In the ongoing debate about the size of federal deficits, views vary widely among economists. In the following article, the author uses a particular framework to assess the size of the federal deficit in light of concerns about economic efficiency. Other views about the deficit based on alternative frameworks may appear in the *Business Review* from time to time.

—Editor

Sizing Up The Deficit:
An Efficient Tax Perspective
*Brian Horrigan**

It seems that everyone is talking about the size of recent and projected federal government budget deficits these days, and many believe that deficits should be very low or zero. A number of politicians, journalists, and pundits seem to worship at the shrine of the balanced budget. The popular view is epitomized by Shakespeare's dictum: "Neither a borrower nor a lender be." Contrary to popular belief, there are good reasons why a fiscally responsible government should sometimes run budget deficits, even large budget deficits for several years in a row. Deficits and surpluses perform an important economic function, namely, to promote

*Brian Horrigan is a Senior Economist in the Research Department at the Federal Reserve Bank of Philadelphia.

economic efficiency. Indeed, if efficiency is the main criterion in deciding how to finance government expenditures, then the budget will typically be in a deficit or surplus position. From this point of view, the question in the deficit debate should focus not on whether there should be deficits, but instead on whether deficits are "too large" or even "too small" to further efficiency.

WHY DEFICITS? SOME BUDGET BASICS

In many ways, the government is no different from any of us. People do not typically run a balanced budget year in and year out; neither does the government. Because their receipt of cash is rarely synchronized with their spending desires, people sometimes spend more than they receive in income (by using their savings or by borrowing),

and other times they spend less than they receive (saving the difference). As with individuals, the government sometimes borrows and sometimes saves because it is inefficient —it wastes resources— to synchronize perfectly its income (tax revenues) with its spending plans.

In other ways, the government is radically different from the individual. In particular, the government is "immortal." An individual, for example, can borrow only up to his expected ability to repay the principal and interest on his loans within his own lifetime. Since the government's "lifetime" is indefinite, it can refinance its debt year after year, so long as its capacity to raise tax revenues to pay the interest on the debt is assured.[1]

Some economists hold the view that government deficits play no major role in economic activity unless they are so big that, if they continue, it would be doubtful that the government could raise taxes to service its debt. (Indeed, the weight of economic research has not indicated a strong relationship between government deficits, or debt, and economic activity.) If we adopt this view of government deficits, which is an unsettled issue in macroeconomics, and if we emphasize eliminating waste in financing government spending, then some judgments can be made about whether projected deficits are too large. (See *Debt Neutrality* in A THEORY OF DEFICITS.) The logic involves a notion of "efficient taxation," which suggests a rule for financing government expenditures while minimizing tax-related inefficiencies in the economy.

HOW TO SET TAXES TO MANAGE THE DEFICIT

Judgments about how to finance government spending, and, therefore, to manage deficits, are very different from judgments about the proper size of government or the level of expenditure on particular items. Unfortunately, these two issues have been confounded in much of the discussion about the size of the deficit. Economists who apply the principles of efficient taxation to the problem of financing government spending take the level of government spending as given, and ask: what is the best way to finance current and future government spending?

The government could keep the budget balanced (or nearly so), if it so desired, by raising tax rates whenever tax revenues fell below expenditures, and by reducing tax rates whenever tax revenues were larger than expenditures. Many economists do not think such a policy is sensible because it is inefficient. They argue that a policy which frequently raises and lowers tax rates imposes unnecessary costs on the economy. Instead, they claim, it is preferable to stabilize tax rates, and to let deficits and surpluses occur.

The theory underlying this notion rests on two propositions: first, taxes cause inefficiencies— waste—in the economy. For example, income taxes discourage work and investment, change the allocation of resources among industries, generate administrative and collection costs, and encourage tax avoidance and tax evasion. Economists call the economic inefficiencies caused by these distortions the "deadweight loss due to taxation." Second, as tax rates rise, these deadweight losses rise more than proportionately. If tax rates increase twofold, for example, then the deadweight loss more than doubles.[2] Resources are wasted adjusting to the changes in tax rates.

Taken together, these two propositions imply a tax "rule" that sets the tax rate as low as possible (given projected government spending and tax base changes) and that stabilizes the tax rate, that is, that minimizes fluctuations in the tax rate. Following a rule based on the importance of effi-

---

[1] The government, like each individual, faces an intertemporal budget constraint: the present value of all tax revenues equals the present value of all government non-interest spending plus the value of the national debt. The constraint can only be violated by declaring bankruptcy.

Throughout this paper, I ignore the possibility that some government revenues come from the creation of money— "seignorage," in economic jargon. If the present value of spending plus the national debt exceeds the present value of tax revenues, the government presumably must print money (with inflationary consequences) to close the gap.

[2] For a discussion of the theory and evidence concerning the inefficiencies caused by the tax system, see A. Protopapadakis, "Supply Side Economics: What Chance for Success?" this *Business Review*, (May/June) 1981. There is a large literature on the economic theory of efficient taxation. Standard references are: A. Harberger, *Taxation and Welfare*, (Boston: Little, Brown and Co., 1974), Chapter 2, and A. Atkinson and J. Stiglitz, *Lectures on Public Economics*, (New York: McGraw-Hill Book Co. 1980), Chapters 11 to 14.

cient taxation suggests that there will be deficits (indeed, that there ought to be deficits—see *Principles of Efficient Taxation* in A THEORY OF DEFICITS) whenever there are changes in economic conditions. And economic change, of course, is typical of our world: GNP and the tax base grow over time, there is inflation, GNP fluctuates with the boom and bust of the business cycle, and government expenditures fluctuate during the business cycle and between wartime and peace-time.

