# Fiscal Policy in a Depressed Economy

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March 20, 2012 11:30 AM PDT[1]

DRAFT 1.32: 52 pages/12280 words

## ABSTRACT

This paper examines logic and evidence bearing on the efficacy of fiscal policy in severely depressed economies. In normal times central banks offset the effects of fiscal policy. This keeps the policy-relevant multiplier near zero. It leaves no space for expansionary fiscal policy as a stabilization policy tool. But when interest rates are constrained by the zero nominal lower bound, discretionary fiscal policy can be highly efficacious as a stabilization policy tool. Indeed, under what we defend as plausible assumptions of temporary expansionary fiscal policies may well reduce long-run debt-financing burdens. These conclusions derive from even modest assumptions about impact multiplier, hysteresis effects, the negative impact of expansionary fiscal policy on real interest rates, and from recognition of the impact of interest rates below growth rates on the evolution of debt-GDP ratios. While our analysis underscores the importance of governments pursuing sustainable long run fiscal policies, it suggests the need for considerable caution regarding the pace of fiscal consolidation in depressed economies where interest rates are constrained by a zero lower bound.

[1] We would like to thank the Coleman Fung Center for Risk Management at U.C. Berkeley and the Berkeley Freshman Seminar Program for financial support. We would like to thank Simon Galle and Charles Smith for excellent research assistance. And we would like to thank Alan Auerbach, Laurence Ball, Robert Barsky, Raj Chetty, Gabriel Chodorow-Reich, Jan Eberly, Barry Eichengreen, Justin Fox, James K. Galbraith, Yurii Gorodnichenko, Bob Hall, Jan Hatzius, Bart Hobijn, Greg Ip, Miles Kimball, Brock Mendel, John Mondragon, Peter Orszag, Christina Romer, David Romer, Jesse Rothstein, Matthew Shapiro, Robert Waldmann, Johannes Wieland, Jim Wilcox, and especially Justin Wolfers for helpful comments and discussions.

# I. INTRODUCTION

This paper returns to the long debated question of the efficacy of discretionary fiscal policy concluding that in severely depressed economies in which interest rates are constrained by the zero lower bound discretionary fiscal policy is a crucial instrument. The analysis suggests that under plausible conditions regarding the fiscal multiplier, hysteresis effects of downturns on future output and real interest rates temporary fiscal expansions may actually be self-financing. Even if expansionary policies do raise long-term debt levels, the analysis suggests that they may well be desirable in certain circumstances. A corollary conclusion is that policies of deficit reduction in the presence of substantial output shortfalls will have adverse impacts in both the short and long run, and may even exacerbate creditworthiness problems.

Economists' views on the efficacy of discretionary fiscal policy have evolved substantially over the 75 years since the publication of Keynes's (1936) *General Theory*.[2] The experience of the Great Depression, followed by the natural experiment represented by World War II, led to near-consensus views holding that the fiscal multiplier was substantial and that fiscal policy had an important role to play in mitigating the business cycle by counteracting economic downturns. With the rapid expansion of the mid-1960s fueled by the 1964 tax cut and subsequent Vietnam war spending in recent memory, Richard Nixon echoing Milton Friedman was able to assert at the end of the 1960s that "I am now a Keynesian in economics".[3]

This near-consensus was shattered by subsequent experience. The late 1960s and 1970s provided powerful demonstrations that monetary policy had major effects on economic performance. The 1970s provided convincing evidence of the natural-rate hypothesis holding that in the medium and long runs demand-management policy could affect levels of nominal but not real income. The late 1970s and the 1980s brought increased emphasis on the supply-side aspects of tax and expenditure policies. These three factors had led most economists by the 1990s to reject

[2] See, for a review of the rise of confidence in strategic government interventions to balance aggregate demand and fiscal policy in particular, Hall, ed. (1989). For the apex see Johnson (1970). For the rough consensus that the literature had arrived at before the current crisis, see the excellent Taylor (2000).

