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**When is the Government
Spending Multiplier Large?**

By

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When is the Government Spending Multiplier Large?¹

By

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¹ This lecture is based on my paper with Lawrence Christiano and Sergio Rebelo, 'When is the Government Spending Multiplier Large?' *Journal of Political Economy*, Volume 119, Number 1, February 2011, pages 78 – 121.

1. Introduction

The financial crisis of 2008 and the Great Recession have led to a resurgence of interest in understanding the effects of fiscal policy. A key question confronting policymakers is: how large is the government-spending multiplier? That is, by how much does aggregate output rise in response to a unit change in government purchases of goods and services? For simplicity I refer to this magnitude as *the multiplier*. Initially governments around the world responded to the Great Recession with large increases in government spending and tax cuts. But some countries, like the U.K., went in the opposite direction, and cut government spending. In part they did so because of concerns about the long-term consequences of large government deficits. The size of the multiplier plays a central role in evaluating the consequences of alternative policy responses to the Great Recession.

Today I would like to discuss the following questions:

- When, if ever, is the multiplier large?, and
- When might counter cyclical increases in government purchases be welfare improving?

A large empirical and theoretical literature has grappled with these questions without achieving consensus. One of the difficulties in estimating the size of the multiplier arises from the interaction between government spending and aggregate output. For example an exogenous shock that decreases aggregate economic activity will also typically affect the level of government spending as governments respond to fluctuations in employment and output. To estimate the size of the multiplier using relatively atheoretical empirical methods, researchers need to identify changes in government spending that are independent of (exogenous to) changes in economic activity. Absent the ability to identify such changes, an analyst will confound the effect of a change in government spending with the effects of a shock that led to the

change in government spending. To take an extreme example, suppose that a government chose spending to keep output exactly constant in the face of shocks that would otherwise change the level of aggregate output. A naive statistician who simply looked at how output varies with government spending would falsely conclude that the multiplier is zero.

In practice, researchers have utilized two methods to identify exogenous changes in government spending. The first approach analyzes the impact of government spending induced by wartime episodes. The idea is that changes in government spending during wartime periods are not caused by economic conditions. So, it is possible to isolate the direction of causation between government spending and aggregate output. The second approach identifies exogenous changes in government spending through statistical techniques and then to explore the dynamic response of output to these spending shocks.

Utilizing relatively atheoretical empirical approaches, Ramey (2011) finds that the multiplier is roughly 1.2, Barro (1981) places it around 0.8, and Hall (2009) argues that it is between 0.7 and 1.0.² In contrast, President Obama's Council of Economic Advisors asserted that the multiplier is 1.5. Auerbach and Gorodnichenko (2010) distinguish between the size of the multiplier in recessions and expansions and argue that the multiplier is much larger in recessions than in booms.

Viewing this literature as a whole, I conclude that there is a great deal of uncertainty about the size of the multiplier. This uncertainty reflects large differences in the point estimates of the multiplier reported in different papers. Moreover, confidence intervals associated with point estimates are the largest in the

² For recent contributions to the VAR-based empirical literature on the size of the government- spending multiplier see Fisher and Peters (2010) and Ilzetzki, Mendoza, and Vegh (2009). Hall (2009) provides an analysis and review of the empirical literature.

‘wartime’ studies where identification seems most compelling.

There is also a large literature that uses general-equilibrium models to study the size of the multiplier. In standard new-Keynesian models the multiplier can be somewhat above or below one depending on the exact specification of agent’s preferences (see Gali, López-Salido, and Vallés (2007) and Monacelli and Perotti (2008)). In frictionless real-business-cycle models the multiplier is typically less than one (see e.g. Aiyagari, Christian, and Eichenbaum (1992), Baxter and King (1993), Burnside, Eichenbaum and Fisher (2004), Ramey and Shapiro (1998), and Ramey (2011)). Dynamic stochastic general equilibrium models used by the IMF, the Board of Governors of the Federal Reserve System, the Bank of Canada and the European Central Bank all imply that the multiplier is substantially below 1 under standard assumptions about the response of the monetary authority to expansionary fiscal policy.

Viewed overall it is hard to argue, based on the literature, that the multiplier is substantially larger than one under normal circumstances. However, it is now recognized that the multiplier can be much larger than one when the nominal interest rate does not respond to an increase in government spending. Normally we don’t expect this case to be empirically relevant because most central banks follow a version of the ‘Taylor rule’. That is, they raise interest rates in response to an expansionary fiscal policy shock that puts upward pressure on output and inflation. Other things equal, the rise in interest rates crowds out private consumption and investment, thereby reducing the overall size of the multiplier.

There is, however, a natural scenario in which the nominal interest rate does not respond to an increase in government spending. Suppose that the policy interest rate is very close to zero and the government would like to lower that rate even more. The nominal interest cannot be negative so the government just cannot lower its policy rate any farther. In this case we say the zero lower bound

(ZLB) on the nominal interest rate is binding. Throughout, I will refer to such a situation as one in which the ZLB is binding. For economies in which the ZLB is binding, output is likely to be far below normal. For reasons discussed below, the multiplier can be much larger than 1 when the ZLB is binding and it may be socially optimal to substantially raise government spending under these circumstances. There is good reason to believe that we are in such a situation now.

