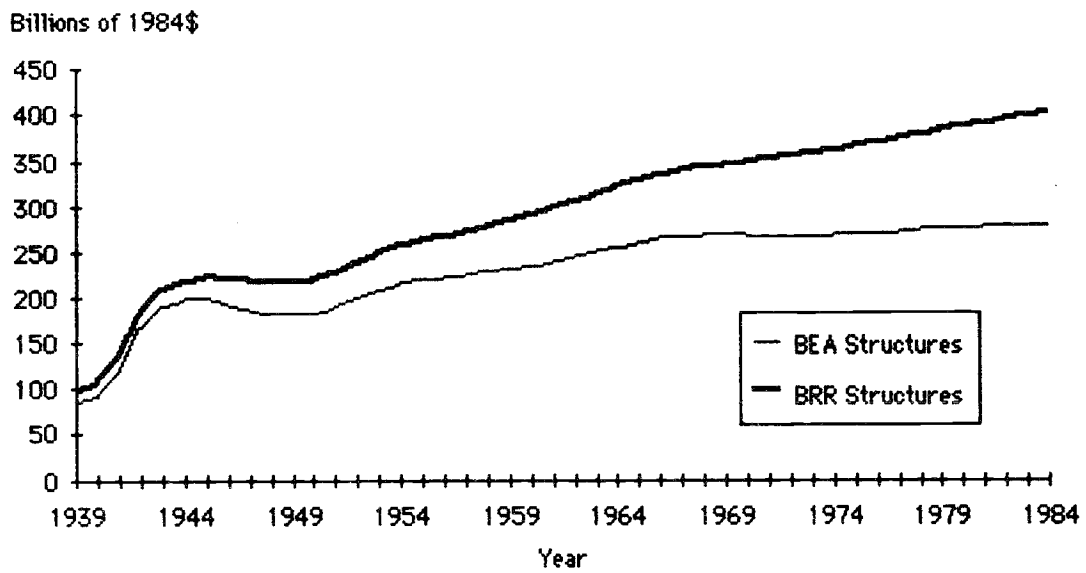


Figure 4
BEA and BRR Net Equipment Stocks

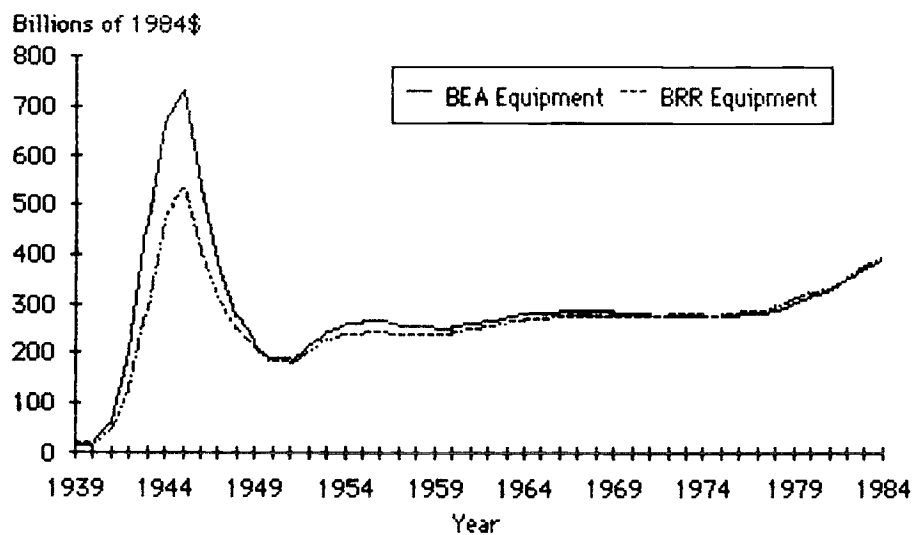


Figure 5
