GOVERNMENT BUDGET CONSTRAINT

It is now time to introduce government spending, taxation, and budget deficits into our model. The level of government spending, the structure of taxes, and the way in which the spending is financed is called fiscal policy. Our analysis of fiscal policy begins with a discussion of the government budget constraint. Like a household, the government faces a budget constraint. It has sources of funds, such as taxes, and uses of funds, such as military spending. If we are careful to include all of the uses and all of the sources, the two totals must be equal. So, to examine this constraint we divide our discussion into these two categories: the uses of government funds and the sources of these funds.

The analysis applies to all levels of government: federal, state, and local. Nevertheless, most discussions of fiscal policy focus on the federal government, but this is not because state and local policy is unimportant. Instead, the focus falls on federal spending because it is much larger than the spending by any one state, though it is not as large as spending and taxation for all the states combined. Moreover, since Social Security is a federal program, transfer payments by the federal government are about three times as large as the transfer payments made by all the states. Also, the policies adopted by the federal government affect, in general, all of the fifty states, while state and local policy have impacts mostly in their own region.

Uses of Funds

The government uses funds to buy goods and services and to make transfer payments. The largest component of federal spending on goods and services is defense spending. State and local governments spend substantial amounts on schools, police and fire departments, hospitals and so forth. Total spending on goods and services by all levels of government has been
relatively stable. The fraction of total output devoted to government purchases is plotted in Figure 15.1, and it shows that governments have used about 18% to 19% of total output since the mid-1950s. Though this percentage has been relatively stable, the mix of spending has changed over time. For example, Figure 15.2 shows the downward trend over the past 40 years in defense spending. This decline has been interrupted several times most notably in the mid-sixties as a result of the Vietnam war build-up, and in the late seventies and early eighties.
when Carter began and Reagan accelerated the most recent defense build-up. The downward movement resumed in the late eighties with the end of the cold war.

Transfers, unlike spending on goods and services, follow an upward trend beginning in the mid-sixties that is shown in Figure 15.3. In the 1950s transfers accounted for about 5% of GDP. By the 1990s transfers were roughly 12% of GDP. The largest transfer program is Social Security and Medicare; but large outlays are also made to aid the handicapped and households with low incomes. Interest on government debt is another large transfer payment. Net interest
aid by the federal government fell after World War II, and then stabilized in the sixties and early seventies. High interest rates and large deficits caused interest payments to grow rapidly in the late 1970s and into the 1980s. This path is plotted in Figure 15.4. In addition to its trend, transfers also reflect the business cycle. During a recession the number of people who qualify for income assistance programs, food stamps for example, rises and spending on transfers increases accordingly. When the economy expands, transfers decline.

Finally, funds may be used to pay off the federal debt. The last two decades have seen the federal debt increase as a fraction of GDP, but it is still below the level it reached in World War II. By the end of the war the debt exceeded GDP by some 20%. However, in the decades after the war the debt to income ratio shrank until the early seventies when poor economic growth and large deficits combined to increase the ratio. It currently stands at about 60% of GDP.

We may summarize our discussion neatly with the following equation

$$\text{total uses of funds} = P_t G_t + TR_t + R_{t-1} B^g_{t-1} + B^g_{t-1}$$

where $G$ is real government spending, $TR$ is nominal non-interest transfer payments, $RB^g$ is interest payments, $P$ is still the price level, and $B^g_{t-1}$ is the debt that is retired. Subscripts refer to the time period.

**Sources of Funds**

Governments have three sources of funds. They may tax, borrow by selling bonds, and the federal government may issue new money. Taxes may take many forms. There is a federal income tax, and most states and many cities have one as well. States also rely on the sales tax and local schools are often financed by a property tax. Federal income tax receipts as a percent of GDP are plotted in Figure 15.5 and the major changes in the federal income tax can be seen in this figure. The Kennedy tax cut in the early 1960s and the Reagan tax cut in the early 1980s are clearly visible. The so-called tax surcharge in 1968, passed to help finance the Vietnam War, and tax increases to help pay for the Korean War also show up clearly. Note that the tax hikes to pay for wars have been temporary phenomena.
Another important aspect of taxes shows prominently in the last half of the seventies and early eighties. The strong trend upward over this period was due in large part to bracket creep. In the U.S., and most other countries, the income tax system is progressive. This means that tax rates increase as income increases. Table 15.1 shows the tax brackets for an individual after the tax reform of 1986. If your taxable income were $21,000 or less, then all of it would be taxed at the 15% rate. However, if your taxable income were $60,000, you would owe 15% of the first $21,000, which is $3,150, 28% of your next $17,000, which is $4,760, and 31% of your next $22,000, $6,820. Your total tax bill is $14,730, which is calculated by

\[(.15)(21,000) + (.28)(17,000) + (.31)(22,000) = 14,730.\]

