
THE ECONOMICS OF THE GOVERNMENT BUDGET CONSTRAINT

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This article summarizes the simple analytics of the macroeconomic effects of government budget deficits. The presentation is organized around three key relationships: the national income accounts budget deficit identity, the deficit financing identity, and the dynamic equation for the evolution of the ratio of public debt to gross national product. The national income accounts identity highlights the effect of the deficit on domestic saving and investment and the current account. Examining the financing of the deficit brings to light the different kinds of macroeconomic imbalance the deficit can cause—as a first approximation, printing money excessively shows up as inflation, excessive use of foreign reserves leads to crises in the balance of payments, high foreign borrowing leads to a debt crisis, and too much domestic borrowing leads to high real interest rates and crowding out of private investment. The debt dynamics equation is used to show the long-run constraints on fiscal policy.

It is increasingly recognized that sustained economic growth is possible only within a sound macroeconomic framework and that in such a framework fiscal policy plays a key role. In this article we draw on recent developments in the analysis of the consequences of deficit finance to show how and why sound fiscal policy is so crucial to the achievement of macroeconomic stability.

We are not here concerned with the effects of fiscal policy on resource allocation, important as these undoubtedly are (see World Bank 1988 for comparative data on government revenues and expenditure and for an authoritative modern account of the role of fiscal policy). Instead, this article focuses on the

macroeconomic effects of government budget deficits—the consequences of different methods of financing the deficit and the links between the budget deficit and inflation. The article is built around three simple relationships: the national income accounts budget deficit identity, the budget deficit financing identity, and the dynamic equation for the evolution of the ratio of debt to gross national product (GNP).

Macroeconomic Effects of the Deficit: Standard Analysis

The Keynesian revolution brought the budget deficit out of the closet as a macroeconomic variable. Although governments had run budget deficits without the aid of Keynesian theories before, the pre-Keynesian presumption was that in peacetime the budget should generally be balanced or even in surplus to pay off the government debt generated by wartime deficits. The devotion to balanced budgets is evident from the desire of political candidates and governments to balance the budget even during the Great Depression. Though few succeeded in balancing the budget, some governments raised tax rates during that period.

Keynes provided a framework—now recognized to be incomplete—in which it is possible to analyze the question of how the deficit should behave. The earliest emphasis was on fiscal policy and the deficit as components of aggregate demand. From that perspective, Keynesians saw no need to balance the budget during periods of recession. Instead the notion of the cyclically balanced budget, that the budget should be in balance on average over the business cycle—in surplus during booms and in deficit during recessions—was developed as a norm for fiscal behavior.

There were, of course, well-known refinements to this concept. First, the balanced budget multiplier shows that the deficit is not an unambiguous measure of the effect of fiscal policy on aggregate demand; given the deficit, an equal increase in government spending and revenue increases aggregate demand. Second, the budget deficit is itself endogenous, affected by the state of the economy as well as affecting it. The notion of the full-employment deficit, or high-employment deficit, or structural deficit developed from these qualifications of the original concept. The structural deficit estimates the size of the budget deficit as it would be if output were at the full employment level (see appendix).

Once the threat of widespread postwar unemployment had receded, the emphasis shifted from the effect of fiscal policy on aggregate demand to its effect on the components of demand. Here the saving-investment identity, or the resource constraint facing the economy as a whole, is a useful guide to analysis:

$$(1) \quad \text{Budget deficit} = (\text{private saving} - \text{private investment}) \\ + (\text{current account deficit}).$$

Since equation (1) is an identity, there is not much arguing with it (though it is necessary to define terms consistently: the budget deficit in (1) is that of

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the consolidated public sector). To illustrate the uses of the equation, suppose the economy is at full employment, and take the rate of saving as given. The saving-investment identity illustrated by the equation then implies the crowding-out problem: an increase in the budget deficit will result in either a reduction in investment or an increase in the current account deficit. Until this decade, textbooks—at least U.S. textbooks—tended to emphasize the possibility of crowding out investment. The clear relation in this decade between the U.S. budget deficit and its trade deficit has reminded us that there are two terms on the right-hand side.

