The Congressional Budget Office (CBO), on the other hand, has made budget projections under the assumption of no further government action to reduce the primary deficit. The CBO also assumes that interest rates, after adjusting for taxes, would remain below the growth rate of GNP. Even if the primary deficit and the interest rate on Treasury debt were to stabilize relative to GNP at the average levels projected by CBO, however, federal debt would continue to grow until it was about 133 percent of GNP.[8] It would take many years for the debt-to-GNP ratio to reach such a level; 40 years from now, debt would "only" be 90 percent of GNP.

The possible scenarios are virtually limitless. Generally, the higher the annual primary deficit, and the higher assumed interest rates are relative to the assumed rate of GNP growth, the higher will be the projected debt-to-GNP ratio. In evaluating such projections, however, one should keep two things in mind.

First, even small differences in the basic budget assumptions can make large differences in the results. A $20 billion difference in the assumed initial level of the primary deficit, followed by proportional changes in future years, would alter the projected debt-to-GNP ratio by almost 20 percent after 40 years. A $20 billion difference is smaller than differences between current forecasts of 1986 budget cuts. Similarly, the small 0.6 percentage point difference between the OMB and CBO projections of real economic growth might produce a 13 percentage point difference in their projected debt-to-GNP ratios.

One should also remember that reliable projections of the debt-to-GNP ratio would have to recognize the interdependence among the values assumed for the primary deficit, interest rates, and GNP growth rate. A lower primary deficit could, as a by-product, reduce interest rates and raise the long-term growth rate of the economy. The debt-to-GNP ratio resulting from a lower primary deficit, including these by-products, could be lower than the ratio that would result if a reduction in the primary deficit were assumed, but the by-products ignored.

Nevertheless, it appears that under some fairly reasonable assumptions about the behavior of the primary deficit, interest rates, and the growth of GNP, the federal debt-to-GNP ratio could climb beyond levels reached at the end of World War II.

The major uncertainty, therefore, is whether we can accommodate wartime debt ratios under peacetime conditions. In contrast to a wartime economy, a growing peacetime economy might only accommodate high levels of federal borrowing at the expense of private investment that is needed to foster continued growth and price stability. So far in the current recovery, record net inflows of private foreign capital have helped to finance growing public as well as private credit demands in the United States, but we cannot count on net inflows of foreign savings indefinitely. Moreover, net foreign capital inflows tend to be associated with an appreciating dollar in exchange markets. This weakens our competitive position in world markets and slows growth and employment in trade-related industries.

Persistently high levels of federal debt relative to GNP portend high real interest rates, lower private investment, and slower real growth. These effects could increase the pressure on the Federal Reserve System to expand the money supply in an effort to resist higher interest rates and to stimulate more rapid economic growth. Expanding the money suppy to reduce the debt-to-GNP ratio through faster economic growth, lower interest rates, and seigniorage eventually would rekindle inflation and ultimately could prove unsuccessful.

Cutting the primary deficit remains the surest method of reducing the growth of federal debt. The difficult challenge is to look beyond the relatively small annual increases in the debt to the large cumulative advance those increases eventually will produce, and to realize that we must take the budgetary initiatives necessary to reverse the process.

8. This is based on averages of CBO projections over a six-year horizon for: primary deficit (2 percent of GNP), 90-day Treasury bill rate (8.3 percent), and nominal GNP growth (7.7 percent). It also assumes an average marginal tax rate of 25 percent.

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ECONOMIC COMMENTARY

The Dynamics of Federal Debt

by John B. Carlson and E.J. Stevens

Interest payments on the federal debt have grown faster than the economy since 1974. If this trend were to continue unchecked, by the year 2013 the government would need the nation's entire gross national product (GNP) just to pay interest on the federal debt.

This alarming possibility is not likely to happen, because Congress and the Reagan administration are working to reduce the federal deficit.[1] However, the national debt—and the cost of paying interest on it—is still a threatening problem. The federal government often has to borrow all of the money needed to pay the interest it owes, plus more.

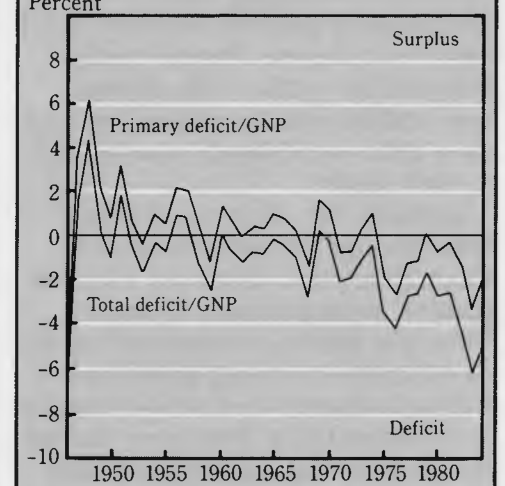
Even without new programs that add to the deficit, the national debt could still grow faster than the economy, and the federal government would require larger and larger amounts of funds relative to GNP.