WHY THERE SHOULD BE DEFICITS

...With Economic Growth... A somewhat surprising implication of the efficient-tax rule is that, if real (inflation-adjusted) GNP grows steadily, then the debt should grow with it, which means, of course, that there will be continuing deficits. (Recall that the efficient tax principle presumes that deficits have no macroeconomic impact save these financing considerations.) For example, take an economy in which real GNP, the tax base, and government expenditures (excluding debt service—interest payments on the debt) are expected to grow at the same fixed rate indefinitely. If the tax *rate* were set so that the budget was balanced now, then in the future the government would show increasing surpluses as the economy continues to grow. The surpluses come about because tax receipts grow as the tax base grows. However, the debt service component of the budget remains constant, because the debt is not growing. Thus, total government expenditures (non-interest expenditures plus debt service) will grow more slowly

---

A THEORY OF DEFICITS

Some economists have worked out a theory which attempts to find the optimal combination of deficits and taxation necessary to finance a given pattern of government spending plans. The theory of optimal deficits rests on two pillars: first, the proposition that government debt is neutral, and second, the theory of efficient taxation.

Debt Neutrality

The proposition that debt is neutral recognizes that government spending must be paid for and suggests that government debt is nothing more than a means of substituting future taxation for current taxation. If people are rational, they realize that real deficits today imply higher taxes in the future. Knowing that higher future taxes will reduce their future after-tax income, people will save more when there is a deficit to maintain a constant level of consumption. In other words, people base their consumption plans on the present value of their after-tax income. Suppose the government were to reduce taxes by $1 billion today, issue a bond (that is, run a deficit) worth $1 billion bearing an interest rate of, say, 6 percent, and announce that it will raise taxes by $1.06 billion next year to pay the debt plus interest. Then rational taxpayers would save the $1 billion from the deficit caused by the tax cut, invest it in a bond earning 6 percent, and use the principal and interest from the bond to pay off the tax increase in the following year. By acting in this way, they are better off than not saving the $1 billion today and having to consume $1.06 billion less the next year when taxes are raised. Deficits (surpluses) raise (reduce) savings, dollar for dollar, according to the theory of debt neutrality.

When debt is neutral, deficits do not raise interest rates, crowd out borrowers, reduce investment, appreciate the dollar on foreign exchange markets, or cause inflation, because deficits automatically generate enough extra savings to fund the deficit.

Principles of Efficient Taxation

Deficits redistribute the tax burden from year to year. But is there a unique pattern of taxes better than any other? If all taxes were lump-sum (fixed amounts) in nature, then as long as debt is neutral it would not matter how or when the government ran deficits. But what if taxes are not lump-sum, but instead are proportional to income? This is where the theory of efficient taxation plays a role. As long as debt is neutral, the only consideration necessary in setting the level of deficits is the goal of minimizing the deadweight loss due to taxation. Efficient taxation requires that tax rates be set so that they are *expected* to remain constant, given forecasts of future GNP and government spending. If new information is obtained, the tax rate must be revised to reflect the new information. The new tax rate must be set such that, once again, the expected tax remains constant in the future. (More technically, the tax rate follows a random walk.) If tax rates are set efficiently, then the deficits that result are "efficient" deficits.

than tax receipts. In fact, as the government shows surpluses, the debt will shrink, reducing the debt service. If the government wished to maintain a balanced budget *over time,* it would have to keep reducing the tax rate. But, according to the efficient tax rule, a strategy of continuously falling tax rates is inefficient, because resources would be wasted adjusting to the changes in tax rates. Deadweight losses would be lower if taxes were lower to begin with and set so people expected them to remain unchanged. The efficient tax rate is set to allow deficits which, on average, grow in real terms at the same rate as real GNP. Deficits will not show steady growth, however, because they will fluctuate with inflation and business cycles.

...With Inflation... Inflation leads to higher deficits when the government follows the tax-rate stabilization rule, yet such deficits have no impact on the economy because they do not add to the real value of the debt. The link between inflation—a general rise in prices—and interest rates is the key to this argument. Workers understand that if wages double while the price level also doubles, then *real* wages haven't increased at all. Similarly, investors who buy bonds know that inflation means that a dollar in the future buys less than a dollar in the present. So, investors demand higher interest rates to offset the expected decline in the dollar's purchasing power. This rise in interest rates increases the dollar size of the deficit.

Suppose, for example, that initially the government budget is balanced, and that the inflation rate is zero. If the interest rate is 2 percent and the national debt is $1 trillion, then the interest expenditures of the government are $20 billion. If the expected inflation rate were to rise from zero to 10 percent, then interest rates would rise from 2 percent to 12 percent (because investors demand compensation for inflation). The annual interest expenditures of the government would rise to $120 billion, and the nominal deficit would automatically rise from zero to $100 billion. The deficit rises, even though tax rates, real governmental purchases of goods and services, and real GNP do not change. The nominal value of government spending and taxes rises in step with inflation, as does the total stock of government debt. But, since the price level also rises by 10 percent, only the nominal value of the debt changes, not the real value of the debt. So, if one assumes that all infla-

tion that actually occurs has been correctly anticipated, then the real value of the debt does not increase—that is, there is no real deficit—and therefore, there is no need for additional future *real* tax revenues to service it.