It would be a mistake, though, to overcompensate by assuming an automatic one-to-one link between the budget and trade deficits. Balassa (1988), for instance, finds a high correlation between budget deficits and trade deficits in the industrial but not the developing countries. To take another example, the United Kingdom ran a large trade deficit in 1988–89 while maintaining a strong fiscal position. The effect on the trade deficit of a reduction in the budget deficit depends on the accompanying monetary policy and its effect on the exchange and real interest rates. Fiscal contraction accompanied by monetary easing would reduce the interest rate and lead to a depreciation of the exchange rate, thus tending to increase investment while reducing the trade deficit.

Standard Keynesian analysis of the effects of fiscal policy has been modified by two important theoretical developments. The first is the more sophisticated model of saving behavior that emerges from the life-cycle and permanent income theories of consumption of Franco Modigliani and Milton Friedman. So far in this article we have implicitly taken the rate of saving as determined by the level of disposable income and have not focused on the link between the budget deficit and saving. The life-cycle and permanent income theories both relate current consumption to a measure of permanent or lifetime disposable income. Accordingly, a current change in taxes that does not change the present value of taxes should not, other things being equal, reduce current consumption. Thus a temporary tax change should have a smaller effect on consumption than a permanent tax change. This, of course, implies that the effect on spending of changes in the budget deficit is influenced by expectations about the permanence of the deficit.

Pursuing the argument to its logical conclusion, Barro (1974) shows that under a very specific set of assumptions, lump-sum changes in taxes would have no effect on consumer spending. What is more, a cut in taxes that increases disposable income would automatically be accompanied by an identical increase in saving. This is the so-called Ricardian equivalence result, which states that deficits and taxes are equivalent in their effect on consumption.

The explanation is quite simple: the far-seeing consumer recognizes that the government debt generated through deficit spending will eventually be paid off by increased taxes, the present value of which is exactly equal to the present value of the reduction in taxes. Taking the implied increase in future taxes into account, he or she saves the amount necessary to pay them.

The potential empirical importance of the Ricardian equivalence hypothesis cannot be exaggerated. If the hypothesis holds, budget deficits do not affect national saving, interest rates, or the balance of payments; nor does the method of financing of social security affect the accumulation of capital. With regard to equation (1), the hypothesis implies that an increase in the budget deficit would, under certain circumstances, be accompanied by an increase in private saving—and that both investment and the trade balance would therefore be unaffected.

Despite the sharpness of its predictions, it has not been possible to reject Ricardian equivalence sufficiently decisively to persuade proponents of the theory to change their views. Bernheim (1987) reviews and extends the theory and evidence, arguing strongly against Ricardian equivalence. Haque and Montiel (1987) reject Ricardian equivalence for fifteen out of a sample of sixteen developing countries. Others regard the evidence as sufficient to rule out Ricardian equivalence as anything more than an interesting theoretical possibility. We believe the evidence, including that from the United States in this decade, still supports the view that tax cuts increase aggregate demand, though the effect does depend on expectations of the permanence of the change.

The second theoretical development that has affected the Keynesian analysis of fiscal policy takes off from the extremely short-run nature of the Keynesian model. Because asset stocks are assumed fixed in the model, the consequences of the method by which the budget deficit is financed are not pursued.

Financing the Budget Deficit

There are four ways of financing the public sector deficit: by printing money, running down foreign exchange reserves, borrowing abroad, and borrowing domestically:¹

$$(2) \quad \text{Budget deficit} = \text{money printing} + (\text{foreign reserve use} + \text{foreign borrowing}) + \text{domestic borrowing}.$$

The public sector in this case is defined to exclude the central bank, whose profits from the printing of money are treated as a source of financing. In both equations (1) and (2), government revenue from the printing of money is treated as a source of financing. Private saving in equation (1) is defined to include additions to money holding.