In this *Economic Commentary*, we look at what makes the federal debt grow or decline. We examine the history of the debt since World War II and the implications of some plausible alternative assumptions for its future.

Debt Dynamics

The growth of the federal debt has four sources: 1) the size of the federal budget deficit or surplus, 2) the average level of interest rates on Treasury securities, 3) the average marginal tax rate for interest income, and 4) revenues that the Federal Reserve System earns from holding Treasury securities. We examine each of these factors in turn.

Chart 1 Primary and Total Deficit
Relative to nominal GNP
Percent



SOURCE: Office of Management and Budget.

Discussions about the growth of the national debt usually focus on the federal deficit, which is the negative difference between what the government spends and what it takes in through taxes and other revenues.[2]

To understand how the federal debt changes, however, it is useful to break the budget deficit into two parts: a) the primary deficit, which is the difference between non-interest spending by the government and what it takes in, and b) interest payments on the debt (see chart 1).

In any fiscal year, Congress can make significant changes in the primary deficit by either increasing or decreasing spending and taxes. In any given year, deficit spending adds to interest payments in current and future years by increasing the size of the federal debt. A surplus, of course, would have the opposite effect and would shrink the federal debt.

Interest payments on the national debt, however, are largely predetermined by the size of the debt in the current year and by the level of interest rates in the current and past years.[3]

Therefore, a second important factor in changing federal debt is the average level of interest rates on Treasury securities. An increase in interest rates can increase the federal deficit by forcing the government to borrow more money to make larger interest payments. A situation in which the average rate of interest on Treasury debt persistently exceeds the rate of GNP growth is of particular concern.[4]

To understand why, assume that the primary deficit were eliminated and that the maturity structure on the outstanding debt were constant. In this case, both interest payments and the outstanding federal debt would grow at a rate equal to the average interest rate on Treasury debt. That is, each year the government would refinance maturing notes and bills at unchanged interest rates and would take on enough additional debt to finance interest payments.

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The views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Cleveland or of the Governors of the Federal Reserve System.

1. The issue of explosive deficits is addressed in John B. Carlson, "The Debt Burden: What You Don't See," *Economic Commentary*, May 1, 1985. The current Commentary examines unique secular elements of debt dynamics and their implications for the long-term consequence of debt relative to output.

2. Year-to-year changes in the federal debt do not precisely equal the corresponding annual federal budget deficits. The inequality results because Congress borrows to finance net spending on certain off-budget programs, and because the Treasury finances a small portion of the deficit through changes in various assets such as its cash

If, in this case, the interest rate were to exceed the GNP growth rate, the federal debt-to-GNP ratio would continue to grow, implying that the government would require an increasing share of the nation's output simply to service the federal debt. The debt-to-GNP ratio would grow even faster if the primary deficit were not zero, especially if the initial level of the outstanding debt were large.

The relevant interest rate for debt dynamics is not the stated rate on bonds, notes, and bills, but the stated rate adjusted for federal taxes on interest earnings. These taxes enable the federal government to regain a portion of the money it pays as interest. Many economists estimate the average marginal tax rate for interest earnings to be about 25 percent.

A less obvious factor influencing the growth rate of the federal debt is seigniorage. This refers to revenue that the government gets as a result of the Federal Reserve System's ability to create money. The process works like this. The Federal Reserve usually adds money to the economy by purchasing Treasury securities. When the System buys a Treasury security, it pays for it with a check and thereby injects money into the banking system. The Federal Reserve System earns income from holding these Treasury securities, but does not pay interest on the money it creates. A small portion of the income is used to pay the operating expenses of the System, and the remainder is returned to the Treasury, which uses the funds to finance the government budget.[5] Seigniorage thus helps reduce debt by lowering the deficit.

Because seigniorage is a by-product of monetary policy, it links growth of the federal debt to the monetary policy activities of the Federal Reserve System. In addition to its effects on interest rates, a restrictive monetary policy that reduces growth of the money stock tends to restrict seigniorage, while an expansionary monetary policy that increases growth of the money stock tends to increase seigniorage.

History of the Deficit Since World War II

Until the 1980s, the United States ran persistently large federal deficits only in wartime. During World War II, for example, deficits averaged 25 percent of GNP, resulting in a five-fold increase in the federal debt. Heavy wartime government credit demands, however, did not conflict with private credit demands because of the unique economic conditions prevailing during the war.