Federal Nonresidential Capital Stock by Usage

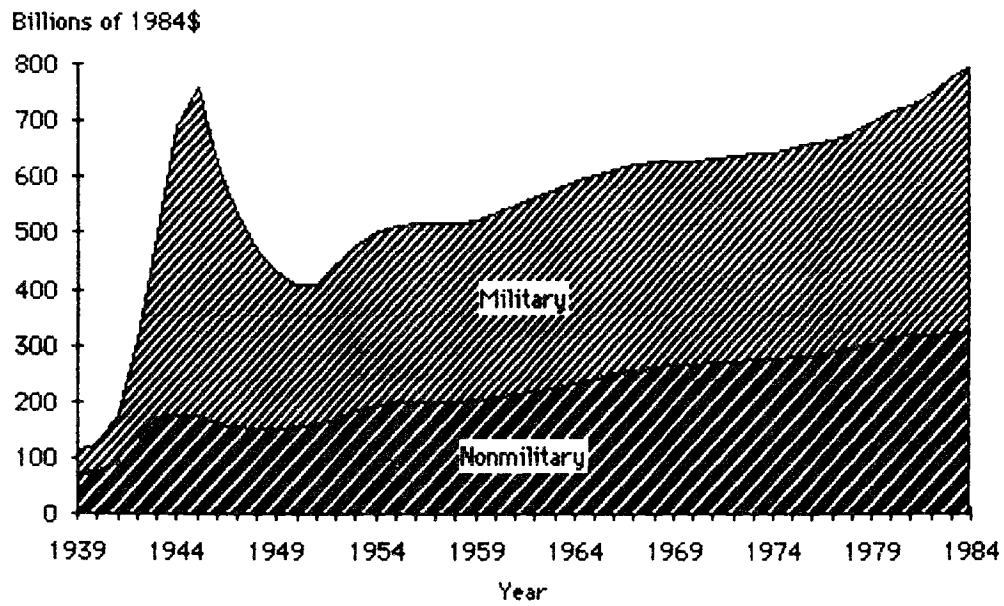


Figure 6
Comparison of Federal Investment with Federal Budget
