Fiscal Policy: Theory and Evidence[1]

This set of notes provides an overview of the theory and empirical evidence regarding government expenditures and tax policy. It consists of 4 items.

1. Models in the Keynesian tradition generally predict that increasing G_t or lowering taxes increase output in the short run. Models in the Classical tradition predict that these effects are smaller. We briefly develop the former.

Suppose that households have the following utility function: $u(C_t, G_t) = ln(C_t + \gamma G_t)$ where $\gamma \in (0, 1)$ reflects the relative value of government expenditures. Further suppose that households initially have no assets and there is no discounting of any kind.[2] The Life Cycle Model of consumption predicts that households will attempt to equalize their marginal utilities of consumption in each period:

$$\frac{\partial u(C_t, G_t)}{\partial C_t} = \frac{1}{C_t + \gamma G_t} \tag{1}$$

It is therefore true that:

$$C_t + \gamma G_t = C_{t+1} + \gamma G_{t+1} = C_{t+2} + \gamma G_{t+2}... \tag{2}$$

In words, the weighted average of consumption and government spending are equalized. It follows that each term in (2) must also equal the average, $\bar{C} + \gamma\bar{G}$. But it must also be true that average consumption $(\bar{C})$ must equal average disposable income, $(\bar{Y} - \bar{T})$. This yields:

$$C_t = \bar{Y} - \bar{T} + \gamma(\bar{G} - G_t) \tag{3}$$

Differentiating:

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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.

[2]Formally, $i_t = 0$, and $\beta = 1$

$$\frac{\partial C_t}{\partial G_t} = -\gamma \tag{4}$$

The fiscal multiplier includes two factors. First, when G_t increases by one-unit, this is included in GDP (Recall $Y = C + I + G + NX$). Second, (4) shows the change that occurs to consumption. Summing these together we get a multiplier of $1 - \gamma$. This term is decreasing in the substitutability of government spending and consumption. Suppose, for example, that $\gamma = 1$. In this case, government spending and consumption are perfect substitutes. Assuming that $\bar{G}$ is unchanged, increasing spending by one-unit causes households to perfectly offset this by reducing their consumption.

The true value of γ is thus of considerable interest as it closely ties to the stimulative ability of fiscal policy. The leading macroeconomist in terms of estimating this substitutability was longtime Bates professor David Aschauer. His work found that government spending and consumption are not good substitutes, suggesting relatively effective fiscal policy.[3]

Equation (3) also gives us insight on the tax multiplier. Tax cuts increase consumption if and only if they affect the average taxes paid by the household over its lifetime. Consider two extremes.

i. The government passes a tax cut that will last for the rest of the household's life. The government pays through the tax change with larger deficits that need not be paid off until the next generation. It also does not change G_t as a result. In this case, the tax multiplier is -1.

ii. The government cuts taxes today. It pays for this change by increasing taxes by the same amount in the future. In this case, $\bar{T}$ is unaffected and the tax multiplier is zero. This is known as *Ricardian Equivalence*.

In models that are part of the Classical tradition (complete information with flexible prices), changes to government spending have no effect on output. Lowering proportional tax rates does increase output, however, because it increases labor supply in the short run.

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[3]See, for example: Aschauer, D. 1985. "Fiscal Policy and Aggregate Demand." *The American Economic Review*, 75(1): 117-127.

2. The short-run empirical evidence produces a wide range of estimates for the fiscal (government spending) and tax multipliers.

Romer

The debate over the 2009 stimulus package demonstrates the wide divergence of beliefs about the fiscal multiplier. Christina Romer headed the Council of Economic Advisers, a group of economists that advise the President. In advocating for the stimulus package, she argued for a large multiplier. Students should read her remarks (available on the course website) where she discusses this issue:

Christina D. Romer. *As prepared for the National Association of Business Economists 25th annual Washington Economic Policy Conference* Washington, D.C., March 3, 2009

Romer bases her estimates largely on theoretical models: "In most models, a tax cut has a multiplier of roughly 1.0 after about a year and a half, and spending has a multiplier of about 1.6."

She goes on to argue that these estimates are probably too small. She argues that data from the Reagan tax cuts suggests a higher tax multiplier:

> The 1975 tax cut, which was passed to try to mitigate a recession that was expected to continue in the absence of policy actions, is inherently endogenous with respect to output and so is not an appropriate observation to consider; the Reagan tax cuts, on the other hand, which were motivated by views about the appropriate size of government and the adverse incentive effects of high marginal tax rates, are relatively exogenous and so are appropriate to use. We then looked at what happened to output following the relatively exogenous tax changes. We find that the short-run effect of a permanent tax cut of 1% of GDP is to raise output by between 2 and 3 percent over the next three years. Furthermore, the nature of the responses suggests that the short-run effects of a tax cut operate mainly through aggregate demand: unemployment falls quickly and sharply, and inflation tends to rise.

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She maintains that the true government spending multiplier is even higher:

> Furthermore, there is every reason to believe that if we could do the same kind of careful study for government spending, the usual relationship between tax and spending multipliers would be maintained. That is, measured correctly, I would expect the spending multiplier to be larger than the tax multiplier. The reason is the conventional one: all of an increase in government purchases goes into spending, whereas only some fraction of a tax cut is spent."

When the Obama administration talks about jobs "created or saved," they have used a multiplier of 2.5. They convert this multiplier into jobs by assuming that a 1% increase in GDP leads to 1,000,000 jobs. The lack of rigorous empirical or theoretical support for the CEA's claims is disappointing.

