Fiscal Policy[1]

Fiscal policy refers to changes in government spending (G) and taxation (T). These may be enacted in order to affect output, unemployment, etc. Or they be enacted for reasons largely unrelated to macroeconomic conditions. Expansionary fiscal policy refers to increases in G or decreases in T while contractionary fiscal policy refers to decreases in G or increases in T.

Government Debt

Suppose that the government increases its spending. In doing so, the following relationship must hold:

$$G = T + \Delta Debt \tag{1}$$

Government spending may be paid for in two ways. First, the government can raise taxes in order to pay for its increased spending. Second, the government can borrow to pay for its spending so that debt increases. The budget deficit is $G - T$. It is the amount of borrowing that the government must due in order to pay for its spending.

Most governmental borrowing occurs in bond markets. In the United States, the Treasury Department sells enough bonds to cover the budget deficit. Suppose tat the budget deficit is $400 billion. The Treasury Department might sell bonds that promise to pay $800 billion in 30 years for $400 billion. The proceeds are used to pay for government spending. We can calculate the associated interest rate with this borrowing:

$$\$400 = \frac{\$800}{(1 + i_t)^30} = 2.3\% \tag{2}$$

This would be the yield on 30 year Treasury bonds.

The national debt is the accumulation of deficits plus interest. In the previous example, the effect of the $400 billion budget deficit will be to raise the national debt by $800 billion due to accumulated interest. Each period, the government issues new bonds both to pay for any deficit spending and to pay for maturing bonds issued prior. This is known as rolling over the debt and can continue as long as the government can find buyers for its debt.

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[1]These are undergraduate lecture notes. They do not represent academic work. Expect typos, sloppy formatting, and occasional (possibly stupefying) errors.

The most obvious way to measure the debt would be just to count the amount of outstanding Treasury debt. For the United States, this figure is about $18 trillion as of 2015. There are a pair of issues with this figure, however.

1. A significant portion of the debt is owned by the government itself (e.g. Social Security and Medicare). This debt is not economic meaningful. Economists thus tend to look at the public debt, the portion not owned by the government. This figure is closer to $13 trillion.

2. Suppose that you know a household has $300,000 in debt. You cannot say whether this is a lot. If the household is a billionaire, it is not. If it is a low income household, however, then it is. The same idea applies to governmental debt. We thus divide by GDP to get the public debt as a fraction of GDP. This indicates the ability of the government to handle its debt. The following charts show these figures for the United States.

Figure 1: U.S. Federal Deficit to GDP Ratio
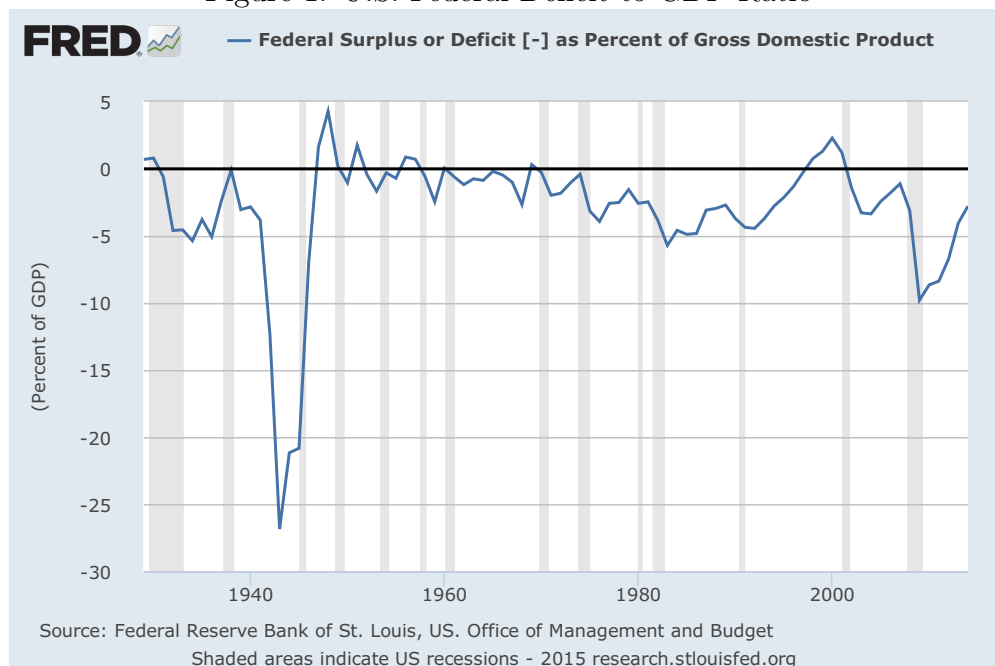
Between 2009 and 2011, the budget deficit equaled 10.1%, 8.9%, and 8.6% of GDP ($1.4, $1.3, and $1.3 trillion). These are the largest deficits since the Second World War when the deficit peaked at 27.5% of GDP in 1943. As expected, these have led to an increased debt burden as shown in Figure 2.