The terms on the right-hand side can be grouped in different ways. For instance, the parentheses around the foreign components emphasize the link between the budget deficit and the current account, as in equation (1). Alternatively, parentheses could be placed around (money printing + foreign reserve use), which is equal to creation of credit by the central bank; this emphasizes that domestic credit creation is the alternative to borrowing.

As a useful first approximation, we can associate each of the forms of financing in equation (2) with a major macroeconomic imbalance. Money print-

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ing is associated with inflation; foreign reserve use is associated with the onset of exchange crises; foreign borrowing is associated with an external debt crisis; and domestic borrowing is associated with higher real interest rates and, possibly, explosive debt dynamics as borrowing leads to higher interest charges on the debt and a larger deficit. But the first approximation is only the beginning of the story, for there are links between these problems—for instance, between domestic borrowing and inflation (discussed in the next section) and between foreign exchange use and external debt crises (discussed in the section on foreign borrowing).

Money Printing

It is straightforward to relate the creation of base money to inflation in the usual monetarist way. The printing of money at a rate that exceeds the demand for it at the current price level creates excess cash balances in the hands of the public. The public's attempts to reduce excess cash holdings eventually drive up the overall price level, until equilibrium is restored. Of course, cause and effect are not necessarily obvious or immediate: initially, for instance, an increase in the stock of real money may reduce interest rates, particularly in a low-inflation economy.

The amount of revenue that the government can expect to obtain from the printing of money is determined by the demand for base or high-powered money in the economy, the real rate of growth of the economy, and the elasticity of the demand for real balances with respect to inflation and income. Assume for convenience that the income elasticity of the demand for base money is unity. Assume also that the currency to GNP ratio is 13 percent, as it is in Pakistan—this is high by international standards. (We have changed from high-powered money to currency, because rediscounts to the banking system of about 6 percent of GNP effectively reduce the base on which the government earns seignorage—its right to print money.)

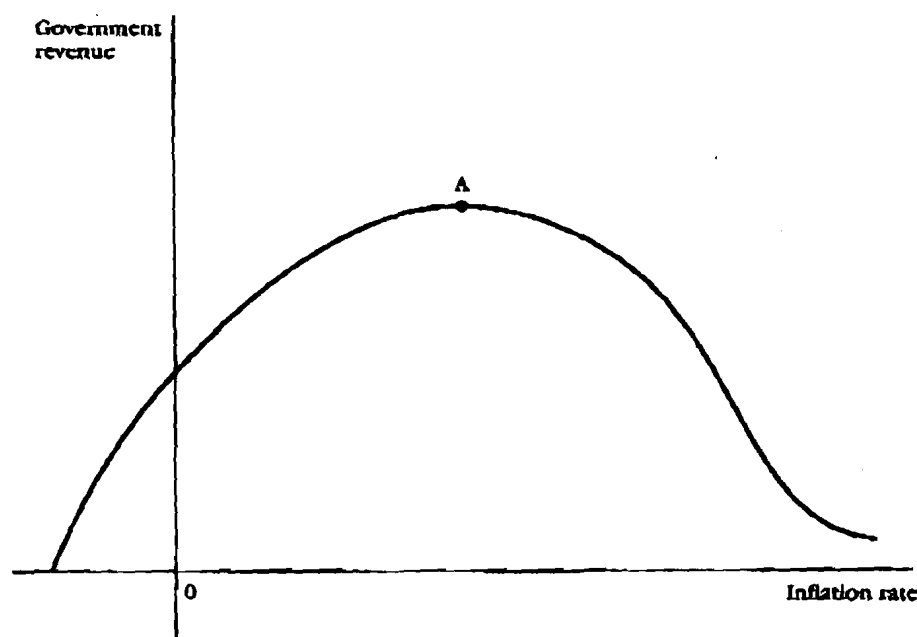
Then for every one percentage point that GNP increases, the government can obtain 0.13 percentage points of GNP in revenue through the printing of money that just meets the increased demand for real balances. With an annual economic growth rate of 6.5 percent, the government should be able to obtain nearly 0.9 percent of GNP for financing the budget deficit through the noninflationary printing of money, increasing the high-powered money stock at an annual rate of 6.5 percent.