The difference inflation makes between real deficits and nominal deficits can be dramatic. In the last half of the 1970s, nominal deficits were high, but this was due largely to inflation; in 1979, for example, the nominal deficit was $56 billion, yet the real deficit was not a deficit at all, but rather a real surplus of $7.5 billion.[3] Inflation can have a substantial effect on the dollar value of the deficit, but it does not affect real deficits. Business cycles, however, do affect the size of real deficits.

...And During Business Cycles. Much of the variation in real deficits is accounted for by the responses of tax revenues and government spending to business cycles and wars. The business cycle is the fluctuation of real GNP around its trend growth path, and is composed of a recession (a significant and prolonged fall in real GNP below its trend), and a boom (a rise in real GNP above its trend). When real GNP falls during a recession, tax revenues necessarily fall also, while at the same time, government expenditures rise (relative to trend) due to increased spending on unemployment compensation, public works, and welfare programs. Unless the tax rate is changed, the real deficit automatically rises in a recession and shrinks in a boom. For example, if GNP falls $300 billion below its trend value during a recession, and if the tax rate on GNP is 20 percent, tax revenues will automatically fall $60 billion dollars. At the same time, government spending on unemployment compensation and other programs may rise $20 billion above its trend. Then the real deficit will be $80

---

[3]Real deficits are calculated as changes in the real national debt. The national debt is defined as interest-bearing debt outstanding plus agency debt whether owned by the public, foreigners, or the Federal Reserve System. This debt is divided by the Implicit GNP Deflator (1929=1.0) to generate the real debt. The annual change in the real debt is the annual real deficit. Further analysis of the relationship between the measured deficit and inflation can be found in: *Economic Report of the President,* U.S. (Washington, D.C.: Government Printing Office, 1982), Chapter 4, and B. Horrigan and A. Protopapadakis, "Federal Deficits: A Faulty Gauge of Government's Impact on Financial Markets," this *Business Review,* (March/April 1982), pp. 3-16.

billion higher than if there were no recession.

Temporary fluctuations in government spending around its trend occur not only over the business cycle, but also during wars, and other kinds of national emergencies (because civilian spending is never reduced enough to offset completely increases in military or emergency spending). Just as the government finances its expenditures with debt when tax revenues are unusually low during recessions, so the government should finance unusually high expenditures with debt.[4] In fact, running real deficits during recessions and wars and running smaller real deficits or real surpluses during booms and peacetime has been the pattern of deficit behavior in the U.S.

Figure 1 plots the ratio of the real deficit to real GNP for the U.S. from 1790 to 1983. Examining the graph reveals that large deficits are associated with wars and recessions, and peace and prosperity bring smaller deficits or surpluses. The U.S. started in 1790 with a national debt, the financial heritage of the deficits which financed the American Revolutionary War. The new government almost always ran surpluses (except for some large deficits during the War of 1812) until Andrew Jackson paid off the national debt in 1834. The Civil War produced deficits which drove the deficit-GNP ratio to as high as 6.6 percent in 1865. After the war, the ratio was virtually zero—except for a few brief rises during the 1870s and 1890s—until World War I raised the deficit-GNP ratio to 17 percent by 1918. There were surpluses in the years following the war until the Great Depression produced some real deficits over 8 percent of real GNP, and World War II pushed real deficits over 27 percent of real GNP in 1944. Since then, the real deficit-GNP ratio has

been low—except during a few recessions in this period. The ratio was less than 1 percent in 1980. The recession of 1981-1982 produced a real deficit-GNP ratio of 5.7 percent, the highest value of that ratio in the post World War II period. Historically, a high real deficit-GNP ratio is associated with the real deficits caused by large wars and recessions; in the intervening period, the real deficit-GNP ratio is low.[5]

The behavior of the government over business cycles and during wars is exactly analogous to the behavior of families with fluctuating incomes. During hard times, families borrow or dip into their savings to maintain their standard of living, and in good times, families pay off loans and rebuild savings. It would be unwise for the government to slash spending on, say, national defense, education, and health merely to keep a balanced budget in a recession or during a war. And most economists agree that it is destabilizing and inefficient to raise taxes during a recession (which would reduce private spending and discourage work precisely when employment is low) to maintain a balanced budget. Tax rates should be changed only when government spending is changed permanently or when the path of real economic growth changes.

HOW LARGE IS TOO LARGE?

Assuming agreement about the size of government spending relative to the economy, the theory of efficient taxation and of the resulting deficits suggests that the higher real economic growth and inflation are, the larger deficits should be. Furthermore, during recessions the year-to-year deficits should rise above the level implied by economic growth and fall below that level during booms.

By interpreting the U.S. historical experience in terms of the efficient taxation theory, and by using this interpretation of history, we can get a rough

---

[4]If government expenditures as a share of national income rose permanently to a new higher level, tax rates would have to be raised immediately. If taxes were not raised and the permanently higher government spending were all financed by deficits, the national debt would balloon out of control, ultimately forcing the government into bankruptcy (but only if the after-tax interest rate on government debt exceeded the growth rate of GNP). If debt plus interest is paid off by issuing more debt, which is paid off with more debt, and so on forever, the national debt would grow more rapidly than national income. That would amount to a government-run perpetual chain letter, a Ponzi game—it cannot work. Once the interest bill on the national debt exceeds the tax capacity of the government, the government reaches insolvency.