Deficit

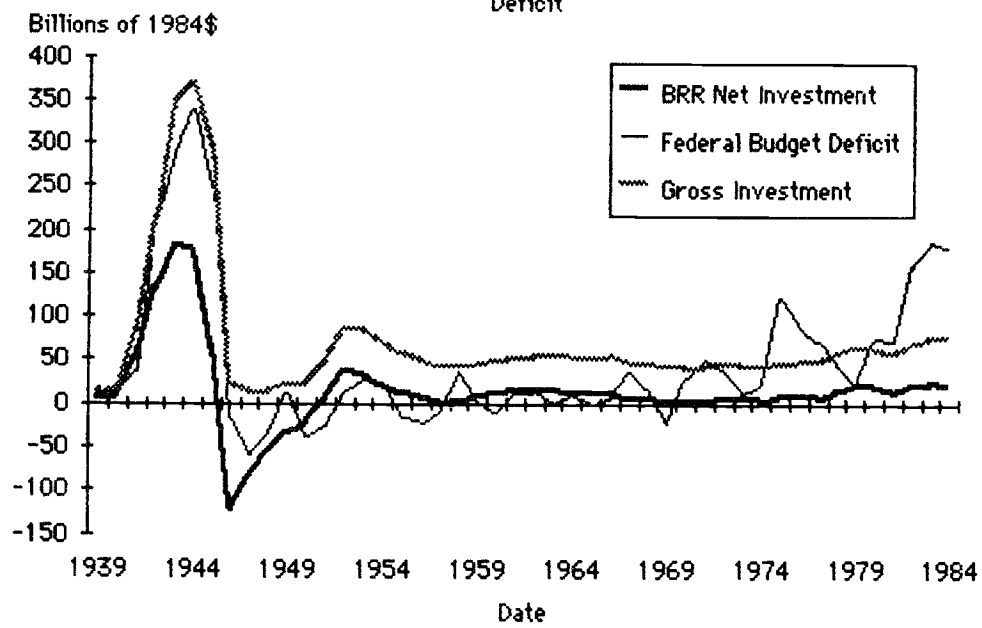
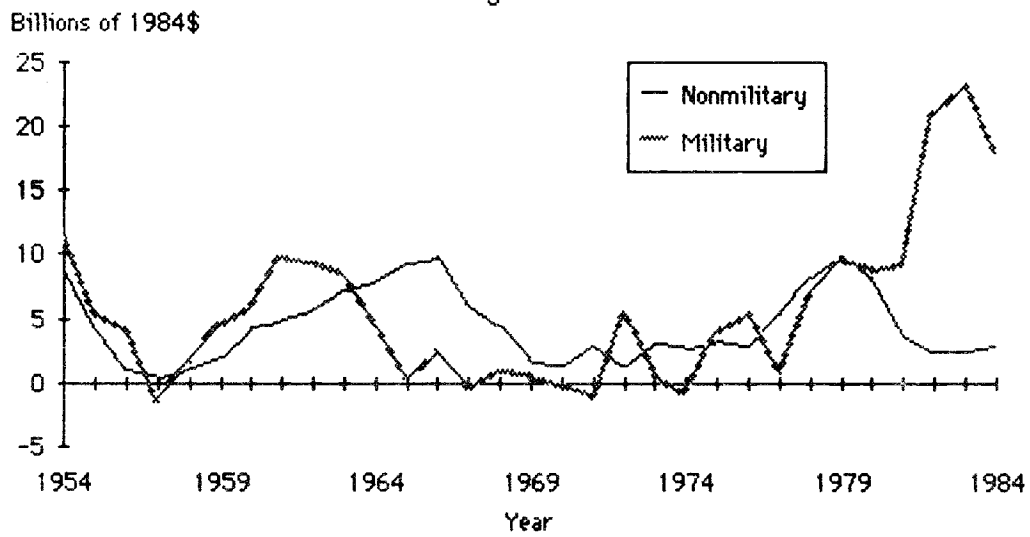
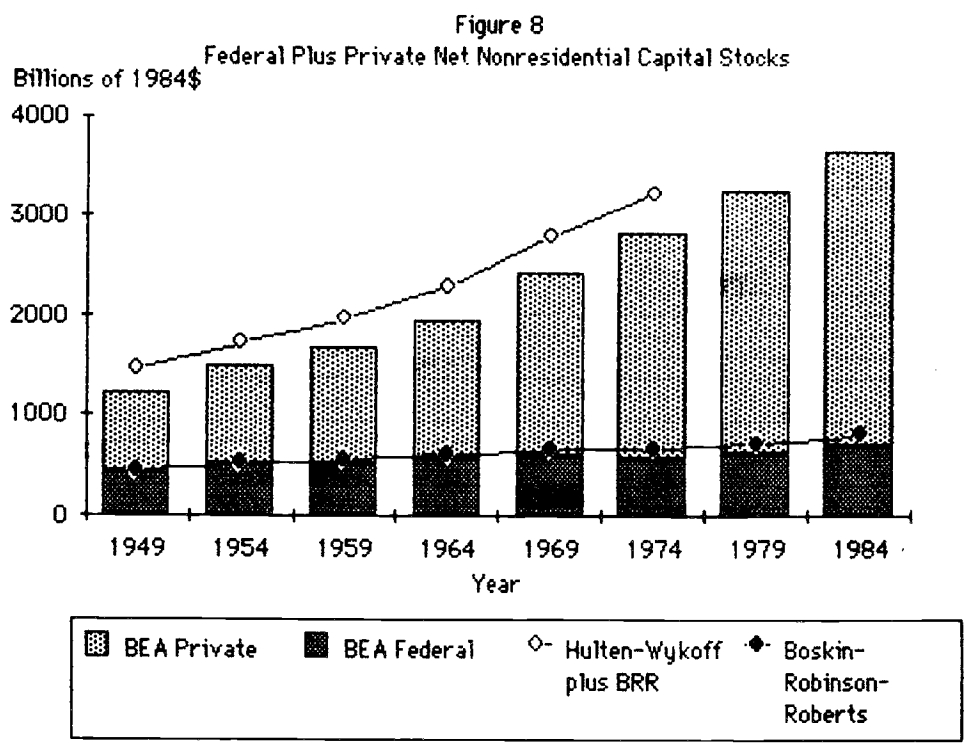


