GOVERNMENT SPENDING

Fiscal policy can, and usually does, involve simultaneous changes in government spending, income taxes, and the deficit. However, it is much simpler if we take each of these issues in turn instead of trying to analyze them all at once. When each is understood in its own right, then the more complex analysis may be pursued. In this chapter we examine the effects of changes in government spending.

Financing Government Expenditures

To isolate the effects of government spending, we assume that debt, seigniorage, and transfer payments are zero. In this case the government budget constraint is very simple. It is just

\[ P_t G_t = T_t, \]

where \( T_t \) is taxes. We will assume a very simple form of taxation. Instead of an income tax, we assume the government finances spending through lump sum taxes. A lump sum tax is a tax that is independent of the household's characteristics. For example, it does not depend on the household's income, its consumption spending, or the value of the property it owns. The closest real world analog to a lump sum tax is the standard exemption.

The personal exemption allows each taxpayer to deduct from his taxable income a fixed amount for each dependent in the household. A single person has one dependent, himself. A husband and wife with two children have four dependents. The standard exemption allows each household to deduct some amount from its taxable income, and the amount does not depend on
the number of dependents in the home. To see how these exemptions act like lump sum taxes, it is easiest to look at a simple example. Consider a single person who earned $25,000 in 1992, roughly the starting salary of a college graduate. The value of the standard exemption in 1992 was $3,600, while the personal exemption was $2,300. This means that our single household can deduct $5,900 from its gross income of $25,000 to get a taxable income of $19,100. The income tax rate for this taxpayer was 15%, and this leaves the household with a tax payment of $2,865.

Now suppose that the standard exemption falls to only $2,000. The household's taxable income would increase to $20,700, and its tax payment to $3,105. A decrease in the standard exemption raises the household's tax liability even with no change in the income tax rate or its earned income. A decrease in the standard or personal exemption may be thought of as an increase in a lump sum tax. Notice one other important point. Since the income tax rate is still 15%, the value of the last $1000 earned by the household remains $850. In short, changing the standard exemption does not affect the reward for the last unit of income earned and therefore does not produce a substitution effect. A change in the income tax rate, which we will study later, does not have this property because it changes the reward for the last unit of work effort.

**Aggregate Demand and Government Spending**

The government uses its funds to purchase goods and services. This adds to the demand for the nation's output, and means that to consumption and investment demand, we must add government spending on goods and services, G. Aggregate demand is now written as

\[ Y^d = C^d + I^d + G. \]

We take G to be determined by policy makers, Congress and the executive branch in the case of fiscal policy.

**A Permanent Change in Government Spending**
Changes in government spending may be temporary or permanent, and the effects of government spending depend greatly on which it is. We first investigate the effects of a permanent change in government spending and it is easiest to take an example. Suppose that government spending is permanently increased by 100 units, perhaps a new national park opens and it will take these resources to operate and maintain it, or a new weather satellite is put into orbit that must be monitored. To finance this increase in spending, lump sum taxes must also increase by 100 units. Since the increase in spending is permanent so also is the tax increase. The tax increase lowers the disposable income of households by 100 units permanently, and households reduce their consumption accordingly. Moreover, the marginal propensity to consume out of permanent changes in income is still 1, so consumption demand will fall by the entire 100 units.

What is the effect on aggregate demand? One component of aggregate demand is up by 100 while another component is down by 100. These changes exactly offset each other and there is no direct effect in aggregate demand. There is just a reallocation of spending away from the private sector toward the public sector.

However, the story doesn't stop here. The wealth effect that caused the decrease in consumption, also effects the work effort decision. The household is less wealthy because of the greater tax burden, and will work more to make up some of their lost spending power. This increase in work effort will cause the $Y^*$ curve to shift out and to the right. It is possible that the household will work hard enough to replace the entire 100 units of lost disposable income, but this is unlikely. Instead, only a part of the lost disposable income, say 40 units, will be replaced by the additional work effort, and the $Y^*$ curve shifts out by this 40 units.

The household undertakes more work effort to replace a part of the lost consumption. In our example the extra work effort replaces 40 units of consumption. This means that the $C^d$ shifts out by the same 40 units. The original tax increase caused consumption to fall by 100 units, but the additional work effort made up 40 units. The net increase in aggregate demand of 40 units is made up of a 100-unit increase in government spending and a decline of 60 units in consumption.

The shifts in the $Y^*$ and $Y^d$ curves look like the effects of a permanent positive shock, but they occur because people are working harder and not because output is less costly to produce. In other words, the increase in output comes at the expense of leisure. The nature of the tax is
critical for this result. A lump sum tax only evokes a wealth effect. If the income tax rate is increased, then, as we will see in the next chapter, work effort may fall.

This analysis is shown in Figure 16.1 where the $Y^d$ curve shifts out by the same amount, 40 units, as the $Y^s$ curve. Equilibrium output increases, but the interest rate remains the same. Although total output increases, the private sector now uses less of total output, while the government uses more. So, permanently higher taxes lower household wealth, reduce consumption, and increase work effort. The increase in work effort is not large enough to replace all of the lost consumption, and the share of total output used for government spending increases. The increase in the supply of work effort does lower the real wage. We summarize these results in Table 16.1.