As is the case for most things in life, timing is everything. For the multiplier to be large, spending must come on line when the ZLB is binding. The larger the fraction of government spending that occurs when the ZLB is no longer binding, the smaller is the multiplier. Therefore, any argument that expansionary fiscal policy is socially desirable in the wake of a shock that makes the ZLB binding must confront the timing issue. That is, advocates of expansionary fiscal policy must also argue that government spending programs which are put into effect when the ZLB is binding will not persist after the ZLB is no longer binding.

In what follows I discuss the magnitude of fiscal multiplier when the ZLB is and is not binding from a new-Keynesian perspective. My discussion is organized around the model reported in Christiano, Eichenbaum and Rebelo (2011). After reviewing the intuition for what determines the size of the multiplier, I ask what our model has to say about the current recession and what we can learn from the Obama experiment about the efficacy of expanding government spending during a recession.

2. A Simple New-Keynesian Model

The model has a number of standard features. Monopolistically competitive firms set their price as an increasing function of marginal cost. In any given period, only a subset of firms adjust their prices. As is standard in new Keynesian models, output is demand determined. For now I abstract from real investment and open economy issues. So aggregate demand is the sum of private

sector demand for consumption goods and government purchases. Consumption demand is inversely related to the real interest rate. The latter is the nominal interest rate minus the expected inflation rate.

Suppose that central bank policy is well described by the Taylor rule below:

$$1 + R_t = \text{constant} + \phi_1 \cdot (\text{Inflation Rate}) - \phi_2 \cdot (\text{Unemployment Rate}),$$

where R_t is the nominal interest rate and ϕ_1 and ϕ_2 are positive constants.

The real interest rate is defined as the nominal interest rate minus the expected rate of inflation. I assume that the expected inflation rate moves closely with actual inflation. When $\phi_1 > 1$, the central bank raises the nominal interest rate by more than one percentage point when the rate of inflation rises by one percentage point. Thus, the Taylor rule implies that the central bank raises the real interest rate in response to a rise in the inflation rate. The Taylor rule also implies that the central bank lowers the real interest rate in response to a rise in the unemployment rate

Suppose the economy is in a recession with a higher than normal unemployment rate, and the government increases spending on goods and services in an attempt to combat the recession. Other things equal, the increase in government spending leads to a rise in aggregate demand with a corresponding rise in output and employment.

The rise in output leads to a rise in real wages and other production costs. When firms can respond, they react to rising marginal costs by raising prices. These individual pricing decisions generate a rise in the aggregate inflation rate. The Taylor rule implies that the central bank responds to the rise in inflation by raising the real interest rate. This rise leads to a fall in consumption demand. So

aggregate demand rises by less than one-to-one with a rise in government spending. Since output is demand determined, the multiplier is less than one.

As long as consumption falls, the multiplier will be positive but less than one. Taking investment into account just makes things worse because a higher real interest rate decreases investment demand. So the rise in government spending crowds out both consumption and investment. The more aggressive the central bank is in responding to inflation (a larger ϕ_1), the greater is the crowding out of private spending and the smaller is the multiplier.

The second term in the Taylor rule generates another drag on the multiplier. As output rises and the unemployment rate falls in response to an increase in government spending, the central bank will raise the real interest rate, further depressing private spending and the overall size of the multiplier.

Some observers have argued that the multiplier is positive in new-Keynesian models because individuals do not take into account that future taxes must be raised to finance the increase in spending. This claim is simply incorrect. The model I have just described assumes Ricardian equivalence. That is, people are assumed to understand the intertemporal budget constraint of the government. So people know that an increase in the present value of government spending leads to an equal-sized rise in the present value of their taxes. Consumption smoothing implies that households don't cut back on current consumption one-for-one with an increase in the present value of their taxes. Instead they smooth the impact of future tax increases on their consumption over many periods. So contemporaneous aggregate demand and output rise when government spending rises even though Ricardian equivalence holds.

Note that the longer a given per-period increase in government spending lasts, the larger is the implied increase in taxes. Rational agents understand this fact. Under Ricardian equivalence, they

internalize the larger rise in the present value of the tax increase into their consumption decisions. So the longer lasting the rise in government spending, the more crowding out of private consumption there will be as people start to save more to pay for higher future taxes. In the limit where the spending increase is viewed as permanent, the decline in consumption exactly offsets the rise in government spending and the multiplier is zero.

What about tax cuts? Under Ricardian equivalence, the wealth effect of a tax cut is zero. Consumers just save tax rebates or reduce their debts to pay for higher taxes in the future. Since neither government nor private spending changes, aggregate demand and output do not change. In effect the government borrows the amount of the tax cut from households who finance their loan to the government with the tax rebate itself.

To summarize, in simple new-Keynesian models, the multiplier is positive even under Ricardian equivalence. It's even possible to produce examples where the multiplier is larger than one. But for plausible parameterizations, it is difficult to generate very large multiplier values or argue for countercyclical fiscal policies during 'normal' business cycle episodes.

What if the nominal interest doesn't respond to the rise in government spending? Then the multiplier can be much larger than one. The most natural scenario in which the nominal interest (R) doesn't respond to an increase in government spending is when ZLB is binding.