Barro

Macroeconomist Robert Barro has been very critical of the CEA's claims. Read his Wall Street Journal piece:

Barro, R.. 1/22/09. "Government Spending is No Free Lunch." *Wall Street Journal*

Barro begins with an interesting discussion of what a government spending multiplier greater than one implies:

> To think about what this means, first assume that the multiplier was 1.0. In this case, an increase by one unit in government purchases and, thereby, in the aggregate demand for goods would lead to an increase by one unit in real gross domestic product (GDP). Thus, the added public goods are essentially free to society. If the government buys another airplane or bridge, the economy's total output expands by enough to create the airplane or bridge without requiring a cut in anyone's consumption or investment."

Despite the simple appeal of this argument, there is no theoretical reason that, during a time of depressed aggregate demand, the multiplier cannot exceed one. Also, many economists would support fiscal stimulus if the multiplier were simply close to one.

Barro has performed empirical work on the effect of fiscal policy. He finds that:

> I have estimated that World War II raised U.S. defense expenditures by $540 billion (1996 dollars) per year at the peak in 1943-44, amounting to 44% of real GDP. I also estimated that the war raised real GDP by $430 billion per year in 1943-44. Thus, the multiplier was 0.8 (430/540). The other way to put this is that the war lowered components of GDP aside from military purchases. The main declines were in private investment, nonmilitary parts of government purchases, and net exports – personal consumer expenditure changed little. Wartime production siphoned off resources from other economic uses – there was a dampener, rather than a multiplier."

Unlike Romer, Barro believes that the current multiplier is less than that of World War II:

> There are reasons to believe that the war-based multiplier of 0.8 substantially over-states the multiplier that applies to peacetime government purchases. For one thing, people would expect the added wartime outlays to be partly temporary (so that con-sumer demand would not fall a lot). Second, the use of the military draft in wartime has a direct, coercive effect on total employment. Finally, the U.S. economy was al-ready growing rapidly after 1933 (aside from the 1938 recession), and it is probably unfair to ascribe all of the rapid GDP growth from 1941 to 1945 to the added military outlays. In any event, when I attempted to estimate directly the multiplier associated with peacetime government purchases, I got a number insignificantly different from zero.

He concludes by comparing the Obama administration to extreme supply-siders who argue that the economy is on the right hand side of the Laffer Curve, an argument that has been thoroughly debunked and is widely seen as intellectually dishonest.

Just as in the 1980s, when extreme supply-side views on tax cuts were unjustified, it is wrong now to think that added government spending is free.

Meta-Analysis

Valerie Ramey (2001) collects and discusses many of the most influential empirical estimates of the fiscal multiplier.[4] She reaches the following conclusion:

> I will conclude that the U.S. aggregate multiplier for a temporary, deficit financed increase in government purchases (that enter separately in the utility function and have no direct effect on private sector production functions) is probably between 0.8 and 1.5. Reasonable people can argue, however, that the data do not reject 0.5 or 2.

Chahrour, Schmitt-Grohe, and Uribe (2010) examine the tax multiplier.[5] They find that different studies show that reducing taxes by 1% of GDP increases GDP by between 1% and 3%.

I conclude this point with a caution. There surely is not one true fiscal (or tax) multiplier. We would expect fiscal policy to have different effects depending on the state of the economy, the type of spending, etc.

3. The theoretical effects of government spending and taxes on the long run are hard to pin down.

Recall the fundamental issue with public goods; a free and unregulated market will underprovide them because private agents do not consider the public benefit of these goods when making their contributions. If given the choice, most of us would choose to personally provide nothing to the national defense or highway system because our contribution would be too small to make a difference.

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[4]See: Ramey, V. 2011. "Can Government Purchases Stimulate the Economy?" *Journal of Economic literature*, 49(3): 673-685.

[5]See. Charour, R., Schmitt-Grohe, S., and M. Uribe. 2010. "A Model-Based Evaluation of the Debate on the Size of the Tax Multiplier." *NBER Working Paper 16169*.

Efficiency, which may not be closely linked to output, requires that the government provide the right amount of public goods. Clearly, the efficient level of public goods is debatable. Some economists believe that genuine public goods are rare (including national defense and not much else), while others believe that they are more common, possibly including things like health care. This is a common source of disagreement among economists and often determines why some economists come down on one side of a political issue while others take the opposite stance.

It is easy to find anecdotes about where the government provides too few public goods, think of the recent bridge collapse in Minneapolis. It is also easy, however, to find cases of too many public goods, think of the Bridge to Nowhere.

4. Empirical evidence on the long run effects of fiscal policy is mixed.

Nijkamp and Poot (2004) conduct a meta-analysis of 123 studies on the long run effects of fiscal policy.[6] They find the following:

i. 92% of the 12 studies that looked at government spending on education found a positive effect on GDP growth. None found a negative effect, and 8% were inconclusive.

ii. 72% of the 39 studies that looked at government spending on infrastructure found a positive effect on GDP growth. 8% found a negative effect, and 20% were inconclusive.

iii. None of the 10 studies that looked at tax rates found a positive effect on GDP growth. 60% found a negative effect and 40% were inconclusive.

iv. 17% of the 41 studies that looked at government consumption found a positive effect on GDP growth. 29% found a negative effect, and 54% were inconclusive.

v. 5% of the 21 studies that looked at government spending on defense found a positive effect on GDP growth. 52% found a negative effect, and 43% were inconclusive.

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[6]See: Nijkamp, P. and J. Poot. 2004. "Meta-analysis of the Effect of Fiscal Policies on Long-run Growth." *European Journal of Political Economy*, 20: 91-124.