![Figure 16.1 Permanent Increases in Government Spending]

<table>
<thead>
<tr>
<th>Table 16.1</th>
<th>The Effects of a Permanent Increase in Spending</th>
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<tr>
<td>Y</td>
<td>+</td>
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<td>C</td>
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**Supply-Side Effects**

The analysis so far assumes that government spending does not have any effects on the private sector's ability to produce output. That is, there are no supply-side effects. This,
however, may not be the case. Some of the increase in spending may be used to purchase public capital or infrastructure goods and services, for example, some of the spending may go to improve roads, to build new communications and information systems, or to make the legal system more efficient. This type of spending makes private production less costly and encourages an increase in the supply of output.

If spending is on these types of goods, it may be thought of as a permanent positive shock to the economy. We may study this complicated type of shock in the same way that we studied a simultaneously improvement in technology and increase in the productivity of capital. The results are given in Table 16.2.

| Table 16.2 |
| The Effects of a Permanent Increase in Spending with Supply Side Effects |
| Permanent increase in G | Supply Side Effect | Total Effect |
| Y | + | + | + |
| C | - | + | ? |
| I | 0 | 0 | 0 |
| r | 0 | 0 | 0 |
| N | + | ? | ? |
| W/P | - | ? | ? |

It is important to note the three question marks. They imply that magnitudes must be known to make judgments about the direction of the effects on consumption, work effort, and the real wage. For example, if the wealth effect from the permanent change in income is small and the supply side effects are large, then consumption would rise. But in order to make this assertion we have to know about the relative sizes of the two effects. Things would become even more complicated if the investment in private capital raised the productivity of private capital. For example, if the government lays down a quality interstate highway system, then the profitability of investment in trucks is likely to increase. This would mean an increase in investment demand that would have additional consequences for our results.
A Temporary Change in Government Spending

Now suppose that the change in government spending is temporary. Wars provide the most dramatic example of large, but temporary changes in government spending. Large public works programs, such as the building of the interstate highway system, provide another. Although both these examples have a similar impact on the economy in the short run, the long run implications are, of course, very different. Wars destroy capital and leave the warring countries with a smaller productive capacity after the war. Public works projects presumably increase the productive capacity of a nation.

To begin, assume once more that G increases by 100 units, and so lump sum taxes must also increase by the same amount. However, the change in taxes is only temporary, so consumption doesn't fall initially. There is no wealth effect. Now what happens to aggregate demand? One component is up by 100 units and there is no initial change in any other component, so aggregate demand is up by 100 units.

There is an initial excess demand of 100 units, and this drives the interest rate up. The increase in the interest rate lowers consumption and investment demand, and increases the quantity of output supplied. This is shown in Figure 16.2. The increase in the interest rate also encourages more work effort thus lowering the real wage.

Both permanent and temporary increases in government spending increase output and work effort, but lower consumption. Although these effects are the same, the causes behind them are different. A permanent change in government spending causes negative wealth effects that account for lower household consumption and greater work effort. The increase in work effort accounts for the greater output. A temporary increase in government spending evokes no wealth effects. Instead, it results in an initial excess demand for goods, and then higher interest rates.
The higher interest rates induce intertemporal substitution effects that cause work effort to rise and consumption to fall. Again, the greater work effort accounts for the increase in output.

The temporary increase in government spending has driven up interest rates and lowered private spending. This reduction in private spending is called **indirect crowding out**. It is indirect because the government spending did not directly replace the private spending. Instead, the increase in government spending raised interest rates and this induced the private sector to reduce its spending. Note that this crowding out is not one for one. In Figure 16.2 output increases by 30 units. This means that private spending falls by 70 units instead of 100 units. The crowding out is incomplete because higher interest rates induce an increase in total output.

Whether or not the government spending is permanent or temporary, there may be **direct crowding out**. This occurs when the government spending falls on goods or services that the private sector would otherwise provide. Examples include campgrounds, garbage collection, and in some countries air transport. Direct crowding out amounts to relabeling the expenditure. Suppose for instance that the government increased your taxes by $500, but spent the funds exactly as you would have. Instead of buying two tickets to the movies, the government provides "free" passes. Instead of paying a private provider to collect your garbage, the government does it for no (direct) charge, and so on. Would anything of substance have changed? The answer is no. Government spending would have increased by $500 and private spending, consumption in our example, would have fallen by $500. Direct crowding out thus has no effect on total output or the interest rate.

**Summary**

The government budget constraint tells us that changes in government spending must be accompanied by a change in total receipts. We have looked at the case where the new spending is financed by increases in lump sum taxes. This simple type of tax financing allowed us to concentrate on the effects of spending.

The effects of spending depend critically on the type of spending and whether the change is permanent or temporary. A permanent change in government spending increases output and
work effort, but lowers consumption. The interest rate and investment are left unchanged. If the increase in spending has supply-side effects, output will rise further, but the interest rate remains unaffected. A temporary increase in spending will raise both output and the interest rate. Since the interest rate increases, consumption and investment fall, but work effort increases.

Review Questions

1) At the outset of the Korean War there was a sharp increase in real growth, and a sharp increase in prices. Is this consistent with the predictions of our model? What does our model predict about the behavior of interest rates at that time?

2) The Clinton administration wants to increase spending on infrastructure. They believe that such spending makes the private sector more productive. If they are correct, and the infrastructure spending is temporary, discuss the effects of this policy on interest rates, output, investment, and consumption. Be sure to distinguish between long and short run results. (Assume the spending is financed by lump sum taxes).

3) Suppose that the federal government takes over the airline industry. If the government can operate the airline industry just as efficiently as the private sector, what is the effect of this nationalization on interest rates and output? How would your results change if the government is inefficient in its management of the airlines?