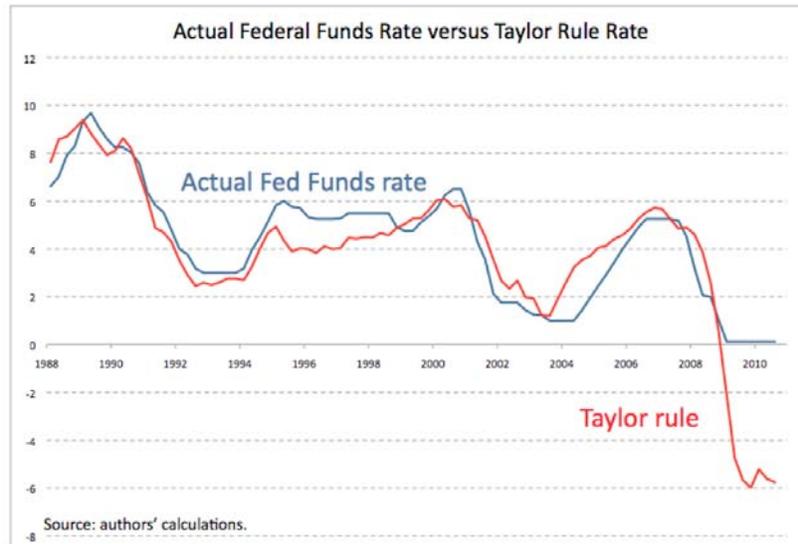
A Taylor rule that describes the behavior of the Federal Reserve over the last 30 years is:

$$1 + R_t = 2.1 + 1.3 \cdot (\text{Inflation Rate}) - 1.0 \cdot (\text{Unemployment Rate})$$

Figure 1 displays the actual level of the Federal Funds rate (the policy rate in the U.S.) in blue and the Federal Funds rate that is

implied by the above Taylor rule in red. Note that since the early part of 2009, the nominal interest rate implied by the Taylor rule is negative. This result reflects the fact that the inflation rate is close to zero and the unemployment rate is more than four percentage points above normal. The Federal Reserve would very much like to reduce the real interest by lowering the nominal interest rate.

Figure 1



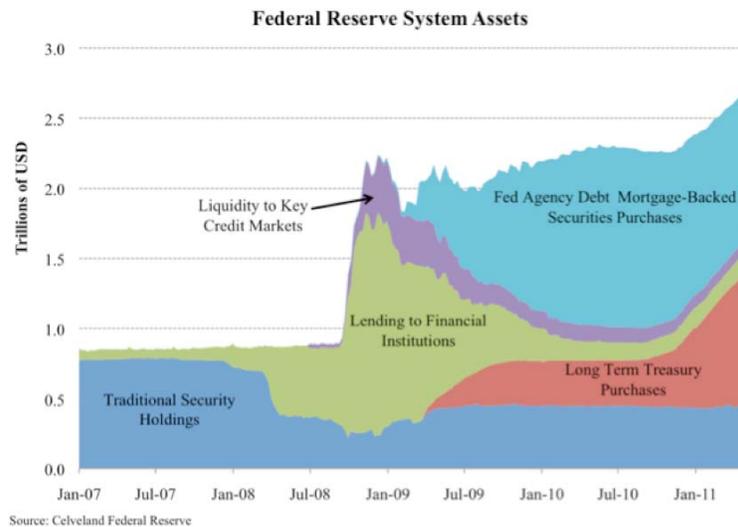
But you cannot set the nominal interest rate to a negative number. Just think how much you would like to borrow at a negative nominal interest rate! Put differently the ZLB is binding and the Federal Reserve can't stimulate the economy as much it would like to using normal interest rate policy.

Of course, the Federal Funds rate is not the only instrument in the Federal Reserve tool kit. The Federal Reserve has resorted to other unconventional policies that have been described in the press as quantitative easing (QE). The initial round of quantitative easing (QE1) involved the purchase of commercial paper and mortgage-backed securities in an attempt to stabilize particular financial

markets. The second round of quantitative easing (QEII) involved purchases of long-term government debt in order to boost economic activity by lowering longer-term interest rates.³

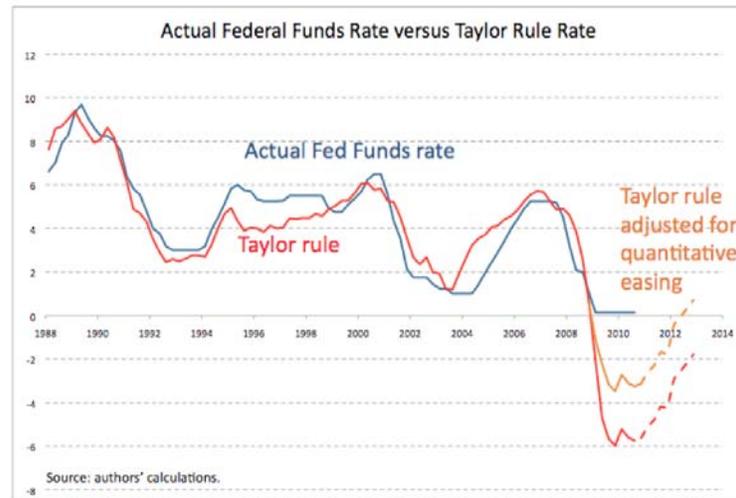
The impact of Federal Reserve's unconventional policies up to the end of August 2010 on their balance sheet is depicted in Figure 2 below.