[5]The experience of Britain parallels the experience of the United States. The financing requirements of the Napoleonic Wars drove the British real deficit-GNP ratio to very high levels. The following century witnessed low real deficit-GNP ratios (with only a few blips) until 1914. World War I, the Great Depression and World War II all produced major increases in the real deficit-GNP ratio, but the ratio fell following all of those unfortunate occurrences. Indeed, despite all of the talk about Britain's deficits during the 1960s and 1970s, the ratio of real deficits to real GNP was low.

FIGURE 1

RATIO OF REAL DEFICIT TO REAL GNP
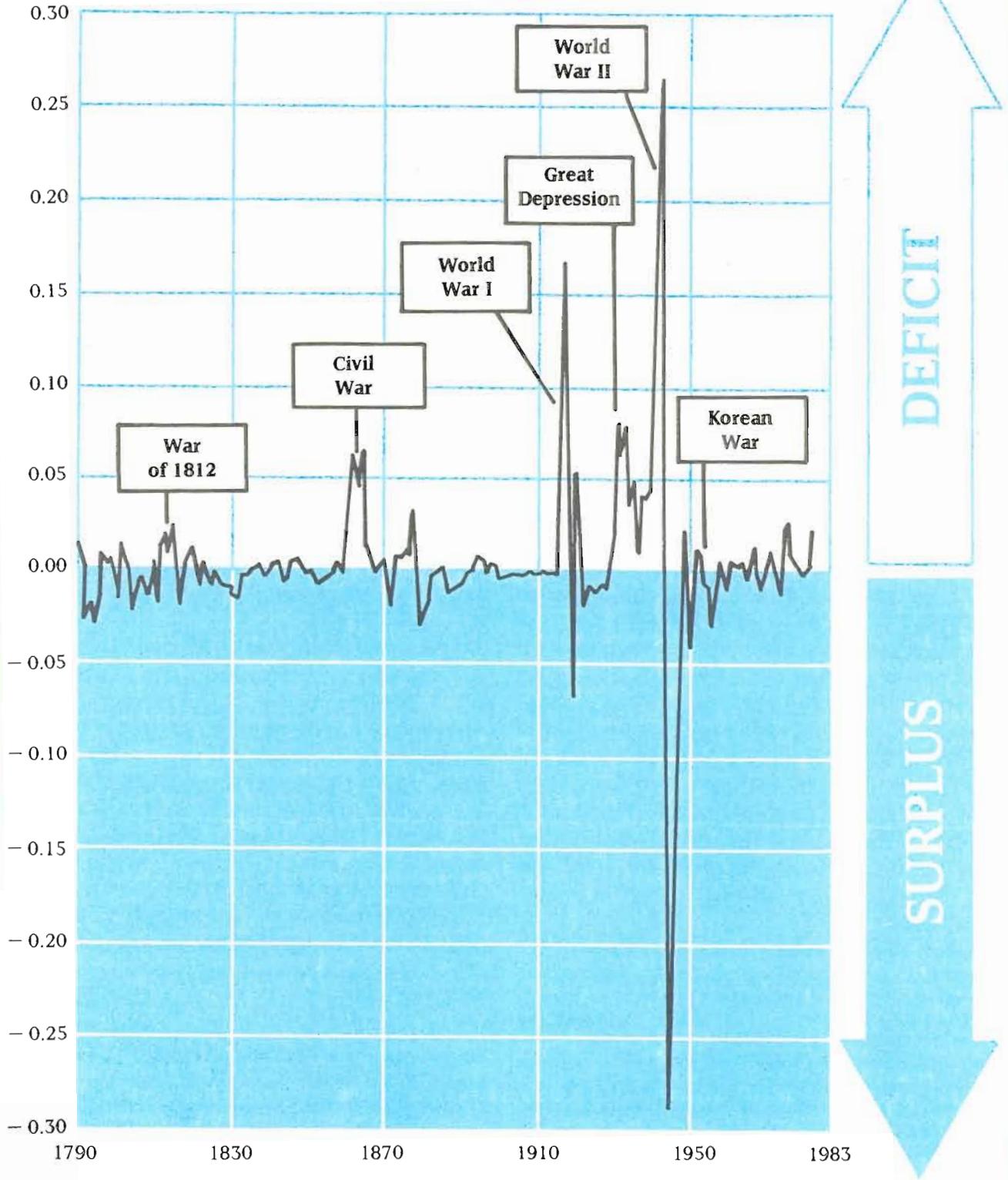
The graph displays annual values of the ratio of real deficits to real GNP from 1790-1983. Footnote 3 describes how the real deficit is calculated.

idea of whether present and projected deficits are out of line with historical experience.[6] This approach involves estimating the historic relationship between real deficits and the economic variables suggested by efficient taxation considerations. Given forecasts of real GNP, real government spending, and inflation, it is possible to estimate what deficits *would be* if the U.S. economy continues to perform as in the past. We call these estimated deficits "efficient deficits" to distinguish them from the deficits predicted by various economists and by government sources. The calculated "efficient deficits" are *not* predictions. Rather, they should be regarded as benchmark figures that incorporate both the efficient taxation considerations and the historical performance of the U.S. economy. By comparing the actual deficits from 1975 to now, and the projected future deficits to these "efficient" deficits, we have a rough and ready way to judge whether the deficits have been or will be "too large." In particular, if the projected deficits are consistently larger than the efficient deficits, then this suggests that tax rates are not set at their "efficient" levels and should be raised. The formula for calculating efficient deficits and the economic assumptions underlying the estimates are explained in the Appendix.