[3] See *Time* (1965), Fox (2008), Friedman (1966), Friedman (1968).

discretionary fiscal policy directed at aggregate demand as a tool of stabilization policy.[4]

Indeed, a central element of the economic strategy of the Clinton administration was the idea that deficit-reduction policy was likely to accelerate economic growth.[5] Front-loaded deficit reduction, even with the unemployment rate less than a year past its recession peak, would allow the Federal Reserve to maintain its price stability objective with looser monetary policy. Moreover, front-loaded deficit reduction would reduce risk premia in long-term interest rates. Thus reducing the deficit would have no adverse short-term aggregate demand effect on production, and the reduction in long-term interest rates would have positive medium- and long-run supply-side effects by improving business incentives to invest and so boosting private capital formation. This strategy proved successful in both the short-term business cycle and medium-term growth dimensions. Moreover, the idea deficit reduction would be a source of stimulus by increasing "confidence" has been a central part of European economic thinking for sometime now.[6]
.
This paper examines the impact of fiscal policy in the context of a protracted period of high unemployment and output short of potential like that suffered by the United States and many other countries in recent years. We argue that, while the conventional wisdom rejecting discretionary fiscal policy is appropriate in normal times, discretionary fiscal policy where there is room to pursue it has a major role to play in the context of severe downturns that take place in the aftermath of financial crises.

Our analysis suggests that three aspects of situations typified by the current situation in the United States alter the normal calculus of costs and benefits with respect to fiscal policy.

First, the absence of supply constraints and interest behavior associated with economy being constrained by a zero lower bound mean that the likely multiplier associated with fiscal expansion is likely to be substantially greater and longer lasting than in normal times. The multiplier may well be further magnified by the impact

[4] For example, see Feldstein (2002). But even in the mid-2000s there were dissents. See, for example, Alan Blinder (2004).
[5] See Jeffrey Frankel and Peter Orszag (2002).
[6] Alesina and Ardagna (2009).

of economic expansion on expected inflation and hence in reducing real interest rates, an effect not present when inflation is above its target level and the zero lower bound is not a constraint. Second, even very modest hysteresis effects through which output shortfalls affect the economy's future potential have a substantial effect on estimates of the impact of expansionary fiscal policies on future debt burdens. While the data are not conclusive, we review a number of fragments of evidence suggesting that mitigating protracted output losses like those suffered by the United States in recent years raises potential future output. Third, extraordinarily low levels of real interest rates raise questions about the efficacy of monetary policy as a source of stimulus, and reduce the cost of fiscal stimulus.

The paper is organized as follows. Section II presents a highly stylized example making our basic point regarding self-financing fiscal policy, and then lays out an analytical framework for assessing the efficacy of fiscal policy. It incorporates impacts on present and future output as well as the future price level. It identifies the parameters that are most important in evaluating the impact of fiscal policy changes. It analyzes necessary conditions for expansionary fiscal policy to be self-financing. It also considers the less stringent conditions under which expansionary policy is not self-financing but nonetheless raises the present value of output.

The following three sections examine evidence on the parameters of central importance--the fiscal multiplier, the extent of hysteresis, and the relationship between interest rates and growth rates.

Section III argues both theoretically and empirically that the fiscal multiplier is highly context dependent, depending in particular on the reaction function of monetary policy. It concludes that at moments like the present when interest rates are constrained by a zero bound, fiscal policy is likely to be more potent than is suggested by standard estimates of "the multiplier". Section IV examines available evidence on the extent of hysteresis effects. It argues that standard economic forecasts build in the assumption of substantial hysteresis effects in both employment and output behavior. It examines a number of fragments of evidence suggesting that this assumption is warranted, particularly in the context of financial crises.

Section V takes up issues relating to interest rates and monetary policy and argues that available evidence on central bank behavior suggests that it is unlikely that in severely depressed economies expansionary fiscal policy will lead to an offsetting monetary policy response. We also rehearse a number of considerations suggesting

that monetary policy should not offset fiscal policy. It then discusses the long run government budget constraint when the government's creditworthiness is in question or could come into question. And it concludes with a discussion of policy implications of the analysis for the United States and the industrialized world, and directions for future research.

## II. A FRAMEWORK

This paper focuses on policy choices in a deeply depressed demand constrained economy in which present output and spending are well below their potential level. We presume for the moment that monetary policy is constrained by the zero lower bound, and that the central bank is unable or unwilling to provide additional stimulus through quantitative easing or other means—an assumption we discuss further in Section V. The fact that most estimates of Federal Reserve reaction functions suggest that, if it were possible to have negative short-term safe nominal interest rates, they would have been chosen in recent years suggests the relevance of our analysis.[7]

We focus on the impact of temporary fiscal stimulus on the government's long run budget constraint.