Figure 2



It is possible to take into account the impact of QEI and QEII on the Taylor rule (see for example Rudebusch (2010)). Figure 3 displays the Federal Funds rate implied by an appropriately modified version of the Taylor rule. The modified rule indicates that the ZLB will be binding until 2012. Accordingly we can expect short-term interest rates to stay low at least until then. Section III explores the multiplier in the context of an economy when the ZLB binds.

³ When completed, QEII will involve the purchase of roughly 600 billion U. S. dollars of long-term government debt.

Figure 3

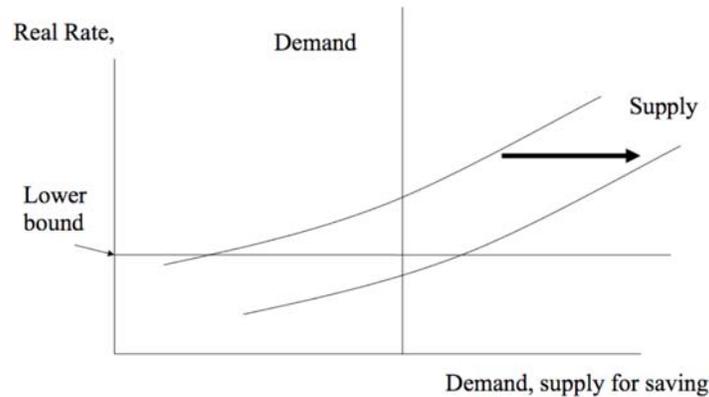
Reference: Rudebusch, Glenn D. "The Fed's Exit Strategy for Monetary Policy," Federal Reserve Bank of San Francisco, June 14, 2010.

III. The Role of Government Spending When the ZLB Binds

New-Keynesian macro models imply that output can fall dramatically in response to a shock that makes the ZLB. Under these circumstances the multiplier can be very large and it can be socially optimal to substantially raise government spending. To develop intuition for these results, consider Figure 4 where I have depicted the demand and supply for saving, plotted against the real rate of interest, r_t , (Recall, the real rate of interest is the nominal interest rate minus the expected rate of inflation.) By assumption we are abstracting from investment, so the aggregate demand for saving is zero. The vertical line at zero in Figure 4 represents the demand for savings⁴

⁴ This assumption is made to simplify the analysis. An interest sensitive investment demand and a corresponding downward sloping demand for saving

Figure 4
The Consequence of an Increase in Saving When the ZLB Binds



The supply of saving is depicted as a positive function of the real interest rate. Since the demand for savings is zero, the equilibrium saving must be zero. Imagine that the supply of saving shifts back and forth, say in response to factors that affect how much households want to save, e.g. a change in views about the future which affect desired precautionary saving. If the supply shock occurs when the nominal interest rate is positive, then nominal and real interest rates will decline in order to restore equilibrium between the demand for and supply of saving. So movements in the real interest rate can bring about equilibrium without output, consumption and other variables being ‘unduly’ disturbed. In contrast, if the ZLB on the nominal interest rate binds, then for a given level of inflation expectations, the market for savings cannot be brought about by a large fall in the real interest rate. Such a situation is depicted in Figure 4 where, given the shift in the supply of saving, the equilibrium real rate of interest lies below the lower bound on the real rate implied by the ZLB on the nominal interest

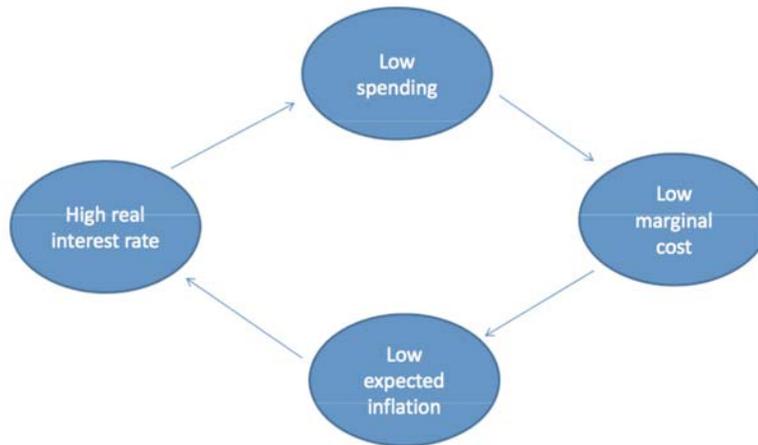
would not yield a qualitatively different analysis. See Christiano, Eichenbaum and Rebelo (2011).

rate. When the ZLB binds, something else must happen to bring loan supply (desired saving) into line with demand.

Recall that in the standard new-Keynesian model, some firms are not able to adjust their prices instantaneously and output is demand determined. An increase in desired savings corresponds to a decrease in the demand for consumption. So output, employment and national income must decline. The decline in output feeds back into the loan market as households try to smooth their consumption over time. Since the decline in output is transitory, households try to mitigate the decline in their income on consumption by reducing saving. The drop in national income is the key mechanism by which the supply of loans is re-equated to the demand for loans when the ZLB binds. That is, output and income must fall by enough to induce households to set desired savings to zero.