Table 1 presents actual and efficient deficits for 1975 through 1983, and projections of actual and efficient deficits for 1984 through 1990. The projections assume no change in government fiscal policy and are based on forecasts of the economy from Data Resources, Inc. (DRI). Projected actual deficits exceed $200 billion in 1984 and beyond, rising to over $300 billion by the end of the decade. Efficient deficits are also substantial for the entire time period, and after 1980, they never drop below $100 billion. One reason the efficient deficits are so high is inflation. For example, the contribution

---

[6]Barro and others have used statistical methods to determine how well American deficit behavior conforms to the predictions of the theory of efficient deficits. Barro (1979) found that the data neither strongly accept nor strongly reject the predictions of the theory. Barro's conclusions were verified using different data by Horrigan (1982, 1984). Benjamin and Kochin (1980) and Barro (1981) tested the implications of efficient taxation theory using American tax data and did not reject the theory. The theory of efficient taxation as applied to deficit behavior is new, but the results of early tests indicate that it does provide a plausible description of deficit behavior.

TABLE 1
ACTUAL AND EFFICIENT FEDERAL DEFICITS NO FISCAL POLICY CHANGE

Year	Federal Deficits		Difference Between Actual or Projected Deficits and Efficient Deficits
	Actual and Projected[a]	"Efficient"	
1975	$ 83.9	$ 71.3	$ 12.6
1976	76.9	45.1	31.8
1977	65.4	40.8	24.6
1978	70.3	40.8	29.5
1979	55.9	54.0	1.9
1980	85.1	105.3	- 20.2
1981	98.5	128.2	- 29.7
1982	168.4	163.2	5.2
1983	213.6	155.1	58.5
1984*	252.4	141.7	110.7
1985*	246.0	160.2	85.8
1986*	271.4	186.7	84.7
1987*	297.0	211.7	85.3
1988*	292.0	228.8	63.2
1989*	306.7	249.6	57.1
1990*	324.9	277.9	47.0

All numbers are in billions of dollars.

*Projections based on forecasts prepared by Data Resources, Inc.

[a]Actual deficits, defined as the end-of-year to end-of-year change in the gross public debt outstanding, are from various issues of the *Federal Reserve Bulletin*. The deficit measured this way is nearly always higher than the deficit measured by the National Income and Product Accounts or by the Unified Budget, the result of off-budget financial transactions.

---

of inflation to the deficits in 1983, 1984, and 1985 is about $50, $62, and $73 billion, respectively. The high unemployment currently troubling the American economy is another reason for high efficient deficits. If real GNP equaled its trend value in 1983, 1984 and 1985, the efficient deficits in those years would be lower by $105, $78, and $85 billion, respectively. (Projected deficits would

fall by a comparable amount.) Efficient deficits remain high in the 1980s (exceeding $200 billion after 1987) because real GNP returns to trend very slowly and inflation rises to 6 percent in the DRI forecasts used here.

A balanced budget, or even a small deficit, then, is far from efficient in the 1980s. In 1980 and 1981, the actual deficits were *smaller* than their efficient levels, while the deficits for 1983 and 1984 are well above efficient levels. Because the projected deficits for 1984-1990 are consistently above the calculated efficient deficits, these figures lend some support to those who argue for tax or expenditure actions to reduce future deficits. But this approach also suggests that such a fiscal policy package should not be aimed at producing a deficit substantially lower than the efficient deficit—in particular, not a zero deficit.

In fact, tax increases that would appear modest to many analysts may result in future deficits that are "too low" relative to efficient deficits. For example, DRI also has a long-term forecast of the economy that is based on what it considers to be a likely change in fiscal policy effective in 1985. It involves a gradual rise in tax rates and modest expenditure reductions. (See Appendix for details.) The impact of this fiscal policy on projected deficits is shown in Table 2, which presents the difference between the deficits projected on the basis of this policy and efficient deficits. As the negative numbers after 1987 show, projected deficits actually fall below efficient deficits, and, over time, the gap between the two widens. This result is caused primarily by the gradual increase in tax rates that occurs under DRI's assumption about changes in fiscal policy.

From the efficient tax viewpoint, having projected deficits consistently lower than their efficient levels implies that tax rates move too high, and deadweight losses are unnecessarily large. So, a better strategy, by the standards of tax efficiency, would be a one-time, smaller tax increase imposed immediately.

The estimates of efficient deficits depend on the estimates of trend real GNP and trend federal government expenditures as well as forecasts of real GNP and government expenditures. Economists who have different estimates of these trends or different forecasts of these variables will necessarily have different estimates of efficient

TABLE 2	
DIFFERENCE BETWEEN PROJECTED AND EFFICIENT DEFICITS WITH FISCAL POLICY CHANGE[a]	
1984	$ 95.3
1985	83.1
1986	51.5
1987	24.9
1988	- 4.3
1989	- 25.7
1990	- 53.0
1991	- 77.4
1992	- 94.3
1993	- 111.9
1994	- 132.4
1995	- 160.8

[a]See Table 1 for notes. For details of the fiscal policy change, see the Appendix.

deficits. There is room for disagreement in making these estimates. Indeed, there is substantial disagreement about the usefulness of this approach to analyzing deficits. In particular, some economists would contend that deficits affect the economy *aside* from financing considerations (see ALTERNATIVE VIEWS OF THE DEFICIT). These effects need to be addressed in assessing policy actions concerning deficits, in their view.