The distinction between average tax rates and marginal tax rates is important. The decision to work another hour depends on what you will get to keep from that hour's labor, so it is the marginal tax rate that is critical for the choice.\textsuperscript{25} In this example the average tax rate is

\[\text{Average tax rate} = \frac{14,730}{(21,000 + 17,000 + 22,000)} \times 100 = 15.5%.\]

Marginal tax rates can also affect someone's decision to take a job or not. When someone on assistance decides to work or not to work he must take into account the loss of assistance payments. For example, suppose a single mother gets $700 a month in food stamps, housing assistance, Medicaid, and so on. If she gets a job paying $1,000 a month, it increases her "take home pay" by only $300 because she will lose her food stamps and other aid. The marginal tax rate for this mother is effectively 70%. She

\[\text{Marginal tax rate} = \frac{300}{700} \times 100 = 42.86%.\]
$14,730/$60,000 = .246, or 24.6%. About a quarter of income goes to pay income taxes. The marginal tax rate is the tax rate on the last dollar of income earned. In this case the marginal tax rate is 31% because if another dollar is earned, so that taxable income rises to $60,001, the tax on that dollar is 31 cents. Choices are made at the margin.

Inflation can have serious effects on the average and marginal tax rates. Suppose all prices and wages double, so that your taxable income also doubles to $120,000. So far nothing real has changed, your nominal income has kept up with inflation. When you recalculate your tax liability you find

\[(.15)(21,000) + (.28)(17,000) + (.31)(82,000) = 33,330\]

Note that your tax liability more than doubles because inflation has pushed a greater fraction of income into the highest tax bracket. The average tax rate increases to $33,330/$120,000 = .278, or 27.8%. No new tax laws have been passed, but average tax rates have risen. Marginal rates can also be affected. Consider a household whose income is originally $15,000. They face a marginal tax rate of 15%. However, when prices double, their income increases to $30,000, and this pushes them into the 28% bracket. Inflation has raised this household's marginal tax rate from 15% to 28%.

The high inflation rates in the 1970s raised concerns about bracket creep among voters and in the 1982 tax reform tax brackets were indexed. The bracket levels now increase with inflation so that when prices double the $21,000 cut-off would increase to $42,000, the $38,000 bracket would increase to $76,000 and so on. You can recalculate the tax liability with these new brackets and see that the average and marginal tax rates would not change.

Another source of government funds, but available only to the federal government, is the printing press. The federal government has the power to print and issue currency. Since the government gets to spend the new money first, it is a source of funds. For the U.S., money creation is not an important source of revenue. It accounts for only 1% to 2% of federal government revenue. Other countries that find it difficult to raise funds through taxation and borrowing use seigniorage to finance as much as 15% to 20% of their spending. For example, Bolivia and

earns an additional $1,000, but her net income increases by only $300. Many economists believe that these very high effective marginal tax rates do much to keep people on assistance and out of the workforce.
Mexico acquired over 20% of their funds from this source during the 1970s.\textsuperscript{26} The revenue from money creation is just the change in the money supply, $\Delta M_t$, and it is called \textbf{seigniorage}.

When the government increases the money supply, we know that the price level will rise. The increase in the price level lowers the purchasing power of the dollars that the public holds, and this reduces household wealth, just like a tax. For this reason seigniorage is sometimes called the \textbf{inflation tax}.

Finally, governments may raise funds by selling bonds. For simplicity we assume that all government borrowing is in the form of bonds that mature in one year. In practice, the U.S. government issues bonds that range in maturity from three months to thirty years. We write government bond sales in year $t$ as $B_t^g$. $B_t^g$ represents the government debt, which is closely related to the deficit that we will discuss below.

We can now summarize our discussion. The sum of all the sources of funds is given by

$$\text{total sources of funds} = T_t + B_t^g + \Delta M_t,$$

where $T_t$ is tax receipts.