Beyond that rate of growth, and given a stable demand function for currency, inflation will result. If the ratio of base to GNP were invariant to the inflation rate, it would be easy to estimate the amount of revenue collected at different inflation rates. For instance, at a 10 percent inflation rate the government would be able to finance an extra 1.3 percent of GNP of budget deficit through seignorage.

But the demand for high-powered money declines as the inflation rate rises. Eventually the government's revenue from seignorage reaches a maximum (see figure 1). Thereafter, increases in the growth rate of money lead to more inflation and less revenue. In this situation there is a true Laffer curve: beyond point A in the figure, the government can obtain more revenue by printing money less rapidly.

At what rate of inflation is the government's revenue from money printing maximized? The historical record shows average (not maximum) rates of seignorage of about 1 percent of GNP for the industrial countries and less than 2.5 percent of GNP for the developing countries (Fischer 1982). Estimates of the inflation rate at which the maximum rate of seignorage is attained range from 30 percent to more than 100 percent. These estimates, however, are misleading, for there are lags in the process of adaptation of money demand to inflation. In the very short run of a few days or weeks, the government can almost always increase its revenue by printing money more rapidly. But the longer a process of high inflation continues, the more the demand for real balances at any given inflation rate declines. People find other ways of doing business, especially by transacting in foreign currencies. (For treatment of the problem of high inflation see Blejer and Liviatan 1987 and Kiguel and Liviatan 1988.)

Figure 1. Revenue from Seignorage



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The dynamic process associated with high inflation, in the high double digits, is inherently unstable. The government may initially obtain large amounts of revenue, perhaps even 7 to 8 percent of GNP, by increasing the money stock rapidly. But as the inflation proceeds and individuals find ways of reducing their holdings of local currency, the government has to print money more rapidly to obtain the same revenue. Thus it is safe to argue that rates of seignorage of much more than 2.5 percent of GNP would not be sustainable and that even that rate would be possible only in a very rapidly growing economy.

In the extreme cases, reliance on seignorage revenue to finance the deficit leads to hyperinflation. A recent example is Bolivia in 1984-85. Inflation in Bolivia soared to over 11,000 percent in 1985, although revenue from currency creation fell to 8 percent of gross domestic product (GDP) in 1985 from 14 percent of GDP in 1984. But Bolivia is not alone: many other governments—including Nicaragua and Peru—have suffered from the same phenomenon in recent years as well as during the great hyperinflations. The instability of the process is reinforced by the decline in the efficiency of the tax system as the inflation rate rises, the so-called Keynes-Olivera-Tanzi effect (Tanzi 1977).

Using Foreign Exchange Reserves

The second means of financing the government budget deficit is to run down foreign exchange reserves. By running down reserves instead of printing money, the government can hope to put off the inflationary effects of a deficit. This policy appreciates the exchange rate. The policy of slowing the rate of exchange depreciation to slow down inflation (carried out not only through reserve use but also through increased foreign borrowing) has been tried time and again; it cannot be maintained unless the essentials—that is, fiscal policy—are made compatible with the lower inflation.

Use of international reserves to finance the deficit has a clear limit. The private sector's expectation that the limit is about to be reached can provoke capital flight and a balance of payments crisis, since exhaustion of reserves will be associated with currency devaluation. The devaluation that takes place in response to a run on the currency might be blamed on speculators but is most likely an entirely rational response by the private sector to unsustainable public policies (see Krugman 1979).

This private sector response is a plausible explanation for the event that precipitated (though it did not, of course, by itself cause) the debt crisis—the exhaustion of reserves in Mexico in August 1982. A loss of fiscal control resulted in deficits of 14 percent of GDP in 1981 and 18 percent in 1982. Capital flight had been proceeding at the rate of \$7 billion² a year from 1979 to 1982. Finally, a speculative attack on the remaining reserves in August 1982 led to the suspension of payments and the beginning of the rescheduling process.