A very simple calculation conveys the major message of this paper: A combination of low real U.S. Treasury borrowing rates, positive fiscal multiplier effects, and modest hysteresis effects is sufficient to render fiscal expansion self-financing.

Imagine a demand-constrained economy where the fiscal multiplier is 1.5, and the real interest rate on long-term government debt is 1 percent. Finally assume that a $1 increase in GDP increases tax revenues and reduces spending by $.33. Assume that the government is able to undertake a transitory increase in government spending, and then service the resulting debt in perpetuity, without any impact on risk premia.

[7] See Rudebusch (2006), Rudebusch (2009), Henderson and McKibbin (1993), Taylor (2003), Taylor (2010).

Then the impact effect of an incremental $1.00 of spending is to raise the debt stock by $0.50. The annual debt service needed on this $0.50 to keep the real debt constant is $0.005. If reducing the size of the current downturn in production by $1.50 avoids a 1% as large fall in future potential output—avoids a fall in future potential output of $0.015—then the incremental $1.00 of spending now augments future-period tax revenues by $0.005. And the fiscal expansion is self-financing.

The point would be reinforced by allowing for underlying growth in the economy, positive impacts of spending on future output, and increases in the price level as a result of expansion. It is dependent on multiplier and hysteresis effects, the assumption about government borrowing costs, and the assumption that government spending once increased can again be reduced. These issues and assumptions are explored in subsequent sections.

Below we develop a framework for assessing under what conditions fiscal expansion is self-financing, and whether fiscal expansion will pass a benefit-cost test. Throughout, we assume a transitory increase in government spending and assume that it doe not affect government borrowing costs. We address these issues in subsequent sections.

A temporary boost $\Delta G$ to government purchases to increase aggregate demand in a depressed economy has four principal effects:

First, there is the standard short-term aggregate demand multiplier. In the present period, prices are predetermined or slow to adjust and in which the level of production is demand-determined. A boost to government spending for the present period only of $\Delta G$ percentage point-years is amplified or damped by the economy's short-term multiplier coefficient $\mu$ and boosts production and income $Y_n$ ("n" for "now) in the present period by an amount of percentage point-years:

(2.1) $\Delta Y_n = \mu \Delta G$

We shall discuss plausible views as to the value of $\mu$ in normal times, and make the crucial point that there is a strong likelihood that $\mu$ is now above its normal-time value, in Section III.

Second, there are "hysteresis" effects: a depressed economy is one in which investment is low; in which the capital stock is growing slowly; and in which workers without employment are seeing their skills, their weak-tie networks they use to match themselves with vacancies in the labor market, and their morale decays. All of these reduce potential output. In future periods production is supply determined, and equal to potential output. Thus in future periods potential and actual output $Y_f$ will be lower by some fraction $\eta$ of the depth by which the economy is depressed in the present:

$$(2.2) \quad \Delta Y_f = \eta \Delta Y_n$$

where the units of $\eta$ are inverse years: percent reductions in the flow of future potential output per percentage point-year of the present-period output gap.

We discuss the mechanisms which may make $\eta$ nonzero, and evaluate its likely magnitude in Section IV.

In an economy with a long-term output growth rate g and a social rate of time discount r and where r>g so that present-value calculations are possible, the net effect of these first two on the socially-discounted present value[8] of the economy's production is:

$$(2.3) \quad \Delta V = \left[ \mu + \frac{\eta \mu}{r - g} \right] \Delta G$$

where V is the present value of future output.

Third, financing the expansion $\Delta G$ of government purchases in the present period increases the national debt by an amount $\Delta D$. In an economy with a multiplier coefficient $\mu$ and a baseline marginal tax-and-transfer rate $\tau$, the required increase in the national debt is:

[8] The change in the present value of output can, of course, be questioned as a welfare measure. In contexts like the present, however, we suspect that the social value of the leisure of the currently-unemployed is low, and that the society attaches a high value to the extra output gained in the future by, for example, avoiding cutbacks to innovation spending or labor force withdrawal by those who after long-duration unemployment retire or apply for disability. See Krueger and Mueller (2011), Gordon (1973), Granovetter (1973), and Gordon (2010).