CONCLUSIONS

According to the efficient taxation approach, deficits may not present a problem unless they are consistently different from their "efficient" levels. If the deficit is smaller than its efficient level, the government is squeezing the economy with excessive taxation or depriving the economy of useful government spending. If the deficit is consistently larger than its efficient level, tax rates must be raised eventually (or future spending reduced) to finance the excessive debt.[7]

The estimates of efficient deficits presented here show that, without a policy change, current

[7]Alternatively, if neither expenditures are reduced nor taxes raised, the only way left to finance deficits will be for the Federal Reserve to "monetize" the deficits, thereby creating inflation.

ALTERNATIVE VIEWS OF THE DEFICIT

There are schools of economic thought that deny the economic reasoning or the political relevance of the theory of debt neutrality. Keynesian economists believe that the economy is inherently so unstable that it needs strong doses of monetary and fiscal stimulation to remain near full employment. Keynesians recommend—among other policies—tax cuts to stimulate the economy when it falls below full employment, and tax increases when the economy "overheats." Keynesians assert that the improvement in well-being due to having an economy nearer full employment on average justifies the relatively minor—in their opinion— deadweight loss caused by changing the tax rate. Under Keynesian fiscal policy, budget deficits during recessions should be even *larger* than the efficient deficits calculated here, and the deficits during economic booms should be smaller.[a]

Other economists are more interested in using fiscal policy to stabilize inflation than they are in using fiscal policy to stabilize employment. They believe that deficits are always monetized to some extent; that is, when the government issues more debt, the Federal Reserve purchases more of it, which creates bank reserves, thus expanding the money supply and ultimately raising the price level. Monetization turns deficits into an engine of inflation. These economists recommend raising taxes or cutting expenditures to reduce inflation when the inflation rate is too high. During inflationary periods, these economists recommend deficits smaller than those advocated by efficient deficit theorists.[b]

The "neoclassical" school asserts that the higher real deficits are relative to real GNP, the higher are real interest rates, which crowd-out private investment: too high real deficits result in too little investment and eventually in a too small capital stock. These economists do not believe that debt is neutral and recommend that the deficit-GNP ratio be kept low, on average, in order to increase the capital stock. These economists agree with efficient deficit theorists that deficits should fluctuate over the business cycle and with war and peace, but they recommend that the average level of the deficit should be smaller than that advocated by efficient deficit theorists.[c]

Some balanced-budget advocates, on the other hand, are not concerned with the deficit *per se* but with the size of the government relative to the entire economy. They believe the government has a tendency to grow larger than it should and that there is less political opposition to governmental growth when government spending is financed by deficits instead of taxes. When the government is forced to pay for its spending with taxes, the government will be smaller, in their opinion. They believe that the benefits of tax stabilization are small relative to the benefits of having less government.[d]

---

[a]For an exposition of Keynesian deficit theory, see: A. Blinder and R. Solow, "Analytical Foundations of Fiscal Policy," in *The Economics of Public Finance,* (Washington, D.C.: The Brookings Institution, 1974), pp. 3-118.

[b]This traditional point of view is being defended with rigorous (though controversial) economic analysis by: P. Miller, "Deficit Policies, Deficit Fallacies," Federal Reserve Bank of Minneapolis *Quarterly Review,* 4 (Summer 1980), pp. 2-4; and T. Sargent and N. Wallace, "Some Unpleasant Monetarist Arithmetic," Federal Reserve Bank of Minneapolis *Quarterly Review* 5 (Fall 1981), pp. 1-18.

[c]This "neoclassical" point of view has been discussed and defended in many publications. A good example is M. Feldstein, "Fiscal Policies, Inflation, and Capital Formation," *American Economic Review,* 70 (September 1980), pp. 636-650.

[d]This point of view is strongly argued in J. Buchanan and R. Wagner, *Democracy in Deficit: The Political Legacy of Lord Keynes,* (New York: Academic Press, 1977). The authors recommend a constitutional amendment to prohibit deficit spending except during declared national emergencies. Critical evaluations of Buchanan and Wagner's work can be found in a symposium published by the *Journal of Monetary Economics,* 3 (August 1978).

---

and projected deficits are larger than efficient, given the state of the economy over the remainder of the 1980s, and should be reduced. Yet, the analysis of one projected change in fiscal policy— which is similar to many other proposals—shows that deficits can be reduced too much for efficiency purposes, producing unnecessary deadweight losses for the economy.

Although newspapers and magazines are packed full of warnings about the dire consequences of deficits, and opinion polls show that deficits are about as popular as heroin addiction, there is an alternative perspective on deficits. If economic efficiency is the criterion driving fiscal policy, then having some level of deficits—the efficient level—can actually be viewed as beneficial.