Foreign Borrowing

The third method of financing the public sector deficit, direct foreign borrowing, tends, like the use of reserves, to appreciate the exchange rate, damaging exports and encouraging imports. The dangers of excessive reliance on external borrowing to finance the budget deficit, and of large budget deficits, are convincingly illustrated by the debt crisis (see Sachs 1989 for a discussion of the link between the external debt crisis and fiscal behavior, and Ize and Ortiz 1987 for an analysis of the relation between fiscal deficits and capital flight). Most, though not all, of the countries that developed debt servicing difficulties were running huge public deficits. For most highly indebted countries, past overborrowing and the perception that they are not creditworthy have severely limited this source of finance for the present.

We have already noted that budget deficits and trade deficits are not necessarily linked. Budget deficits can be financed by printing money and by domestic borrowing. But when, as in some developing countries, domestic capital markets are thin and domestic borrowing possibilities limited, the connection between the budget deficit and external borrowing is more likely to be close. For example, large fiscal deficits (between 7 and 11 percent of GDP) in Bangladesh during the 1980s have been mirrored in sizable current account deficits. Recent fiscal adjustment through cutbacks in expenditure has substantially improved the current account. If the relation is viewed in the reverse direction, reductions in the availability of external financing, as for some of the debtor countries, force either fiscal contraction or inflation.

Domestic Borrowing

The final form of finance, available to some developing countries, is issuance of domestic debt. This is usually intermediated by the banking system, although in a few cases, such as Brazil and Mexico, government bonds have been sold directly to the private sector. To be considered nonmonetary debt, borrowing from the banking system must not be financed by central bank rediscounts. Although government domestic borrowing is often thought of as a way to avoid both inflation and external crises, it carries its own dangers if used to excess. By definition, government borrowing reduces the credit that would otherwise be available to the private sector, putting pressure on domestic interest rates.

In countries as diverse as Colombia and Turkey, reliance on domestic debt has indeed brought high real domestic interest rates. In Turkey the real domestic lending rate reached 50 percent in 1987. More moderate domestic borrowing in Colombia led to high real interest rates during 1983-86.

Even where interest rates are controlled, domestic borrowing leads to credit rationing and crowding out of private sector investment. If the economy is well integrated with international capital markets, government domestic borrowing will tend to push the private sector into borrowing more abroad. In this case,

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the composition of public borrowing between foreign and domestic sources does not have much macroeconomic effect. The link between fiscal and external deficits will also be especially close when the capital account is highly open.

Debt Dynamics

To examine the long-term consequences of running deficits, we use identity (3), which shows the determinants of the change in government debt. It is most useful to concentrate on the ratio of the debt to a measure of the scale of the economy; accordingly, we focus on the ratio of government debt to GNP, which we denote d . Debt is now defined to include both the net external and domestic debts. In terms of equation (2), we consolidate foreign and domestic borrowing and treat changes in foreign reserves as equivalent to net external borrowing.

The change in the debt ratio (d) is equal to the noninterest (or primary) deficit of the total public sector, minus the part that is financed by printing money, plus the current debt ratio (d) times the average real interest rate on the debt minus the growth rate of GNP (this is the last term in (3)):

$$(3) \quad \text{Change in } d = (\text{primary deficit/GNP}) - (\text{seignorage/GNP}) \\ + (\text{real interest rate} - \text{growth rate}) \times d$$

This equation, which is the key to understanding debt dynamics, has a simple intuitive explanation. The noninterest deficit has to be financed with new debt to the extent that this deficit exceeds the amount of money creation by the central bank. In addition, nominal interest expenditures have to be refinanced with new debt. But since the denominator of the debt ratio is nominal GNP, the debt ratio will decline either with inflation or with real GNP growth in the absence of new borrowing.