If that is all there was to the story, the economy would endure a relatively modest recession whose dynamics correspond to the Keynesian 'paradox of thrift.' But in new-Keynesian models, when the ZLB binds, other forces kick in and influence how much income must fall for equilibrium to be restored. To understand the nature of these forces, suppose that in the short run, marginal cost is an increasing function of a firm's output. Then the decline in output that we just discussed leads to lower marginal costs. This decline motivates firms to reduce their prices. But only a subset of firms adjust their prices in any given period. So the price level continues to decline in the future as more firms adjust their prices. In this way the decline in output generates a decline in expected future inflation. Recall that the real interest rate is the difference between the nominal interest rate and expected inflation. Since the ZLB is binding, the nominal interest is stuck at zero. So a decline in the expected rate of inflation leads to a rise in the real rate of interest. But a rise in the real interest rate leads to a rise in desired savings (a fall in consumption), partially undoes the equilibrating impact of the initial fall in output, thus leading to another round in a vicious deflationary cycle.

Figure 5
A Deflation Spiral in the Zero Lower Bound



We can use the deflationary spiral idea to evaluate the likely effectiveness of policies designed to address the fall in output associated with a binding ZLB. Policies that reduce marginal cost simply exacerbate a bad situation since they only accelerate the deflation spiral and associated fall in output. In contrast, anything that raises marginal costs interrupts the deflation spiral and slows or even reverses the fall in output.

What about an increase in government spending? As we discussed above, such an increase leads to a rise in aggregate demand and output. The rise in output leads to an increase in firms' marginal costs and expected inflation. With the nominal interest rate stuck at zero, the increase in expected inflation drives down the real interest rate, thereby increasing private spending. This rise in spending leads to a further rise in output, marginal cost and expected inflation and a further decline in the real interest rate. The net result is a large rise in inflation and output as the increase in government spending unleashes an inflationary spiral that counteracts the deflationary spiral associated with the initial shock that made the ZLB bind.

IV. The Size of the Multiplier when the the ZLB is binding

Structural new-Keynesian models imply that the multiplier is large when the social costs of a shock that makes the ZLB bind are large. Not surprisingly the size of these costs, like the fall in output, are positively related to how long the ZLB is expected to bind. In simple new-Keynesian models it is possible to get multipliers exceeding two when the ZLB state is expected to last for 2 years.

That being said, it is important to take into account the lag involved in implementing new government spending. According to standard new- Keynesian models, if new government spending comes on line when the ZLB binds, there is a large impact on current output. But if the spending comes on line when the ZLB no longer binds, there is a small impact on current output.

We can incorporate investment demand into the model. With capital accumulation, desired saving does not have to equal zero in equilibrium. Instead desired saving must equal desired investment. Since investment demand is negatively related to the real interest rate, for a given size shock, the existence of capital accumulation reduces the likelihood that the ZLB becomes binding. Recall that normally, when there is a positive shift in the desire to save, the real interest declines to equilibrate the demand and supply for savings. Absent investment, the real interest rate must fall enough to reduce desired savings to zero. The ZLB may bind before we reach that point. Now suppose that we allow for investment. A decline in the equilibrium real interest rate increases investment demand. So the change in the real interest rate is less than what is required when the demand for saving is insensitive to the real interest rate. So, the ZLB is less likely to bind for a given size shock.

At the same time, the presence of capital accumulation leads to an increase in the size of the multiplier when the ZLB does bind. When the ZLB binds, there is a vicious deflationary cycle and a rise in the real rate of interest. As the real rate rises, the supply of saving rises and there is a fall in desired investment. So, desired savings and investment diverge by more than when investment is interest insensitive. As a consequence, the fall in output that is necessary to equate savings and investment must be even larger than in a model without investment.

Estimating the size of the multiplier when the ZLB binds is even harder than estimating the size of the normal multiplier. To begin with, we cannot mix evidence from states where the ZLB binds with evidence from other states because the multipliers are very different in the two states. Moreover, as we noted in the introduction, it is necessary to identify exogenous changes in government spending so as not to confound the effect of other shocks on output with the impact of changes in government spending. This task seems daunting at best. Almost surely government spending would rise in response to large output losses in situations when the ZLB is binding. To see the importance of this last observation, consider the experience of Japan. The simple observation that output did not grow quickly in Japan even though there were large increases in government spending when the ZLB was binding, tells us nothing about the question of interest. Who knows what output would have been had the Japanese government not increased spending?

Given these difficulties, Christiano, Eichenbaum and Rebelo (2011) choose to investigate the size of the multiplier in the ZLB using an empirically plausible dynamic stochastic general equilibrium model proposed by Altig, Christiano, Eichenbaum and Lindé (2011), henceforth ACEL. The ACEL model and close variants of it do a good job at accounting for the key properties of U.S. time series data in the period before the financial crisis.

The key features of the model are:

- Price and wage setting frictions,
- Habit formation in consumption,
- Variable capital utilization, and
- investment adjustment costs.