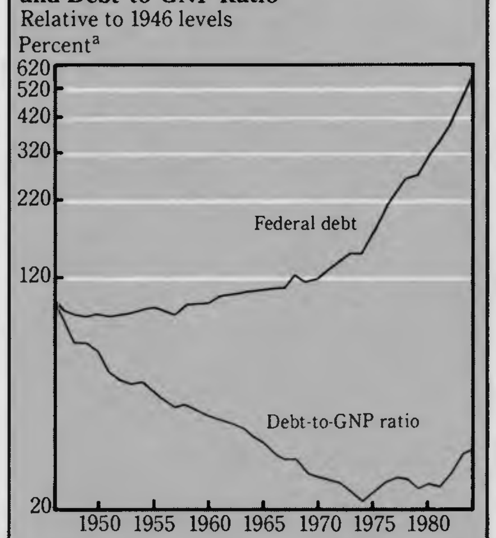
The government, by rationing, by imposing price controls, and by directly controlling production, shifted economic resources from the manufacture of consumer goods to the manufacture of military goods. Civilians typically worked long hours, but had few consumer goods on which to spend their extra income. Private credit demands for products like houses, cars, and appliances declined because these items were simply unavailable to most people.

Consequently, between 1941 and 1945, savings rates skyrocketed to about 25 percent, compared with the postwar average of only 6 percent. Thus, the federal government had little difficulty in finding individuals willing to finance the five-fold increase in the federal debt. Moreover, the Federal Reserve was committed to supporting the market for Treasury securities during the war in order to maintain a level of interest rates as low as 0.375 percent on Treasury bills.

Immediately after World War II, the federal government trimmed the large primary deficits by reducing military expenditures, and the growth rate of the federal debt slowed. As chart 2 indicates, although the federal debt grew in absolute terms, the ratio of debt to GNP began a long decline that persisted through the Kennedy tax cuts and the Vietnam military buildup, until the mid-1970s.

Between 1946 and 1974, the federal government actually had no primary deficit on a cumulative basis. Although the government often incurred annual total budget deficits, primary deficits mostly reflected the effects of the business cycle—growing during economic slowdowns and diminishing as the economy improved. The cumulative balanced primary budget contributed significantly to the decline in the debt-to-GNP ratio between 1946 and 1974.

Chart 2 Federal Debt Held by the Public and Debt-to-GNP Ratio



a. Both the dollar level of the debt and the debt-to-GNP ratio are expressed on an index with 1946 = 100.

SOURCE: Office of Management and Budget.

Many factors accounted for this cyclically balanced primary budget, but the way the budget responded to inflation was particularly important. The GNP deflator, a broad measure of price trends, rose at an annual average rate of 5.5 percent from 1946 to 1974. Until 1972, lawmakers indexed few federal spending programs against inflation. Consequently, benefits from large entitlement programs, like Social Security, did not rise automatically with the price level. Congress tried to maintain the real value of entitlement programs by making periodic changes in benefit formulas, but these adjustments occurred with a considerable lag.

Rising prices automatically increased federal revenues, which rose even faster than inflation, as expanding incomes automatically pushed people into progressively higher tax brackets. Congress offered periodic income tax cuts, but only with a lag. Rising prices, therefore, tended to increase revenues faster than expenditures over this period and helped produce the cyclically balanced primary budget.

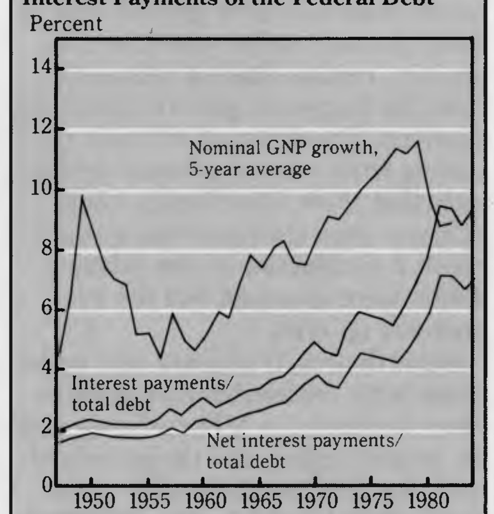
The decline in the debt-to-GNP ratio ended in the mid-1970s and was followed by a decade-long increase. Initially, the rise in the debt-to-GNP ratio reflected sharp increases in the primary deficit resulting from the severe 1973–75 recession. Economic contraction dampened tax revenues and stimulated social program spending. A one-time tax rebate added to the deficit. Attempts to reduce the deficit in the 1970s proceeded slowly and were short-lived.

In the early 1980s, the Reagan administration achieved both large tax cuts and large increases in military spending programs, assuming that it could cut nonmilitary spending and develop a sufficiently rapid pace of economic growth to eliminate the budget deficit. Since initiating those fiscal programs, however, the assumptions about real economic growth have proved unrealistic and Congress has not accepted all of the nonmilitary budget cuts.