Figure 7
Comparison of Military and
Nonmilitary Net Investment





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Table A1

TOTAL FEDERAL NONRESIDENTIAL CAPITAL STOCK
(millions of current dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	7485	7989	-189	-123	322	256	133
1928	7169	7743	-160	-85	311	236	151
1929	6849	7484	-108	-28	305	225	197
1930	6337	6994	-35	42	289	212	254
1931	5670	6298	101	170	265	196	366
1932	5570	6227	165	224	233	174	398
1933	6510	7311	358	418	248	188	606
1934	7480	8393	572	634	299	237	871
1935	8203	9203	605	677	318	246	923
1936	9225	10370	560	638	345	267	905
1937	10040	11319	486	575	394	305	880
1938	10512	11877	564	652	422	334	986
1939	11201	12660	589	678	445	356	1034
1940	12785	14305	917	936	548	529	1465
1941	21261	21241	6968	5391	1550	3128	8519
1942	44659	38076	20874	14487	5789	8784	23272
1943	77154	60166	30621	20668	14486	17929	38597
1944	100898	80914	22669	20222	23007	22229	42450
1945	117239	96129	6764	7307	27896	27353	34660
1946	108411	94801	-26761	-17089	29662	19990	2901
1947	95275	91050	-23207	-13493	25373	15659	2166
1948	83553	86438	-16790	-9465	19519	12194	2729
1949	74437	80549	-9289	-5813	13286	9810	3997
1950	73535	80763	-4709	-3964	9178	8433	4469
1951	79535	87408	902	916	8759	8745	9661
1952	90360	97584	8720	7956	9239	10003	17959
1953	100163	106274	8260	7403	9871	10728	18132
1954	105768	111066	5168	4608	10072	10633	15240
1955	112860	118591	2404	2622	10584	10365	12988
1956	121667	128385	623	1231	11437	10829	12060
1957	123488	131242	-1272	-284	11607	10619	10335
1958	123688	132452	-474	615	11323	10234	10849
1959	124608	134505	524	1661	11213	10075	11737
1960	126438	137408	1569	2662	11118	10025	12687
1961	130844	142775	2917	3776	10970	10111	13887
1962	136151	148916	3207	3889	11054	10372	14261
1963	141589	155137	3611	4165	11282	10728	14893
1964	146389	160815	2792	3342	11382	10833	14174
1965	152034	167637	2176	2827	11797	11145	13972
1966	159832	176875	2831	3612	12320	11539	15151
1967	166588	185521	541	1659	13015	11897	13556
1968	174889	196461	281	1633	13627	12275	13908
1969	183952	208935	-932	652	14362	12778	13430
1970	195511	224460	-1433	387	15272	13453	13839
1971	204563	237741	-1328	681	16124	14115	14796
1972	215251	252846	371	2316	16631	14686	17002
1973	231378	275313	-437	1525	17229	15267	16792
1974	255295	306589	-1170	964	18198	16065	17029
1975	278903	335891	1062	3345	20177	17894	21239
1976	297236	359827	1570	3933	21815	19452	23385
1977	325772	396004	1142	3732	23878	21290	25020
1978	358842	437111	7124	9605	26109	23628	33233
1979	414345	506647	10998	13088	29373	27284	40371
1980	470619	572241	10606	12637	33561	31531	44167
1981	522605	633083	8062	10064	37920	35919	45983
1982	567370	679648	18287	19272	42637	41652	60924
1983	619405	735149	23243	23453	48042	47831	71284
1984	674956	795604	19581	19743	53036	52874	72617