ACEL estimate their model using time series data on 10 aggregate variables and assess both its statistical and ‘economic’ fit. Based on this model, Christiano, Eichenbaum and Rebelo (2011) argue that the peak multiplier in the ZLB state is 2.3. In contrast, when the ZLB does not bind and the interest rates rises in response to an increase in government spending, the multiplier is one initially and then declines to 0.7.

V. An Application to the 2008 Financial Crisis

A natural question to ask is: does the model generate sensible predictions for the current crisis under the assumption that the ZLB binds? The solid lines in Figure 6 display time-series data for real per capita output, private consumption, investment, government purchases, inflation, and the Federal Funds rate. The data cover the period 2000Q1-2010Q1. The dashed lines display projections for these variables prior to the financial crisis based on purely statistical methods described in Christiano, Eichenbaum and Rebelo (2011). We date the beginning of the financial crisis as the third quarter of 2008, the quarter during which Lehman Brothers collapsed. The difference between the actual and forecasted values of these variables provide a rough measure of the impact of the crisis.

Figure 6
The 2008 Financial Crisis in the U. S.

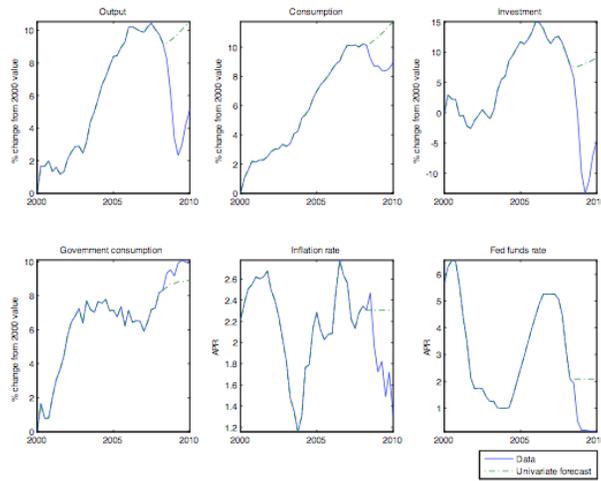
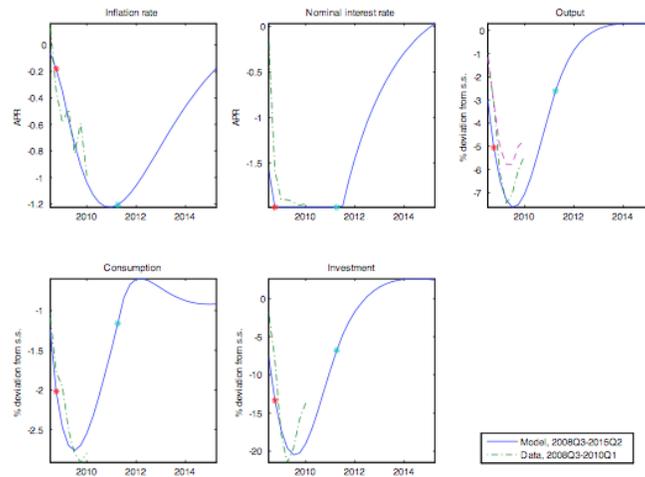


Figure 7
The Impact of the 2008 Financial Crisis On the U. S. Economy



The differences, displayed in Figure 7, are the impulse response functions to the shocks that precipitated the crisis. In response to these shocks, the nominal interest rate fell very quickly and hit the ZLB; there was a significant drop in consumption and a very large fall in investment; output fell by seven percent; and inflation fell by one percent relative to what it would have been absent the crisis.

Despite the fiscal stimulus plan enacted in February 2009 total government consumption rose by only two percent. Total government purchases, which includes both consumption and investment, rose by even less. Figures 8 – 10 show that this result reflects two facts. First, a substantial part of the stimulus plan involved an increase in transfers to households. Second, there was a large fall in state and local purchases that offset a substantial part of the increase in federal government purchases. In short, the Obama fiscal experiment never happened!