**The Government Budget Constraint**

If we have covered all the possible uses and all the possible sources, then we must have

$$\text{total uses of funds} = \text{total sources of funds}.$$

Using our definitions of the total uses and sources of funds, we can rewrite this equation as

$$P_tG_t + TR_t + R_{t-1}B_{t-1}^g + B_t^g = T_t + B_t^g + \Delta M_t.$$

\textsuperscript{26} Edwards and Tabellini in "Political Instability, Political Weakness and Inflation: An Empirical Analysis" NBER Working Paper #3721, May 1991 provide an appendix with a list of the fraction of government revenue acquired through seigniorage for a wide variety of countries. Their data comes from the International Monetary Fund's \textit{International Financial Statistics} and \textit{Government Financial Statistics}.\textsuperscript{26}
This is the government budget constraint. It is instructive to rearrange this constraint to recognize the government budget deficit

\[(P_t G_t + TR_t + R_{t-1} B_{t-1}^g) - (T_t + \Delta M_t) = B_t^g - B_{t-1}^g = \text{budget deficit}.\]

The first term in the parentheses is called total budget outlays, while the second term is called total receipts. In short, the budget deficit is just

\[
\text{total budget outlays} - \text{total receipts} = \text{budget deficit}.
\]

This equation says that the difference between total budget outlays and total receipts must be financed by an increase in debt. It is important to understand the difference between the deficit and debt. Debt is the total amount owed by the government. The deficit is the change in the debt and it represents new borrowing. A country builds up debt by running deficits and pays off a debt by running a surplus (which is just a negative deficit). To put the point a bit differently, the debt is analogous to the balance on your credit cards; it tells you the total sum you owe. A deficit is analogous to the new charges on your card. The new charges represent how much you borrowed in the previous month. In the U.S. the deficit has recently been around $200 billion while the public debt is over $4 trillion.

**The Deficit**

The government budget constraint can help explain why reducing the deficit is such a difficult problem. On the face of it, deficit reduction is easy. If you want to lower the deficit, just decrease spending, or raise taxes or seigniorage. The problem arises in just what spending to cut or what taxes to increase. Our first possibility is to cut \(P_t G_t\). At the federal level about 70% of government purchases is defense spending, and most of this is on the wages and salaries of members of the armed services. Cutting the forces entails layoffs of military personnel, base closings, and so on. Cutbacks on military hardware, tanks, airplanes, and the like, will affect employment and output in those industries. Representatives of the districts with bases and
defense-related industries fight hard to protect their constituents. This makes it difficult to decrease defense spending. Since the end of the cold war, defense spending has been reduced considerably, but many believe additional cutbacks will be difficult to get passed in Congress.

The next possibility is transfer payments. But the largest transfer payments are Social Security and Medicare. If anything, the political costs of cutting these programs is higher than the political costs of cutting defense because the beneficiaries of these programs form a sizable voting block. The other major transfer program is Supplemental Security Income which is payments to the handicapped and the poor. Significant cuts here are also difficult. The final spending element is interest payments, and unless the federal government wants to default on its debt, in which case it would find it hard to borrow in the future, this spending will fall only if interest rates fall.

Increasing revenues pose political costs also. Any candidate advocating higher taxes on anyone but the rich is on shaky political ground, and unfortunately there are not enough rich to generate the necessary amounts of new tax revenues. In 1990 less than 4% of households claimed an adjusted gross income of $100,000 or more. Their incomes made up about 22% of the total and they paid more than 35% of the income tax payments. If you would raise the taxes on this group by 25%, you would generate at most $40 billion, and, since after the tax hike there is less incentive to work and a greater incentive to avoid taxes, the revenue gain would probably be considerably less. Even though the upper bound figure is a sizable sum, it would have covered less than a third of the 1990 budget deficit.\(^{27}\) The other revenue option is to print money, but, as we will learn later, this will cause inflation, and this is also politically unpopular.

In short, there are no easy ways to rapidly close the deficit. Lower spending or increased revenues have political costs and these political costs are at the heart of the deficit problem.

**Summary**

In this chapter we developed the government budget constraint. The budget constraint plays an important role in the analysis of fiscal policy. When we study the effects of government

\(^{27}\) These numbers are from the Internal Revenue Service's *Statistics of Income Bulletin* Summer 1992.
spending, we must take into account how the additional spending is financed. When we examine the effect of an increase in income tax rates, we must specify what happens to the new revenue. Finally, analysis of the government budget constraint can yield insights into why it is so difficult to lower the deficit.

Review Questions

1) Suppose that government spending on goods and services is $400 billion, transfers and interest on the debt are $500 billion, tax revenue is $700 billion, and revenue from money creation is $40 billion. What is the deficit?

2) If a politician advocates higher spending and lower taxes, what else is she advocating?

3) In the bracket creep example in the text, prices and wages double. Recalculate the change in average tax rates on the assumption that prices increase by 20%.