Table A2

NONMILITARY EQUIPMENT
(millions of current dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	285	254	-44	-20	62	38	18
1928	255	243	-36	-13	58	35	22
1929	241	244	-13	4	50	33	37
1930	245	258	10	20	43	33	53
1931	262	277	28	31	37	34	65
1932	262	276	14	13	31	32	45
1933	308	315	50	43	28	35	78
1934	463	453	162	145	37	54	199
1935	477	456	38	27	43	54	81
1936	580	544	93	79	47	61	140
1937	711	656	100	83	60	77	160
1938	799	728	128	109	73	92	201
1939	877	783	11	-3	77	91	88
1940	1262	1058	142	68	136	210	278
1941	2284	1747	714	455	347	606	1061
1942	6011	4137	3137	2010	1082	-1183	827
1943	10978	7261	4513	2854	2401	-2450	404
1944	12159	7381	1276	268	3662	1444	1712
1945	11172	7140	-1533	-655	4344	3466	2811
1946	8724	6928	-3518	-1193	4050	1725	532
1947	7130	6402	-2284	-1104	2627	1447	343
1948	6223	5944	-1229	-759	1635	1165	406
1949	5615	5530	-687	-498	1133	944	446
1950	5482	5617	-326	-128	991	793	665
1951	5840	6181	24	204	1002	822	1026
1952	7075	7435	968	981	860	847	1828
1953	8451	8641	1104	955	774	923	1878
1954	9263	9223	739	539	729	929	1468
1955	10478	10196	716	503	769	982	1485
1956	11522	11011	141	-52	901	1094	1042
1957	11774	11100	-231	-374	1008	1150	776
1958	11683	10923	-281	-360	1075	1154	794
1959	11717	10918	-191	-217	1114	1140	923
1960	12064	11248	272	261	1145	1156	1417
1961	12156	11361	112	131	1131	1112	1243
1962	12363	11581	137	155	1168	1150	1305
1963	12801	12037	410	430	1216	1196	1626
1964	13405	12661	470	496	1291	1265	1761
1965	14474	13718	885	883	1395	1397	2280
1966	15994	15187	1063	1036	1497	1524	2560
1967	17031	16191	409	406	1630	1633	2039
1968	17952	17087	146	160	1751	1737	1897
1969	18360	17521	-233	-178	1846	1791	1613
1970	18979	18199	-322	-221	1956	1855	1634
1971	19295	18617	-199	-79	2032	1912	1833
1972	18605	18127	-942	-733	2066	1857	1124
1973	18946	18713	-536	-277	2112	1853	1576
1974	20868	20908	-817	-533	2320	2036	1503
1975	22129	22622	-740	-296	2709	2265	1969
1976	22348	23399	-962	-410	2938	2386	1976
1977	23752	25322	134	617	3021	2538	3155
1978	27371	29378	1867	2194	3187	2859	5053
1979	33907	36124	4457	4504	3552	3505	8009
1980	42186	44526	3751	3576	4065	4240	7816
1981	45298	47729	-475	-580	4249	4354	3774
1982	46784	49213	-647	-761	4587	4701	3940
1983	48342	50616	163	-60	4774	4997	4937
1984	49229	51306	416	198	4971	5189	5387

Table A3
MILITARY EQUIPMENT
(millions of current dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	1328	1169	-76	-84	88	96	12
1928	1196	1047	-72	-69	87	84	15
1929	1083	950	-67	-57	86	76	19
1930	976	866	-55	-39	84	68	29
1931	866	782	-40	-21	80	61	40
1932	781	723	-40	-19	74	53	34
1933	751	715	-37	-15	73	51	36
1934	774	762	-38	-10	85	57	47
1935	766	784	-49	-19	86	56	37
1936	744	797	-59	-26	88	55	29
1937	716	808	-59	-22	96	59	37
1938	717	844	1	36	99	64	100
1939	797	951	86	114	105	77	191
1940	909	1095	74	98	114	90	188
1941	4273	3116	3201	1889	719	2031	3920
1942	16813	10270	12243	6977	3768	9034	16011
1943	40348	24879	22698	14099	10716	19315	33414
1944	62109	44269	20560	18688	17900	19772	38460
1945	77169	56677	8209	7340	22013	22882	30222
1946	66630	50105	-22177	-15415	23944	17183	1767
1947	50782	41232	-19967	-11963	20958	12954	991
1948	38761	35184	-14950	-8509	16128	9687	1178
1949	31496	30840	-8489	-5504	10589	7604	2100
1950	28938	28573	-4577	-4276	6754	6453	2177
1951	29862	29012	-450	-893	6117	6560	5667
1952	36093	34096	5321	4219	6638	7739	11959
1953	42861	39653	4913	3817	7236	8331	12149
1954	46867	42761	2897	2097	7450	8251	10347
1955	49812	45493	836	806	7899	7928	8735
1956	53395	49108	-155	152	8461	8155	8307
1957	53353	49540	-1671	-1086	8407	7823	6736
1958	53051	49793	-1015	-427	8038	7449	7022
1959	53028	50315	-272	280	7845	7294	7574
1960	53546	51300	226	703	7706	7229	7932
1961	55975	53918	1504	1720	7546	7329	9049
1962	58759	56677	1705	1738	7532	7499	9237
1963	61299	59094	1749	1639	7648	7758	9397
1964	62826	60465	1022	874	7592	7740	8614
1965	63909	61452	23	-36	7800	7859	7823
1966	66131	63662	579	628	8086	8037	8665
1967	67922	65685	-449	-132	8491	8175	8042
1968	70027	68212	-279	195	8814	8340	8535
1969	72180	70860	-495	85	9187	8607	8692
1970	76334	75670	-594	76	9732	9061	9137
1971	77755	77850	-1117	-351	10217	9451	9100
1972	81733	82407	1212	1726	10415	9901	11627
1973	84612	85831	-239	141	10642	10263	10403
1974	90657	92445	-578	-275	10699	10396	10121
1975	101796	103840	1319	1471	11754	11602	13073
1976	110327	112544	2013	2089	12968	12893	14981
1977	124222	127061	123	397	14551	14279	14675
1978	138472	141683	3548	3679	15946	15814	19494
1979	157797	161025	5822	5655	18028	18195	23850
1980	186400	189723	5887	5680	20836	21042	26722
1981	216996	220000	7270	6784	24233	24719	31504
1982	257262	258641	18330	16748	28557	30139	46887
1983	301613	300671	22882	20605	32874	35151	55755
1984	346363	342797	18709	16281	37744	40171	56453