The dynamics of debt and the sustainability of deficits are particularly affected by the difference between the real interest rate and the growth rate of GNP (see Corbo, Goldstein, and Khan 1987; Anand and van Wijnbergen 1989; Morley and Fishlow 1987; and Buitier 1985). Assume first that the real interest rate on debt exceeds the growth rate. Then debt dynamics are unstable, and it becomes impossible to run a permanent primary deficit that exceeds the amount of revenue the government can obtain through seignorage. The conclusion deserves emphasis: if the government is running a primary deficit larger than the amount of seignorage it can obtain, and if the real interest rate exceeds the economy's growth rate, the debt to GNP ratio will continue rising without limit. At some point it will be impossible for the government to sell its debt, and the process will have to be brought to an end by cutting the budget deficit. The point at which the process has to end depends on the expectations of the public. When the public recognizes the unsustainability of the government's fiscal policy, it will cease buying government debt and thereby force a change in policy.

The debt dynamics equation (3) has an interesting implication, first pointed out by Sargent and Wallace (1981). Suppose that the government tightens monetary policy by reducing the rate of printing of money and increasing borrowing. The debt increases; either deficits will be higher in the future or the government will have to print more money in the future to keep the deficit constant. If future deficits are to be held constant, the increased printing of money in the future will mean more inflation in future. Generally, the expectation of future inflation increases current inflation. And, as Sargent and Wallace show, it is even possible in certain—though not all—circumstances that the effect of the expected increase in future inflation outweighs that of the lower rate of money printing today, so that an apparently contractionary monetary policy today will increase current inflation.

We have already discussed maximum sustainable rates of seignorage. To summarize: governments cannot use seignorage permanently to finance primary deficits much in excess of one percent of GNP without producing inflation—but in a rapidly growing and financially deep economy the government may be able to raise as much as 2.5 percent of GNP through non-inflationary seignorage.

What happens if the real interest rate is less than the growth rate? This is a world in which the painful tradeoffs just discussed do not exist. Debt is eroded over time through growth, so primary deficits in excess of seignorage revenue are sustainable. A so-called Ponzi³ scheme of borrowing to pay interest is always possible. This certainly seemed to be so in the late 1970s, as high inflation rates produced negative ex post real interest rates. It is also true that real interest rates are very likely to be below the growth rate in economies that are growing rapidly, such as the newly industrialized Asian economies.

There are some who believe that the real interest rate should normally be below the growth rate, and that this eventual return to normality will provide an escape from the debt crisis. But an economist's instincts, rightly, are that such a free lunch is not possible. Real interest rates can be temporarily below the growth rate and could be below the growth rate for a long time in a rapidly growing economy—this is part of the virtuous circle of growth. But market forces tend to prevent the real interest rate from remaining below the real growth rate permanently. As more debt piles up, the pressure on bond markets drives up the interest rate and growth declines. If a rapidly growing economy attempts to exploit the apparently favorable debt dynamics by borrowing excessively, the growth rate will eventually fall below the real interest rate. At the level of the world economy, the normal situation should be thought of as one in which the real interest rate exceeds the growth rate.

It might seem that the government could make a Ponzi scheme possible by controlling domestic interest rates. But this is a tax on domestic bondholders in the amount by which the controlled rate is below the long-run equilibrium rate. Savers respond by taking their savings elsewhere, and the government faces a limit on how much it can borrow. The experiences of countries such as Argentina, Mexico, and Venezuela with interest rate controls and capital flight

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confirm this limitation (see Cuddington 1986). We are back again in the world of tough choices and unforgiving tradeoffs.

Sustainable Deficits

Whether the deficit is sustainable depends on its size and on how fast the economy is growing. It can be seen from equation (3) that a higher growth rate allows the government to obtain more revenue by printing money and reduces the last term in the equation. Rapid growth permits a larger deficit.

This argument helps explain why countries such as India, Malaysia, Pakistan, and Thailand, where growth was at or above 5 percent over 1980–86, have been able to run sizable domestic deficits while inflation has been in the single digits, whereas Argentina and Brazil—with virtually no growth but with comparable inflation-adjusted deficits—have been plagued with quadruple-digit inflation. This is not to say that public deficits do not matter in high-growth economies, only that they can be bigger, so long as the growth continues.

Whether a given fiscal policy is sustainable can be determined by doing detailed projections of the future course of the debt to GNP ratio. Equation (3) provides the essential analytic tool; the analysis requires subsidiary assumptions about the demand function for money, the desired inflation rate, the real interest rate, and the growth rate of the economy. If the analysis shows the debt to GNP ratio to be rising continually, the fiscal policy has to be changed.