(2.4) $\Delta D = (1 - \mu\tau)\Delta G$

In order to maintain a constant debt-to-GDP ratio in the future periods thereafter, a fraction of this debt must be amortized. Assume for now that the real interest rate on government debt is equal to the social rate of time discount r. The taxes needed to finance these debt-amortization payments impose a marginal excess burden $\xi$ per dollar:

(2.5) $\Delta V = \left[ \mu + \frac{\eta\mu}{r-g} - \xi(1 - \mu\tau) \right] \Delta G$

where the future amortization at a constant debt-to-GDP ratio of the present-period fiscal expansion requires the government to commit recurring future-period cash flows of:

(2.6) $(r-g)(1-\mu\tau)$

to this task. This paper assumes that there is a budget constraint: that the appropriate long-run real r is greater than the growth rate of the tax base g,

The fourth effect is a knock-on consequence of the second. Higher future-period output from the smaller hysteresis shadow cast on the economy because expanded government purchases reduce the size of the present-period depression means that the taxes $\tau$ levied to finance baseline government programs and to amortize the preexisting national debt bring in more revenue. The effect on the government's future period net cashflows then becomes:

(2.7) $-(r-g)(1-\mu\tau) + \eta\mu\tau$

And another long-run supply-side term needs to be added to (2.5) because the hysteresis channel implies that higher present period output $Y_p$ allows the reduction of future-period marginal taxes:

(2.8) $\Delta V = \left[ \mu + \frac{\eta\mu}{r-g} + \xi\frac{\eta\mu\tau}{r-g} - \xi(1 - \mu\tau) \right] \Delta G$

The first term in (2.7) is the amount of extra future-period tax revenue the government must commit to amortize, at a constant debt-to-GDP ratio, the debt incurred to finance present-period fiscal expansion. The second term is the addition to future-period tax revenue flowing from higher future-period potential output produced by hysteresis effects.

The first and most important conclusion follows immediately from (2.7): there is a future fiscal dividend from the present-period fiscal expansion $\Delta G$ as long as:

$$(2.9) \quad r < g + \frac{\eta\mu\tau}{(1-\mu\tau)}$$

Unless the real interest rate at which the government borrows on the left-hand side is greater than the right-hand side of (2.9), fiscal expansion now improves the government's budget balance later.[9] Arguments that economies cannot afford expansionary fiscal policy now because they should not raise their future debt-financing burdens then have little purchase.[10]

For a policy-relevant multiplier $\mu$ of 1.5, a hysteresis parameter $\eta$ of 0.1, and a tax share $\tau$ of 1/3, the second term on the right-hand side of equation (2.9) is 10%/year: if the spread between the Treasury borrowing rate r and the real growth rate of GDP g is less than 10% points, present-period fiscal expansion improves rather than degrades the long-term budget balance of the government.

For a policy-relevant multiplier $\mu$ of 1.0, a hysteresis parameter $\eta$ of 0.05, and a tax share $\tau$ of 1/3, the second term on the right-hand side of equation (2.9) is 2.5%/year: if the spread between the Treasury borrowing rate r and the real growth rate of GDP g is less than 2.5% points, present-period fiscal expansion improves rather than degrades the long-term budget balance of the government.

[9] For a somewhat different argument that austerity worsens the government's budget balance, see Denes *et al.* (2012).

[10] This point is by no means new. See Lerner (1943), and Lerner (1951). Wray (2002) argues that Friedman (1948) proposal for stabilization policy via a money supply provided by countercyclical deficit financing and 100% reserve banking is in its essence the same idea.

## Table 2.1
## Parameter Values: Baseline Case

| Parameter | Interpretation | Value |
|---|---|---|
| $\mu$ | Net-of-monetary-policy-offset present-period spending multiplier | 0-2.5 |
| r | Real government borrowing rate, social rate of discount | .025-? |
| g | Potential GDP growth rate | 0.025 |
| $\tau$ | Marginal tax-and-transfer rate | 0.333 |
| $\xi$ | Reduction in output from raising additional tax revenue | 0.500 |
| $\eta$ | Hysteresis parameter | 0-0.2 |

For what values in the parameter space does (2.9) fail? For the base case, take the marginal baseline tax share $\tau$ to be approximately one-third. The Congressional Budget Office's long-term potential real GDP growth rate is 2.5%/year. This leaves $\mu$, $\eta$, and $\omega$—the multiplier, the hysteresis coefficient that captures the shadow cast by the downturn on the long run, and the share of government purchases devoted to capital investment.