Figure 9
State and Local Government Purchases

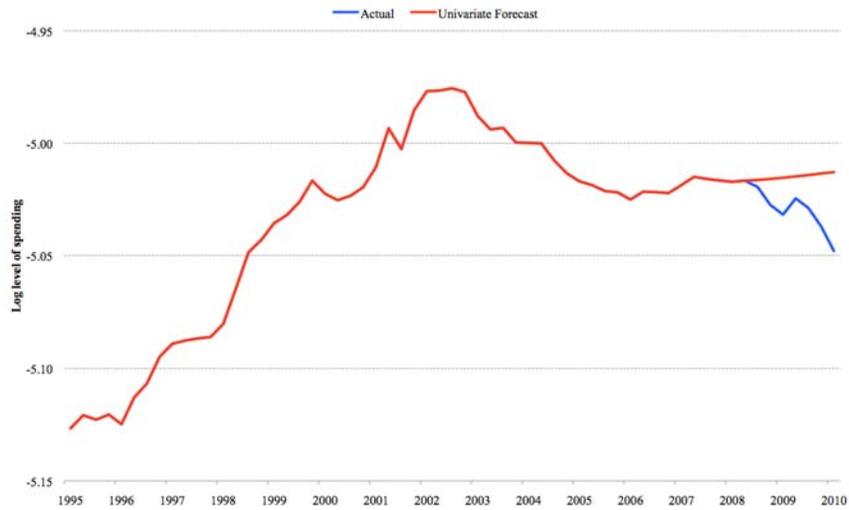
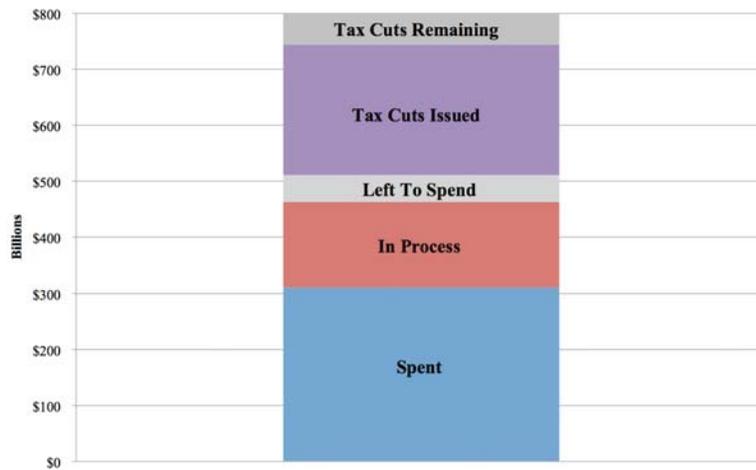


Figure 10
Stimulus Bill Spending as of October 19, 2010



Source: ProPublica, <http://projects.propublica.org/tables/stimulus-spending-progress>

To estimate the impact of the Obama stimulus bill, modest as it turned out to be, we need to specify the shocks that made the ZLB bind. At the risk of oversimplifying, the financial crisis was precipitated by disturbances in financial markets that increased the spread between the return on savings and the return on investment. The financial crisis and the resulting uncertainty led to a large rise in the household's desire to save. Unfortunately, the ACEL model is not sufficiently rich to provide a detailed account of the financial crisis or the large increase in household saving. Christiano, Eichenbaum and Rebelo (2011) mimic the effects of the crisis by introducing two shocks into their model, one to the internal rate of return on investment and one to households' discount factor. These shocks are specified so that investment declines, saving rises and the ZLB binds for 3 years. Consistent with the data, in the simulations, government spending rises by only 2 percent for 11 periods.

Recall that the peak value of the multiplier in the ACEL simulation of a ZLB is 2.3. So the rise in government purchases of two percent in the 2009 stimulus bill accounts for, at most, a seven tenths of one percent rise in annual GDP.⁵ This modest contribution of government purchases to the recovery reflects the fact that government spending increased by a modest amount, rather than a small multiplier per se. If we would have had a real fiscal experiment in the sense of a large rise in actual government purchases, the drop in output would have been much less severe.⁶

⁵ We base this calculation on the fact that $dY/Y = (dY/dG)(dG/G)(G/Y)$ and the assumption that $G/Y = 0.15$.

⁶ This analysis supports critics, such as Paul Krugman of the NYT, who have argued that the stimulus bill was too modest and should be followed by another round of spending lest the recession be characterized by a painfully slow recovery in income and employment.

VI Conclusion

A large class of modern structural macro models imply that under normal circumstances, the fiscal multiplier is relatively small. These same models imply that increases in government spending can have large effects when the ZLB binds. But timing is crucial: if most of the spending comes on line when the ZLB does not bind, then the multiplier is small.

This observation raises critical questions for advocates of counter-cyclical spending, even when the ZLB is binding. Will proposed programs come on line in time? Will political economy considerations imply that ``temporary'' programs create chains of spending that last far longer than the ZLB state? These questions involve considerations beyond an academic economist's expertise. But the answers to these questions play a critical role in any assessment of whether or not counter-cyclical government spending improves social welfare.

References

Aiyagari, S Rao, Lawrence Christiano and Martin Eichenbaum, "The Output, Employment and Interest Rate Effects of Government Consumption," *Journal of Monetary Economics*, " 31(1): 73-86, 1992.

Altig, David, Lawrence Christiano, Martin Eichenbaum and Jesper Linde, "Firm-Specific Capital, Nominal Rigidities and the Business Cycle," forthcoming, *Review of Economic Dynamics*, 2011.

Auerbach, Alan J, and Yurly Gorodnichenko, "Measuring the Output Responses to Fiscal Policy," " 2010, available at www.voxeu.org.

Barro, Robert, "Output Effects of Government Purchases," *Journal of Political Economy*, 89(6): 1086-1121, 1981.

Baxter, Marianne and Robert G. King, "Fiscal Policy in General Equilibrium," *The American Economic Review*, 83(3): 315-335, 1993.

Burnside, Craig, Martin Eichenbaum and Jonas Fisher, "Fiscal Shocks and their Consequences," *Journal of Economic Theory*, 115: 89-117, 2004

Fisher, Jonas D. M. and Ryan Peters, "Using Stock Returns to Identify Government Spending Shocks," *The Economic Journal*, 120(544): 414-436, 2010.