Table A4

NONMILITARY, NONRESIDENTIAL STRUCTURES
(millions of current dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	2028	2419	31	49	60	42	91
1928	2067	2476	39	58	60	41	99
1929	2099	2520	60	79	62	43	122
1930	2054	2465	80	99	63	44	143
1931	1956	2332	163	180	58	41	221
1932	2161	2539	231	246	54	39	285
1933	2903	3349	388	405	68	51	456
1934	3584	4080	490	510	88	68	578
1935	4312	4836	670	691	98	77	768
1936	5185	5773	591	617	116	90	707
1937	5882	6531	508	540	137	106	646
1938	6316	6997	474	508	149	115	623
1939	6777	7498	470	507	160	123	630
1940	7607	8386	606	634	189	161	795
1941	9633	10401	1569	1530	349	389	1918
1942	13644	14399	3205	3168	730	767	3935
1943	15182	16214	1144	1392	1085	837	2229
1944	15615	17022	305	658	1136	782	1441
1945	16600	18596	-278	171	1215	766	937
1946	18637	21539	-870	-393	1284	807	414
1947	20937	24751	-689	-297	1317	925	628
1948	21833	26087	-246	12	1234	975	987
1949	21658	25979	260	406	1054	908	1314
1950	22845	27458	495	591	955	859	1450
1951	25578	30644	1016	1117	1065	964	2081
1952	28041	33380	1656	1799	1129	986	2785
1953	29499	35007	1582	1783	1233	1032	2815
1954	30236	35931	1154	1405	1268	1017	2422
1955	31632	37847	208	476	1273	1005	1481
1956	33854	40773	1	276	1350	1075	1351
1957	34466	41778	120	431	1417	1105	1536
1958	34458	42074	222	562	1409	1069	1631
1959	34943	42988	342	709	1433	1066	1775
1960	35514	43959	537	912	1435	1060	1972
1961	36631	45510	784	1148	1440	1076	2224
1962	38109	47454	992	1351	1461	1103	2453
1963	39912	49764	1200	1559	1492	1132	2691
1964	42082	52519	1339	1714	1551	1175	2889
1965	44764	55925	1418	1819	1621	1220	3039
1966	47995	60025	1489	1920	1710	1279	3199
1967	51020	64029	956	1418	1824	1362	2780
1968	54707	69022	734	1238	1934	1430	2668
1969	58956	74951	129	688	2117	1558	2246
1970	63544	81429	81	698	2269	1652	2350
1971	68983	88933	510	1165	2452	1797	2962
1972	74125	96236	522	1252	2642	1912	3164
1973	82200	107283	799	1591	2844	2051	3643
1974	94049	123103	955	1871	3262	2346	4217
1975	103403	135743	1098	2122	3710	2686	4808
1976	110878	146260	1004	2044	3794	2754	4798
1977	121235	160708	1672	2782	4089	2979	5761
1978	132944	176847	2469	3709	4573	3333	7042
1979	151029	201574	1803	3116	5042	3729	6845
1980	168632	225906	1838	3269	5653	4222	7491
1981	185011	248667	2507	4063	6239	4683	8746
1982	189940	256614	1447	3119	6305	4633	7752
1983	193585	263509	633	2337	7174	5470	7807
1984	200068	274363	916	2676	6947	5187	7863