Note that the debt is large, but not as large as it was in the aftermath of World War Two wen the government borrowed extensively to finance the war effort. Likewise, the deficit was

Figure 2: U.S. Federal Debt to GDP Ratio
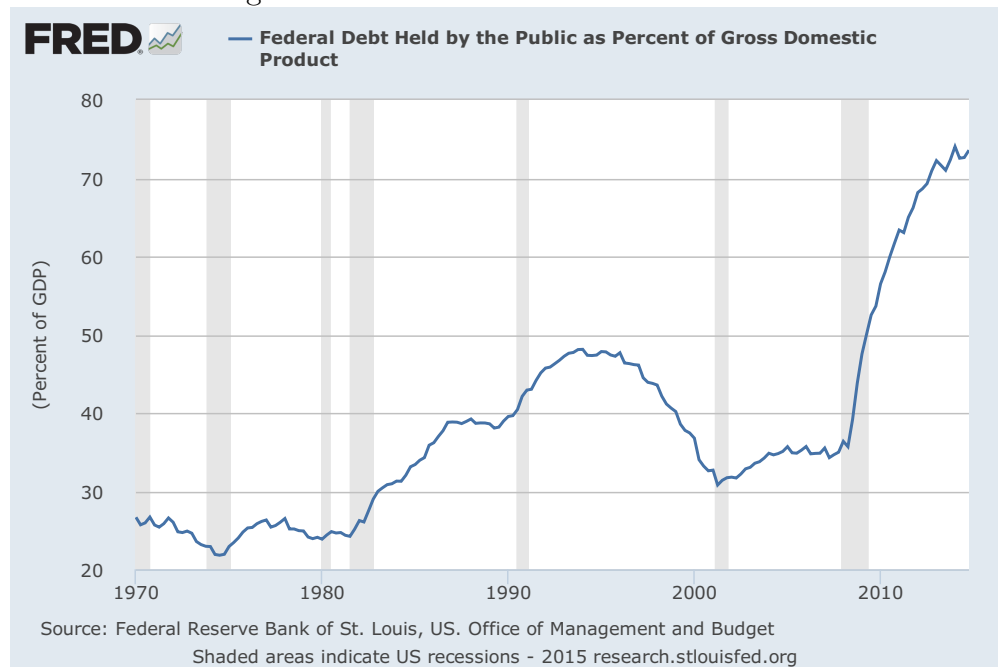
very large after the Great Recession began but has since come down. The deficit rose for a few reasons.

1. Taxes are taken as a percentage of income. As incomes declined during the recession, tax revenue went down. This accounted for about $\frac{1}{2}$ of the increase in the deficit.

2. The government engaged in expansionary fiscal policy to combat the recession which increased the deficit.

Most macroeconomists believe that there are adverse consequences of large debt. The first is known as "crowding out" and is the one more applicable to the United States in the short and intermediate term. Recall the graph of supply and demand in the bond market.

Graph: Bond Market

Both the government and private sector contribute to the total supply of bonds. A higher national debt increases bond supply and thus lowers bond prices. Recall that as bond prices go down, interest rates go up. As we have discussed, this tends to reduce ("crowd out") private investment and consumption. Recall from our discussion of economic growth that investment is a key determinate of long run macroeconomic performance. Economists thus worry that crowding out is a long run effect.

This analysis raises a key question. Can't the Fed just keep interest rates low and thus prevent crowding out? The answer is maybe. As supply goes up, the Fed must buy more and more bonds (the Fed works on the demand side) in order to keep bond prices at any level. More open market p[purchases require more potentially inflationary increases in the monetary base. High deficits may thus force the Central Bank to choose between allowing crowding out and allowing for high rates of inflation.

Notably, however, the Fed has not yet faced this conundrum in response to the large deficits of the recessionary period. This is because it has been able to keep interest rates low without significant inflation due to the reduction in the money multiplier discussed earlier in the semester. Thus while large debt may become a problem in the future, they are not a plausible candidate for the economy's recent troubles because interest rates have been very low.

The second problem with large debt is that eventually, people may become unwilling to buy government bonds. This is known as a *sovereign debt crisis* and prevents the government from further deficit spending. A government in a debt crisis typically must then choose between several unpalatable options:

1. It can honor its debt obligations but stop further borrowing by balancing its budget. This requires contractionary fiscal policy. The problem with this approach, however, is that debt crises tend to occur during economic downturns. Consider the consequences of a large fiscal contraction during a recession:

Graph: Contractionary fiscal policy

Recently, this policy solution has been called "austerity" and may have made severe recessions worse in some countries such as Greece.

2. It can default on its debt. This means it does not pay part or all of its debt obligations. This has severe consequences. First, the government may not be able to borrow for a period of time. This is problematic because while default may eliminate debt, it does not fully solve the problem of an imbalanced budget (although it may reduce interest expenses). Furthermore, default tends to increase perceived risk. More risk causes households and firms to reduce their economic activity.

3. It may raise revenue by printing money. This may, however, result in severe inflation.

Multipliers

Suppose that government spending increases by $1. What happens to output in the short run? The answer is known as the government spending multiplier.