Table 2.1 summarizes these parameters and their base-case values.

## Table 2.2
## Critical Treasury Real Borrowing Rate

| $\mu$ / $\eta$ | **0.0** | **0.5** | **1.0** | **1.5** | **2.5** |
|---|---|---|---|---|---|
| **0.000** | 2.50% | 2.50% | 2.50% | 2.50% | 2.50% |
| **0.025** | 2.50% | 2.99% | 3.73% | 4.95% | 14.29% |
| **0.050** | 2.50% | 3.49% | 4.96% | 7.40% | 26.07% |
| **0.100** | 2.50% | 4.48% | 7.43% | 12.30% | 49.64% |
| **0.200** | 2.50% | 6.45% | 12.35% | 22.10% | 96.97% |

Table 2.2 reports the effective Treasury borrowing rate at which there is a long-term cash-flow cost to present-period expansionary fiscal policy as it depends on the share η of cyclical output shortfalls that become permanent due to hysteresis effects, and on the net-of-monetary-policy-offset multiplier μ.

**Figure 2.1**
**U.S. Treasury Real Borrowing Rates: 10-Year TIPS**


*Source:* U.S. Department of the Treasury and U.S. Bureau of Labor Statistics, via the Federal Reserve Bank of St. Louis's FRED database.

On January 29, 1997, the U.S. Treasury auctioned its first 10-Year Treasury Inflation Protected Securities, or TIPS at interest rate was 3.449%/year, providing the first direct market read, albeit for low volumes, for borrowers with particular niche needs, and for borrowers who were not confident of the liquidity of the market. This provided the first read on the *ex ante* market-expected real cost of borrowing by the U.S. Treasury.[11] On January 1, 2003, the U.S. Treasury judged the market liquid enough to begin calculating its constant-maturity series of what the yield on

[11] The highest yield on a 10-year TIPS auction was 4.338%/year in January 2000. The January 2001 rate was 3.522%/year. The January 2002 rate was 3.480%/year. See U.S. Treasury (2012).

a newly-issued 10-year TIP would be. Figure 2.1 plots the 10-year TIPS real interest rate. With even moderate values for the multiplier and even small values for hysteresis, the critical real interest rate at which a net budgetary cost to the government from expansionary fiscal policy emerges is comfortably above the real rates at which the U.S. government has been able to borrow since the first issue of TIPS.

For earlier periods subtracting the past year's inflation rate from nominal interest rates provides a proxy that does not, since the beginning of the TIPS constant-maturity series, markedly or persistently diverge from the TIPS rate. Figure 2.2 shows this admittedly inadequate proxy rate based on the 10-year nominal Treasury bond for earlier decades.

**Figure 2.2**
**U.S. Treasury Real Borrowing Rates Since 1970: 10-Year TIP and 10-Year Treasury Less Previous Year's Inflation**


*Source:* U.S. Department of the Treasury and U.S. Bureau of Labor Statistics, via the Federal Reserve Bank of St. Louis's FRED database.

For the decade of the 2000s before the start of the financial crisis, both the ten-year TIPS rate and the ten-year Treasury rate minus the past year's inflation were between 2.0% and 2.5%, but were widely viewed as depressed below their long-term sustainable levels by the global savings glut.[12] Since the financial crisis, the ten-year TIPS rate had fluctuated between 1% and 1.5% before last summer's crash to 0—but these rates will hold only as long as the economy remains substantially cyclically depressed.

Expectations of inflation were relatively stable in late 1980s and the 1990s, and were close to the then-current level of inflation. From 1985-2000 the average ten-year Treasury bond rate minus the past year's inflation was 3.8%/year, a little more than 2% points above its average value for the 2000s, but nevertheless still in the range in which Table 2.2 reports that the extra long-run tax revenue following from expansionary fiscal policies might well outweigh the debt amortization costs.