APPENDIX

The formula used to calculate efficient deficits is derived from Barro's equation for the determination of the optimal (or efficient) growth rate of the public debt (Barro (1979)):

(1)
$$(B_t - B_{t-1})/B_{t-1} = 0.0006 + 1.00 \, \pi_t^a + 0.40 \frac{P_t(G_t - \overline{G}_t)}{B_{t-1}}$$

$$- 1.57 \left\{ \left(\frac{Y_t - \overline{Y}_t}{Y_t} \right) \left(\frac{P_t \overline{G}_t}{B_{t-1}} \right) \right\}$$

where

B_t = publicly held federal debt, measured at par value, at time t

B_{t-1} = publicly held federal debt at time t-1

π_t^a = anticipated inflation rate (the percentage change in P_t)

P_t = price level, measured by GNP deflator

G_t = real value of federal expenditures (NIPA definition)

$\overline{G}_t$ = trend value of G_t

Y_t = real GNP

$\overline{Y}_t$ = trend value of Y_t

The parameters in equation (1) were estimated using annual American data for the time period 1948 through 1981. The parameters are similar to the ones Barro estimated. In the estimation, the coefficient on anticipated inflation was restricted to unity, the theoretical value of the coefficient. (Unconstrained, the coefficient on anticipated inflation was 1.47. The data did not reject the restriction to unity.)

Trend growth in real GNP and real federal expenditures for the time period 1948 to 1981 are 3.5 and 4.5 percent per year, respectively. The trend growth in real GNP is determined by the growth of the labor force, of productivity, and of natural resources. Based on the expected slowdown in labor force growth, DRI forecasts trend GNP to grow at about 2.8 percent for 1982 to 1990, 2.6 percent for 1991 to 1995. The trend growth in real government spending is determined by fiscal policy. Ultimately, government spending cannot grow faster than GNP, but it is possible for spending to grow faster than GNP for long periods of time, as it did for the post-World War II era. I assume that the ratio of trend real federal expenditures to trend real GNP is 23 percent in the time period 1982 to 1995, the value of the ratio in 1980 and 1981. The definition of debt used in Barro's theory and in estimating equation (1) excludes all federal debt held internally by federal government agencies and trust funds, and the Federal Reserve System. However, no forecasts are available for how much of newly issued debt will be held internally by the government, so projections of efficient deficits are made using the gross public debt. But note that as long as the percentage of gross public debt held internally by the government remains constant, these definitional issues cause no error in the analysis.

To use equation (1) to make estimates of efficient deficits, I assume that the inflation rate is correctly anticipated (both within and outside of the sample period), and that the DRI forecasts of real GNP, the GNP deflator, real federal expenditures, and the gross debt are accurate.[a] The estimates of efficient deficits are generated dynamically, meaning that in each year, the *efficient* value of the previous year's debt is used as the base for calculating that year's efficient deficit.[b]

---

[a]I derived my projections of inflation, real GNP, real federal expenditures, and the size of the gross debt from the U.S. long-term forecast of Data Resources, Inc., as of April 1984. The issue is not whether these forecasts are accurate but rather how close projected deficits are to efficient deficits, where both projected and efficient deficits are calculated using the same set of economic assumptions. Different economic assumptions would change estimates of both efficient and actual deficits in a similar manner.

[b]Similar results were obtained from estimates of efficient deficits generated statically—that is, by using the projected value, not the efficient value, of the previous year's debt as the base for calculating that year's efficient deficits.

DRI assumes a small tax increase and a small expenditure cut take effect in fiscal year 1986, which reduces the deficit by $49 billion (under static assumptions) in that year. A modification in tax indexation is included in the tax package. In 1981, Congress revised the tax code, providing that as of 1985, the code would be indexed to the Consumer Price Index (CPI). That way, purely nominal increases in income would not cause "tax bracket creep." In DRI's simulation of a new fiscal policy, the tax code will be indexed only to the extent that the CPI rises more than 2 percent per year.

DRI assumes that nominal GNP grows at approximately 9 percent per year for the remainder of the decade—about 6 percent inflation and 3 percent real growth. Real GNP returns to trend slowly in the DRI forecast; by 1990, real GNP is still 4 percent below trend.

ANNOTATED BIBLIOGRAPHY

The theory and evidence on optimal deficits have been largely developed in a series of articles by Robert Barro. These articles include:

Barro, R. J., "Are Government Bonds Net Wealth?," *Journal of Political Economy* 82 (November/December 1974), pp. 1095-1117.

_____, "Public Debt and Taxes," in *Federal Tax Reform: Myth and Realities,* ed., Michael Boskin, (San Francisco, CA.: Institute for Contemporary Studies, 1974).

_____, "On the Determination of the Public Debt," *Journal of Political Economy* 87 (October 1979), pp. 940-971.

_____, *Macroeconomics,* (New York: John Wiley & Sons, 1984).

Daniel Benjamin and Levis Kochin have been conducting research on optimal deficits simultaneously with Barro. Their key papers are:

Benjamin, D. and L. Kochin, , "A Theory of State and Local Finance: The Comparative Statics of Mobility," unpublished manuscript, University of Washington.

_____, "On the Observational Equivalence of Rational and Irrational Governments and Consumers," unpublished manuscript, University of Washington (October, 1980). Revised 1983 with M. Meado.

Mathematical contributions to the theory worth reviewing are made by:

Chamley, C. , "Optimal Intertemporal Taxation and the Public Debt." Cowles Foundation Discussion Paper No. 554, Yale University (1980).

Lucas, R. E., Jr. and N. L. Stokey,(1983), "Optimal Fiscal and Monetary Policy in an Economy Without Capital," *Journal of Monetary Economics* 12 (July 1983), pp. 55-94.