Table A5

MILITARY STRUCTURES
(millions of current dollars)

YEAR	NET STOCK		NET INVESTMENT		DEPRECIATION		GROSS INV'T
	BEA	BRR	BEA	BRR	BEA	BRR	
1927	3844	4146	-100	-68	112	80	12
1928	3651	3976	-92	-60	107	75	15
1929	3426	3769	-87	-55	106	74	19
1930	3062	3406	-70	-39	99	68	29
1931	2586	2907	-49	-20	89	60	40
1932	2366	2690	-40	-16	74	50	34
1933	2548	2932	-43	-16	79	52	36
1934	2659	3097	-43	-12	90	59	47
1935	2648	3127	-54	-21	91	58	37
1936	2717	3256	-65	-31	94	60	29
1937	2731	3323	-64	-26	101	63	37
1938	2681	3308	-39	-1	101	63	62
1939	2750	3428	23	61	102	64	125
1940	3007	3766	96	136	108	68	204
1941	5071	5976	1485	1518	135	102	1620
1942	8191	9269	2289	2332	210	166	2499
1943	10646	11812	2265	2324	285	226	2550
1944	11016	12243	528	607	309	230	837
1945	12299	13717	366	451	324	239	690
1946	14420	16229	-196	-87	384	275	188
1947	16426	18666	-266	-130	470	334	204
1948	16736	19222	-364	-209	522	367	158
1949	15668	18200	-373	-218	510	355	137
1950	16271	19116	-300	-151	477	328	177
1951	18255	21571	312	488	575	399	887
1952	19152	22672	774	956	613	431	1387
1953	19352	22973	662	848	628	442	1290
1954	19402	23150	378	567	625	436	1003
1955	20938	25054	644	837	643	450	1287
1956	22896	27492	636	855	723	505	1360
1957	23896	28824	511	745	776	542	1287
1958	24495	29662	600	840	802	562	1402
1959	24920	30285	645	890	820	576	1465
1960	25314	30901	534	787	831	579	1366
1961	26082	31985	517	777	854	594	1371
1962	26920	33203	373	646	893	620	1266
1963	27578	34241	252	536	927	643	1179
1964	28075	35169	-39	257	949	653	910
1965	28887	36542	-150	160	980	670	830
1966	29712	38002	-300	29	1027	698	727
1967	30616	39615	-375	-33	1070	728	695
1968	32203	42140	-320	41	1128	767	808
1969	34456	45603	-334	57	1213	822	879
1970	36654	49162	-598	-167	1316	885	718
1971	38530	52341	-522	-54	1423	955	901
1972	40788	56076	-421	71	1508	1016	1087
1973	45619	63486	-461	70	1631	1100	1170
1974	49722	70133	-729	-99	1917	1287	1188
1975	51575	73686	-615	48	2004	1341	1389
1976	53683	77623	-485	210	2115	1420	1630
1977	56563	82913	-788	-65	2217	1494	1429
1978	60055	89204	-760	22	2404	1622	1644
1979	71612	107924	-1084	-187	2751	1854	1667
1980	73401	112085	-871	111	3009	2027	2138
1981	75301	116687	-1239	-204	3198	2163	1959
1982	73384	115180	-843	167	3188	2178	2345
1983	75864	120353	-435	572	3220	2213	2785
1984	79295	127138	-460	588	3374	2326	2914