Since World War II it is only in the early 1980s, in the immediate aftermath of the Volcker disinflation, when the permanence of the reduction in inflation was uncertain, was the ten-year Treasury bond rate minus the previous year's inflation in the range in which expansionary fiscal policy would impose any substantial financial burden on the government—if, that is, the multiplier $\mu$ has even a moderate value.[13]

Equation (2.9) implies that the magnitude of the spread by which the Treasury borrowing rate r can exceed the economic growth rate g and expansionary fiscal policy still not impose a net budgetary financing burden on the government scales linearly with the hysteresis parameter $\eta$: double the hysteresis parameter, and double the allowable spread between r and g. Table 2.3 reports such critical values of r-g for a value of $\eta$=0.10. Even for only moderate values of the multiplier and for sensitivities of tax revenue with respect to output that are smaller than those found in

[12] See Ben Bernanke (2005), "The Global Saving Glut and the U.S. Current Account Deficit" (Washington, DC: Federal Reserve) http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/

[13] Moreover, the current U.S. nominal debt has a duration of four years. A depressed economy in which rates of inflation are low for the next several years means a higher real value of the outstanding debt when the economy exits the zero lower bound to short-term safe nominal interest rates. If interest rates stay at their zero nominal bound for three further years, the difference between 1%/year and 2%/year inflation over the next three years is a difference of $300 billion in the real value of the outstanding debt three years from now that then must be amortized.

the North Atlantic today, economies far from the edge of having r in the neighborhood of g can still have fiscal expansion pay for itself.

**Table 2.3**
**Critical r-g Values as Functions of μ and τ, η=0.10**

| μ | 0.0 | 0.5 | 1.0 | 1.5 | 2.5 |
|---|---|---|---|---|---|
| τ | | | | | |
| **0.083** | 0.00% | 0.43% | 0.91% | 1.42% | 2.62% |
| **0.167** | 0.00% | 0.91% | 2.00% | 3.34% | 7.17% |
| **0.333** | 0.00% | 2.00% | 4.99% | 9.98% | 49.70% |
| **0.417** | 0.00% | 2.63% | 7.15% | 16.70% | ∞ |
| **0.500** | 0.00% | 3.33% | 10.00% | 30.00% | ∞ |

Equation (2.9) thus provides no warrant for any investor worried about the long-run fiscal stability of the United States to reduce their confidence in the wake of discretionary fiscal expansionary fiscal policies in a depressed economy. In a depressed economy, with a moderate multiplier, small hysteresis effects, and interest rates in the historical range, temporary fiscal expansion does not materially affect the overall long-run budget picture.

At this point a there arises a very natural question: If the U.S. can usually (except in the early 1980s) borrow, spend on government purchases, and end up with no net increase in the burden of financing government debt, why not do so always? The principal reason is that it cannot. A multiplier μ of even 1 is, as we discuss below, a somewhat special case, likely to be found when the zero lower bound on short safe nominal interest rates applies. A policy-relevant multiplier μ close to 0 is in fact likely to be a better approximation for thinking about discretionary fiscal policy in normal times. If so, there is no stabilization-policy case for debt-financed expansionary fiscal policy.

Note that the arithmetic of Table 2.2 does not in any way hinge on any claim that the U.S. economy is in or at the edge of a situation of dynamic inefficiency. Although we do not distinguish between different interest rates in our framework, the key interest rate in Table 2.2 is the government borrowing real interest rate r. The

key interest rate is not the private marginal product of capital $F_k$, the real social rate of time discount $r^d$, or the rate of return on public capital $r^k$.

This is a point that is at least partially about the attractiveness of U.S. Treasury debt to investors.[14] If the attractiveness of government debt to wealthholders as a safe savings vehicle is sufficiently great, and if there are even minor hysteresis benefits from expansionary fiscal policy, then there is no benefit-cost analysis to conduct because there is no net financing burden of extra government purchases on taxpayers. In such a situation to sell new government debt and use the money to buy something useful in any way is a benefit. Investors then value the safety characteristics of government debt so much that the government can borrow, spend money to boost the economy, and as its debt matures refinance it, and reduce its utility cost lower and lower as the horizon before the debt is permanently retired is extended.

If equation (2.9) does not hold—if the Treasury borrowing rate exceeds or will exceed the critical value—then there is a benefit-cost calculation to be done in order to assess the desirability of expansionary fiscal policy in the current situation.

Equation (2.8) provides a framework for doing such an analysis. It is a guide to evaluating the effects of an attempt to boost demand, production, and employment in a depressed economy via an expansion of government purchases.