Additional empirical examinations of the theory of optimal deficits include:

Horrigan, B., "The Determinants of the Public Debt in the United States, 1953-1978" Working Paper, 82-6, Department of Research, Federal Reserve Bank of Philadelphia, (1982).

_____, "The Long-Run Behavior of the Public Debt in the United States," paper presented at the Eastern Economics Association Meeting, (March, 1984).

Options
for
Savers

THE UNITED STATES OF

INTEREST
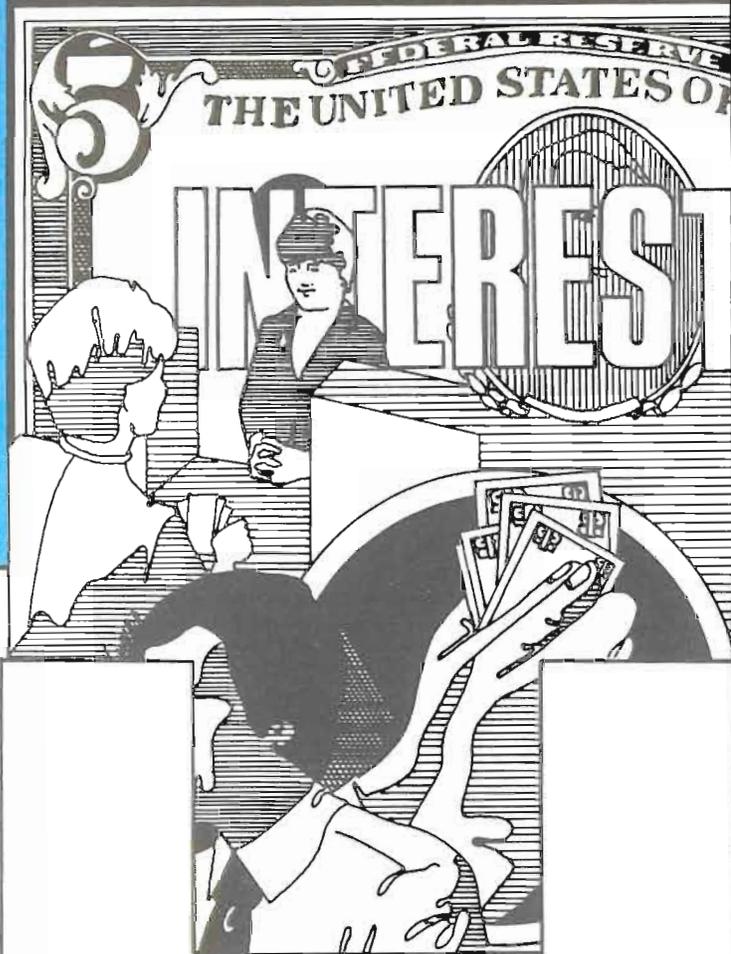
Completely revised from the Philadelphia Fed . . .

This revised pamphlet outlines some of the many savings options currently being offered by depository institutions. Copies are available without charge from the Department of Consumer Affairs, Federal Reserve Bank of Philadelphia, P.O. Box 66, Philadelphia, PA 19105. (215) 574-6115.

Buying
Treasury
Securities

UNITED STATES OF AMERICA
URY BOND
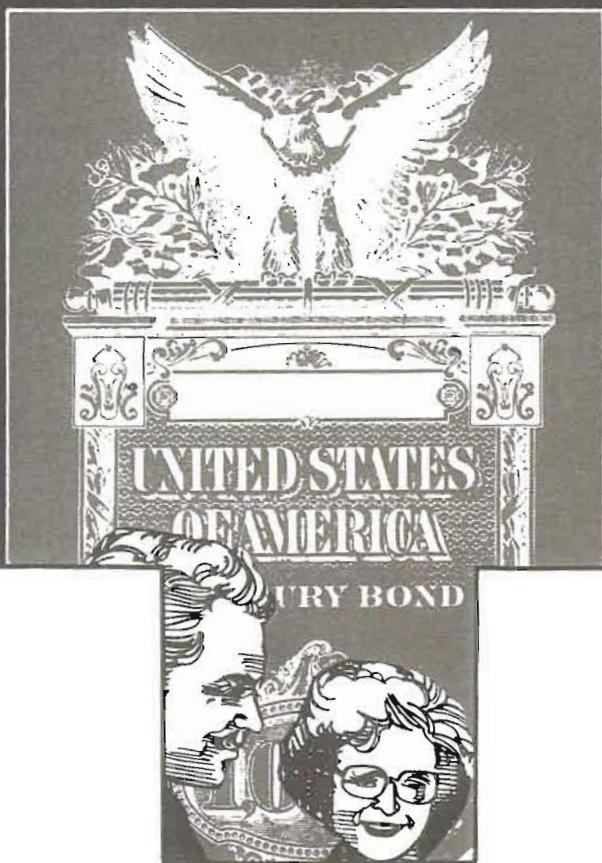
. . . and also from the Philadelphia Fed . . .

This new pamphlet details the Securities available and how to purchase them at Federal Reserve Banks. Copies are available without charge from the Department of Consumer Affairs, Federal Reserve Bank of Philadelphia, P.O. Box 66, Philadelphia, PA 19105. (215) 574-6115.

**FEDERAL
RESERVE BANK OF
PHILADELPHIA**

Business Review
Federal Reserve Bank of Philadelphia
Ten Independence Mall
Philadelphia, PA 19106
Address Correction Requested