Interest rates also influenced debt dynamics over the post-World War II period. One can think of interest rates as including a premium that prevents expected inflation from eroding the lender's purchasing power. The relative price stability of the 1950s and the early 1960s resulted in very small inflation premiums. The market apparently did not fully anticipate the subsequent acceleration of inflation or did not expect it to persist. Consequently, neither the inflation premium in interest rates nor the cost of servicing the federal debt rose enough to completely reflect the subsequent higher rate of inflation.

Interest costs of the federal debt, adjusted for the taxes on interest income, were even lower than market rates. The annual interest cost, adjusted for taxes, never exceeded the five-year-average growth rate of GNP, even though short-term interest rates occasionally exceeded 20 percent in the early 1980s (see chart 3). Although interest costs of newly issued debt were high in the early 1980s, the large proportion of long-term debt issued prior to 1980 kept the overall average interest cost of government debt relatively low.[6] Thus, low interest costs prevented the federal debt from growing faster than the economy.

Chart 3 GNP and Various Measures of Interest Payments of the Federal Debt



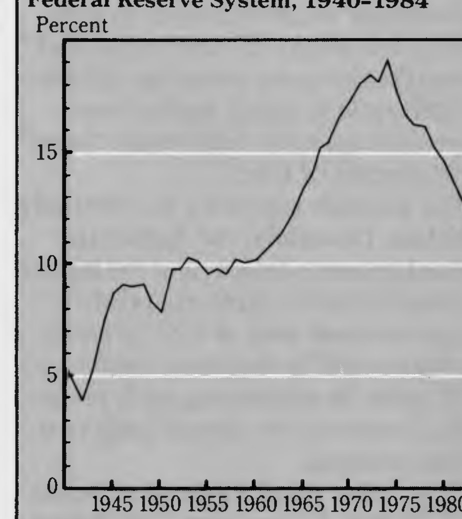
SOURCE: Office of Management and Budget.

Seigniorage also played a role in limiting the growth of federal debt during much of the post-World-War II period. Between the late 1940s and the mid-1970s, the Federal Reserve System increased its holdings of federal debt from roughly 8 percent of the total to nearly 19 percent (see chart 4). By the early 1970s, seigniorage paid approximately one-fifth of the interest cost of all publicly held debt.

Because of the rapid expansion of the primary deficit since the mid-1970s, in conjunction with the Federal Reserve's disinflationary monetary policy since 1979, the share of the public debt held by the Federal Reserve fell to about 10 percent by 1984. This reduced the share of the total interest cost on the public debt paid through seigniorage by roughly the same proportion.

Federal debt growth for much of the post-World War II period was constrained by primary surpluses, by low interest rates, and by relatively high returns from seigniorage. However, these conditions have not prevailed since the mid-1970s and are not likely to return in the foreseeable future. At best, we can hope that the federal debt will stay within the limits that have proven manageable in the past.

Chart 4 Federal Debt Held by the Federal Reserve System, 1940–1984



SOURCE: Office of Management and Budget.

Looking Ahead

We do not intend to make predictions about the federal debt—there are too many uncertainties. We can, however, present some reasonable alternatives about economic events and outline their implications for debt growth.

The Office of Management and Budget (OMB), in its Fiscal Year 1986 Budget, provided one set of assumptions on which to base projections.[7] OMB assumed that government actions would reduce the primary deficit, that real economic growth would average 4 percent, and that interest rates would decline further as inflation continues to abate. On the basis of these assumptions, OMB projected the elimination of the primary budget deficit by 1990 and predicted a continuing decline in the ratios of interest payments and of total debt to GNP.

balances. In this *Economic Commentary,* we use the term *deficit* to refer both to on-budget and off-budget items; we ignore the small changes in Treasury assets.

3. One might argue that Congress, through its power to tax and to apportion funds, is able to eliminate the primary budget deficit. Economic conditions, however, do not always favor sharp increases in taxes, and a sizable portion of federal expenditures in any given year result from implicit contracts from previous years, such as social welfare and cyclical entitlement programs.

4. See Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1986-1990, A Report to the Senate and House Committees on the Budget—Part I.* Washington, DC: Congressional Budget Office, February 1985.

5. In 1984, the System earned $18.1 billion and returned $16.1 billion to the Treasury as "interest on federal reserve notes." Since its founding in 1913, The Federal Reserve System has returned 87 percent of its earnings to the Treasury. See 71st *Annual Report*—1983, Board of Governors of the Federal Reserve System, pp. 234–35.

6. In contrast to the situation of the early 1980s, the interest cost of federal debt recently has continued to grow despite lower interest rates, because in the last five years, the Treasury has refinanced an increasing amount of debt at higher interest rates.

7. Executive Office of the President, Office of Management and Budget, Budget of the United States Government, Fiscal Year 1986.