It is sometimes argued that a deficit that results from high public investment will be sustainable. But this argument can easily be overdone. In the first instance, although spending on public infrastructure often has a very high return, many low-return or no-return items may also be included in the category of investment (the role of inefficient public investment in the economic crisis of oil-exporting countries is trenchantly analyzed in Gelb 1988). More important, even if public investment has a high return, the government must capture the additional returns from the investment if it is to be self-sustaining. For example, suppose that a project yields the remarkably high real return of 15 percent, that the marginal tax rate is 20 percent, and that the government borrows at 7 percent to finance the project. The government will be receiving only 3 percent of the cost of the project in tax revenue, even though its social yield is 15 percent (assuming that the entire social yield is pecuniary). (The higher level of output generated by the project, as indicated by the social yield, would also make possible more noninflationary money and debt finance, but this is a relatively minor effect.) Thus the investment project still adds to future deficits, despite its high yield—though, to be sure, its effect on future deficits is smaller than that of current government spending financed through deficits.

Economies can proceed for long periods with large deficits, as the Italian economy has. It helps in these cases if the domestic saving rate is high, so that individuals are willing to absorb relatively large amounts of government debt in their portfolios. But the relentless increase in the debt to GNP ratio means that even in the Italian case, fiscal policy will eventually have to change.

Deficits and Inflation

Our analysis has made it clear that there is no automatic link between budget deficits and inflation. The visitor to high-deficit economies with high inflation is often told that the deficit cannot be the cause of inflation because the correlation between them is low. In particular, it often happens that a contractionary policy that starts by raising the controlled prices of public enterprises and subsidized goods and by devaluing will both raise the price level—and thereby for some time the inflation rate—and reduce the deficit. And, in the United States, as in Italy, the high deficits of this decade have been accompanied by a decline in inflation.

Nonetheless, budget deficits do sooner or later tend to create inflation, and countries with very high budget deficits are likely to find themselves at some point confronted with extremely high rates of inflation. There have been massive budget deficits in all of the great hyperinflations, with the inflationary process and the deficit feeding on each other through the Keynes-Olivera-Tanzi effect, as higher inflation reduces tax revenue, and through declines in seigniorage revenue, as higher inflation causes a flight from money.

The correlation between the deficit and inflation is low in the early stages of inflation partly for the reason already explained, that programs to reduce deficits are often inflationary. It is low also because the economy adjusts slowly to inflationary pressures. And the correlation may be low for a third reason, that the public in an economy with a high deficit may at different times have different expectations about how the deficit will eventually be closed. For instance, if the public believes at one point that the government will attempt to deal with its fiscal problem through an inflation that erodes the value of the public debt, current inflation—reflecting the expectation of future inflation—will rise. If, at a later time, the public believes that the government will introduce an effective fiscal package to reduce the deficit, the expected inflation rate may be reduced and current inflation—again reflecting the expectation of future inflation—may fall (this argument is developed by Drazen and Helpman 1986).

Milton Friedman's famous statement that inflation is always and everywhere a monetary phenomenon is correct. However, governments do not print money at a rapid rate out of a clear blue sky. They generally print money to cover their budget deficit. Rapid money growth is conceivable without an underlying

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Conclusion

The macroeconomic analysis that we have outlined is a useful starting point for examining the economics of budget deficits. But it takes more than a single indicator to judge fiscal policy. The microeconomics of fiscal deficits both is crucial in its own right and has an impact on the macroeconomics of deficits. The more efficient are taxes and spending, the higher is the public deficit that can be sustained, since growth will be higher.

Consideration of the macroeconomics of the government budget constraint points to the dangers that arise from excessive budget deficits: inflation, exchange crises, external debt crises, and high real interest rates, with implications for the real exchange rate and the trade account and for investment. None of the links is automatic, for there are choices in the sources of financing, and lags in the effect of money printing and borrowing on inflation and interest rates.