Now suppose that the government raises taxes by $1. What happens to output in the short run. The answer is known as the tax multiplier?

The values of the tax and government spending multipliers are crucial to debates over fiscal policy. Economists use both theory and empirical work to try to figure out what they equal. We now consider a model that illustrates a case where they might be very large. It is known as the Keynesian Cross. Recall:

$$Y = C + I + G + EX - IM \tag{3}$$

We assume the following:

1. I, G, EX, and IM are exogenous. They do not change in response to economic changes. Notably investment does not change in response to changes in inflation or the interest rate.

2. $C = a + b(Y - T)$. Here we are assuming that consumption depends on a constant and disposable (after tax) income. We assume that b is greater than 0 and less than 1. If it equals 0.9 then households spend 90 cents of each additional after tax dollar that they earn. It is known as the marginal propensity to consume.

We consider this model not because it is realistic. Rather it will just show how multipliers might be bigger than expected. All we have to do is substitute #2 into the GDP accounting identity:

$$Y = a + b(Y - T) + I + G + EX - IM \tag{4}$$

$$Y - bY = a + bT + I + G + EX - IM \tag{5}$$

$$Y = \frac{a + bT + I + G + EX - IM}{1 - b} \tag{6}$$

So suppose that G increases by $1. Notice that Y increases by $\$\frac{1}{1-b}$. This is the government spending multiplier. If $b = 0.9$, then it equals 10. This might seem odd. After all, G is on the right hand side of (3) so shouldn't Y go up by just $1? The reason this is not the case is because there is feedback between consumption and output. Consider the following process:

1. G increases by $1. Because G is part of Y, Y increases by $1.

2. But when Y increases by $1, so does $Y - T$. Households thus shave more disposable income and choose to increase their consumption by 90 cents. Because C is also part of Y4, output now goes up by 90 cents.

3. When y goes up by an additional 90 cents, so does disposable income. Households then increase their disposable income by 90% of 90 cents or 81 cents. Output thus increases by the same amount.

4. This process continues with increasingly small increases in output.

Now consider a $1 increase in T. From (6) output decreases by $\frac{-b}{1-b}$ units. The tax multiplier is thus negative where higher taxes reduce output because households reduce their consumption when they have less after tax income. If $b = 0.9$, then the tax multiplier is -9.

In practice, these multipliers are never this large. The assumptions made in #1 and #2 are too simple. But this does illustrate that when output is depressed, multipliers may be much larger than 1 in magnitude.

Now consider another case. Suppose that the economy is doing well so that it is on the near vertical part of the AS curve. Now consider the effects of expansionary fiscal policy:

Graph: Expansionary Fiscal Policy when AS is steep

Now, the multipliers are near zero because increasing G or lowering T has very little impact.

The multipliers are thus a range. They may be quite large during a recession (but surely not as big as 10 and -9), or they may be very small when output is high. Empirical macroeconomists have attempted to quantify them many times. A recent and notable example is:

O'Brien, M. October 7, 2014. "Austerity has been an even bigger disaster than we thought." *Washington Post*

This article discusses a recent paper by three economists, Daniel Riera-Crichton, Carlos Vegh, and Guillermo Vuletin that uses a new approach to estimate fiscal multipliers. Here is a quote:

> Riera-Crichton, Vegh, and Vuletin took this analysis a step further. They focused squarely on countries that, between 1986 and 2008, had both been in a recession and increased spending. This last point is critical. Stimulus, remember, is supposed to be countercyclical: the government spends more when the economy shrinks. But historically-speaking, countries have actually cut spending about half the time that they've been in a slump. So counting all that austerity as "stimulus," as most do, gives us a misleadingly low estimate of the multiplier, something like 1.3. But it turns out, based on this new better sample, that the multiplier is really around 2.3 during a garden-variety recession, and 3.1 during a severe one

Debating Fiscal Policy

Fiscal policy is often a source of considerable controversy. The debates over stimulus packages in response to the Great Recession are a good example. As is usually the case, deciding your position comes down to analyzing a tradeoff. Suppose for example, that increased government spending is proposed. There are two obvious benefits:

1. The spending itself brings benefits unrelated to the state of the business cycle. For example, the U.S government is spending $700 to send a spaceship to the planet Pluto.[2] In this case, who cares about the effect on the economy. We are sending a spaceship to Pluto which is inherently awesome.

Keep in mind that stabilizing the economy is not the only goal of fiscal policy.

. In the short run, increased government spending will likely increase output. The scope of this benefit depends on the value of the fiscal multiplier. One may thus support spending during a recession while opposing the same spending during better times if the multiplier is much larger for the former.

There are some drawbacks that then have to be balanced against these benefits.

1. More spending increases debt. As we discussed earlier, most macroeconomists think that this is problematic.

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[2]The instructor is a member of the Pluto Guerrilla Front, dedicated to restoring Pluto's planetary status by any means necessary.

2. Because more spending increases aggregate demand, it may lead to more inflation. In a given case, this may or may not be a major concern.