Gali, Jordi, J. David Lopez-Salido and Javier Valles, "Understanding the Effects of Government Spending on Consumption," *Journal of the European Economic Association*, 5(1): 227-270, 2007

Hall, Robert, "By How Much Does GDP Rise if the Government Buys More Output?" *Brookings Papers on Economic Activity*, 2: 183-231, 2009.

Ilzetzki, Ethan, Enrique Mendoza and Carlos A. Vegh, "How Big (Small?) are Fiscal Multipliers," working paper, University of Maryland, 2009.

Monacelli, Tommaso and Roberto Perotti, "Fiscal Policy, Wealth Effects and Markups," National Bureau of Economic Research Working Paper 14584, 2008.

Ramey, Valerie A., "Identifying Government Spending Shocks: It's all in the Timing," forthcoming, *Quarterly Journal of Economics*, 2011.

Ramey, Valerie A. and Matthew D. Shapiro, "Costly Capital Reallocation and the effects of Government Spending," *Carnegie-Rochester Conference Series on Public Policy*, 48: 145-194, 1998.

Glenn D. Rudebusch, 'The Fed's Exit Strategy for Monetary Policy', FRBSF Economic Letter, June 2010.

The Timlin Lecture

This is the twenty-third in a series of lectures established in 1983 in honour of Mabel Frances Timlin (1891-1976). Mabel Timlin's association with the University of Saskatchewan began in 1912 when she took employment as a secretary in one of its departments. In 1929 she was made director of the University's program of correspondence courses, a position she held until 1942. She began her graduate training in economics in 1932, when she registered as a doctoral candidate at the University of Washington. Taking summer courses and one six-month leave, she fulfilled the residence requirements by 1935. That year she was given her first regular academic appointment: instructor of economics at the University of Saskatchewan.

Her dissertation on Keynes's General Theory was completed in 1940 and published by the University of Toronto Press in 1942 under the title *Keynesian Economics*. From Keynesian theory, Mabel Timlin turned to welfare economics, which she studied while on a Guggenheim Fellowship in 1945. She next took up a study of immigration policy which was to occupy her attention for many years; on that topic she published a brief monograph entitled *Does Canada Need More People?* (Oxford University Press, 1951). Her scholarly papers, a dozen in number, on general economic theory, welfare economics, monetary policy, and immigration policy were published in *the Canadian Journal of Economics and Political Science*, *the American Economic Review*, and edited volumes of essays. After retiring from her university appointment, she completed a commissioned study of the funding and organization of social science research, which was published in Mabel F. Timlin and Albert Faucher, *The Social Sciences in Canada: Two Studies* (Social Science Research Council of Canada, 1968). In all, hers was a prodigious output for one whose first work saw print when its author was fifty years of age.

She held office in the Canadian Political Science Association (member of executive 1941-43, vice-president 1953-55, and president 1959-60); and she was elected, by ballot of the membership, a member of the executive of the American Economic Association (term 1958-60). She was elected to the Royal Society of Canada in 1951 and awarded a Canada Council Senior Fellowship in 1959. In 1975 she was named a Member of the Order of Canada.

Previous Lecturers in the Series

- Roger Gibbins, "Western Voice, Western Vision", 2009.
- Michael Devereux, "Much Appreciated? The Rise of the Canadian Dollar, 2002-2008", 2008.
- Barry L. Strayer, "Patriation of the Constitution and the Charter: 25 Years After", (2007).
- Robert G. Evans, "Ignoring the Obvious: How Economists Promote Economic Inequality", (2006).
- R. Kenneth Carty, "Doing Democracy Differently: Has Electoral Reform Finally Arrived?", (2004).
- Herschel Grossman, "Choosing Between Peace and War", (2003).
- Richard G. Harris, "Globalization and Canada's Exchange Rate Options", (2002).
- Jane Jenson, "Social Citizenship in 21st Century Canada: Challenges and Options", (2001).
- Peter Howitt, "The Economics of Science and the Future of Universities", (2000).
- Thomas J. Courchene, "Canada and the Emerging Global Order", (1999).
- Sylvia Ostry, "Globalization and the Nation State: Erosion from Above", (1998).
- Peter Aucoin, "Accountability: The Key to Restoring Public Confidence in Government", (1997).
- Pierre Fortin, "The Future of Social Assistance in Canada", (1995).
- Carolyn Tuohy, "What Drives Change in Health Care Policy: A Comparative Perspective", (1995).
- Christopher A. Sims, "Inflation as a Fiscal Phenomenon: A New Look at the Interaction of Monetary and Fiscal Policy", (1993).
- Franklyn Griffiths, "Changes in the Soviet Union", (1992).
- John F. Helliwell, "Are Nations Growing Together or Falling Apart", (1991).
- Alan C. Cairns, "Ritual, Taboo and Bias in Constitutional Controversies in Canada", (1989).
- Dan Usher, "The Search for a Useful Model of Predatory Government", (1989).
- Michael Parkin, "What Do We Know About Business Cycles?", (1987).
- Frank MacKinnon, "The Politics of Culture in Canada", (1986).
- G.K. Helleiner, "The New Global Economy: Problems and Prospects", (1985).
- J.R. Mallory, "The Charter of Rights and Freedoms and the Canadian Democracy", (1984).
- A.E. Safarian, "Governments and Multinational Companies", (1983).