Nor are moderate budget deficits to be avoided at all costs: small deficits can be financed without creating excessive inflation, exchange crises, or building up debt excessively. If the real interest rate exceeds the growth rate of GNP, any primary deficit smaller than the maximum amount of seignorage revenue the government can obtain is sustainable. Whether any particular path of fiscal policy is sustainable has to be checked through projections of the debt to GNP ratio; a given deficit is more likely to be sustainable the higher the growth rate of output.

The fact that a fiscal policy is sustainable does not mean that it is optimal. A fiscal deficit may crowd out private investment, and it might well be desirable to reduce the debt to GNP ratio to crowd in private investment. Similarly, it may not be optimal to collect the maximum possible amount of revenue from seignorage but rather a smaller amount corresponding to a lower inflation rate.

Both theory and evidence tell us—and warn us—that large budget deficits pose real threats to macroeconomic stability and, therefore, to economic growth and development.

Appendix: Problems of Measurement

International comparisons of fiscal data are plagued by the variations in methodology and the lack of comprehensive coverage of the public sector. Definitions of deficit change from country to country and even over time in the same country. One country may include aid receipts as revenue, whereas another treats them as deficit finance. Some countries have data only on the

national government, whereas others cover to varying degrees local governments, state enterprises, and decentralized agencies. In some countries, activities of the central bank or other public financial intermediaries create significant losses, but including their deficits in the overall public sector is difficult because of conceptual problems and lack of reliable data. Social security is consolidated with the public accounts in some countries but not in others. Many examples can be given of such accounting difficulties. (The most comprehensive collection of fiscal data is IMF various years. World Bank 1988, p. 45, describes data sources. Blejer and Chu 1988 analyze many of the methodological issues.)

Even aside from technical accounting problems, there are broader issues of how to define deficits in an economically meaningful way. Many different definitions (for a discussion of these, see World Bank 1988, pp. 56-57) have been proposed to attempt to remove short-term distortions from deficit measures. The most important single correction is to adjust the deficit for the inflation component of interest payments, yielding the inflation-corrected, or operational, deficit. The correction removes from the deficit the product (inflation rate times stock of debt), including in the operational deficit only the real component of interest. The correction can be substantial. For instance, estimates of the fiscal deficit in Mexico for 1987 imply a deficit of over 15 percent of GDP, but the operational balance shows a surplus of 3 percent.

Some economists disagree with the use of the operational deficit on the grounds that the government has in fact to find a way of meeting the interest payments, even if they only reflect compensation for inflation. A useful way of thinking of the operational deficit is that it provides an approximate measure of the size of the deficit the government would have to deal with if it succeeded in getting rid of inflation. Thus the fact that there was an operational surplus in Mexico in 1987 meant that there was no underlying fiscal problem that was inconsistent with the government attaining a zero or low inflation equilibrium. (The operational deficit ideally should be evaluated using the expected inflation rate. The actual inflation rate may include an unexpected component that would temporarily lower the operational deficit, but the lower deficit would not be sustainable.)

In addition to correcting the deficit for inflation, influences from commodity price fluctuations or domestic output above or below trend are sometimes removed to give the structural deficit.

Deficits can also be underestimated because of controls on interest rates or key prices. For example, negative real interest rates paid on government debt will make the deficit appear lower than if the interest bill were evaluated at the true opportunity cost of capital. An artificially low exchange rate applied to the government's external debt in a system of multiple exchange rates would similarly suppress the size of the true deficit. To correct for such distortions, public deficits can be evaluated at the long-run equilibrium values of the interest rate, exchange rate, and other key relative prices.

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Notes

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1. Buiter (1988) and Anand and van Wijnbergen (1989) provide a good summary of the macroeconomics of the financing of government deficits; Tanzi's earlier treatment (1984, 1985) is also very useful. Empirical analysis of deficit financing is provided in Easterly (1989).

2. One billion equals 1,000 million.

3. Charles Ponzi was a Boston resident who in the 1920s made a fortune through a pyramiding scheme but who then ended up in jail and was later penniless.

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