The first term in (2.8), $\mu$, is the simple standard net-of-monetary-policy-offset Keynesian multiplier term. The second term, $\eta\mu/(r-g)$, is the private-side hysteresis term: the reduction in the long-term shadow cast by the current downturn if there is a more rapid recovery. The last two terms, $\xi[\tau^*\eta\mu/(r-g) - (1-\mu\tau^*)]$ provide the impact on production of the changes in government cashflow. A reduced shadow cast by a smaller and shorter downturn allows ongoing government operations to be financed with lower tax rates. The burden of amortizing the extra debt needed to finance the fiscal expansion $\Delta G$ requires higher tax rates. And $\xi$ captures how this improvement in the fiscal situation generates a fiscal dividend.

Four significant points that follow from equation (2.8). First, temporary fiscal expansion's effects are not primarily short-run but rather long-run effects: it is not a

[14] See Arvind Krishnamurthy and Annette Vissing-Jorgensen (2012a), Arvind Krishnamurthy and Annette Vissing-Jorgensen (2012).

short-run policy, and should not be analyzed as such. Second, in a non-depressed economy temporary expansionary fiscal policy is highly likely to fail its benefit-cost test (2.8): the argument that it passes the benefit-cost test in a depressed economy does not entail that it passes when the economy is not depressed. Third, even the possibility that the benefit-cost test might not be passed in a depressed economy seems to require a remarkably high fiscal burden coefficient $\xi$ in the absence of a large, positive wedge between the U.S. Treasury's borrowing costs and the social rate of time discount. And, fourth, to the contrary, right now the U.S. Treasury possesses the exorbitant privilege of borrowing cheaply by issuing a safe asset in great worldwide demand. This feature of the economy would have to be not just negated but strongly reversed for the benefit-cost test to fail.

In equation (2.8), only the first multiplier term $\mu$ is a short-run term. All the rest are long-run terms. Even the non-government cashflow terms:

(2.10) $$\mu + \frac{\eta\mu}{r-g}$$

carry the implication that temporary expansionary fiscal policy is more of a long-run than a short-run policy. The ratio of long-run to short-run benefits outside of the consequences for cashflow is:

(2.11) $$1 : \frac{\eta}{r-g}$$

For the central case of Table 2.2, with $\eta$=0.05 and $\mu$=1.0 this ratio of short-term to long-term benefits is 1.7 at the critical real interest rate of r = 5.77%/year. Expansionary fiscal policy is not a policy with primarily short-run benefits, and it should not be analyzed as if pursuing it removes political-economic focus from the long run.[15]

[15] As with all present value calculations at moderate interest rates, a great deal of the value comes from the far distant future. If we impose the condition that we unilaterally stop our forecasting horizon 25 years into the future on the grounds that the world after 2037 is likely to be different from the world of today in an unknown unknowns way, the ratio of short-run to long-run benefits falls to 1.14.

## III. THE VALUE OF THE MULTIPLIER

The recent survey of multiplier estimates by Ramey (2011) concludes that:

> the range of plausible estimates for the multiplier in the case of a temporary increase in government spending that is deficit financed is probably 0.8 to 1.5.... If the increase is undertaken during a severe recession, the estimates are likely to be at the upper bound of this range. It should be understood, however, that there is significant uncertainty involved in these estimates. Reasonable people could argue that the multiplier is 0.5 or 2.0...

Romer (2011) summarizes the evidence as suggesting a somewhat stronger central tendency for estimates of the government-purchases multiplier: 1.5. She stresses a strong presumption that that estimate is likely to be lower than the constant-monetary-and-financial-conditions multiplier, which as we argue below is itself a lower bound to the current policy-relevant multiplier. As Romer says: "in a the situation like the one we are facing now, where monetary policy is constrained by the fact that interest rates are already close to zero, the aggregate impact of an increase in government spending may be quite a bit larger than the cross-sectional effect". Certainly such a larger multiplier is consistent with the high tax multipliers of Romer and Romer (2007).

Ramey describes four methodologies for estimating "the multiplier": (i) structural model estimates; (ii) exogenous aggregate shock estimates (relying almost exclusively on military spending associated with wars) like Ramey and Shapiro (1998), Barro and Redlick (2011), and Ramey (2012) which are vulnerable to omitted variables associated with tax increases and to nonlinearities; (iii) structural VARS like Blanchard and Perotti (2002), Auerbach and Gorodnichenko (2012a, 2012b) and Gordon and Krenn (2010); and (iv) "local multiplier" estimates like Nakamura and Steinnson.(2011).[16]

[16] See also Chodorow-Reich *et al.* (2011), Clemens and Miran (2010), Cullen and Fishback (2006), Serrato and Wingender (2010), and a growing number of others. Romer (2011) and Mendel (2012) provide surveys of local multiplier papers Moretti (2010) estimates a local multiplier that is explicitly a supply-side economic-geography concept rather than a

It is far from clear that any of these methodologies shed as much light as we would wish on the policy-relevant fiscal multiplier at a time like the present, when the zero lower bound constrains interest rates and substantial frictions interfere with the functioning of credit markets. Structural model estimates are only as good as the identification of the structural model. Estimates based on changes in military spending will underestimate the impact of fiscal policy in a context like the present to the extent that (i) spending increases are associated with tax increases and Ricardian equivalence does not hold in full, (ii) supply constraints associated either with a military buildup or a high rate of resource utilization reduce output growth, and (iii) wartime spending is less productive than civilian spending or wars are associated with increased uncertainty. The identification of exogenous fiscal shocks using time-series techniques seems to us problematic. Estimates of the multiplier based on comparisons of localities that benefit from more and less federal spending abstract from any aggregate effects of spending on monetary or fiscal conditions—on future tax liabilities, confidence, or interest rates. So it is far from clear that they estimate a policy-relevant aggregate multiplier.

However, the most important issue in thinking about the fiscal multiplier is the response of monetary policy to fiscal policy. Start with the assumption that real aggregate demand is a function of the fiscal policy impetus G, of the "bare" constant-monetary-and-financial-conditions multiplier, and of the real interest rate charged to firms $r^f$. A counterfactual change in government purchases in the current period $\Delta G_t$ will then generate a different counterfactual level of current-period output:

$$\Delta Y_t = -\alpha(\Delta r_t^f) + \mu' \Delta G_t \quad (3.1)$$

If the monetary authority responds to fiscal policy actions via the monetary policy reaction function:

$$\Delta r_t^f = \gamma \Delta Y_t \quad (3.2)$$

The reduced-form relationship is then:

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demand-side macroeconomic concept. The relationship between economic-geography local multipliers and macroeconomic local multipliers is not clear to us.

(3.3) $$\Delta Y_t = \frac{\mu'}{(1+\alpha\gamma)}\Delta G_t$$

Thus an estimate of the multiplier over a period during which the monetary policy reaction function is characterized by a particular γ will estimate not the "bare" multiplier μ' but rather:

(3.4) $$\mu = \frac{\mu'}{(1+\alpha\gamma)}$$

A high value of γ—an unwillingness on the part of the monetary authority to let its judgment about what level of real aggregate demand is consistent with its price level target be overridden by the fiscal authorities—implies a low value for the estimated μ coefficient no matter how large is the "bare" multiplier μ'.

A monetary authority that seeks to maximize some objective function of the output gap and of the inflation rate in a system in which inflation is a function of its past and of the present and expected future output gap alone will pick as high a value of γ as it can. Maximizing its objective function will give it a target value for the time path of the output gap. It will then use the policy tools at its disposal to attempt to hit that time path. And should shifts in fiscal policy have any effects on the time path of the output gap, it will work as hard as it can to offset them. The relevant parts of the monetary policy reaction function will then incorporate full fiscal offset. And estimates of the multiplier μ over such a period will be very small, reflecting the fact that fiscal expansions will call forth tighter monetary policy and fiscal contractions will call forth looser monetary policy.

However, estimates of multiplier obtained during a period when central banks are desirous of and able to offset the impact of fiscal policies are not likely to be informative with respect to a period when these conditions do not obtain. Given the zero lower bound constraint on interest rates the Federal Reserve is limited in its ability and motivation to tighten policy in response to fiscal expansions or to ease policy in the face of fiscal contractions. Taking any multiplier estimated over any substantial fraction of the post-World War II period and applying it to today as the current policy-relevant multiplier may be misleading.

If the Federal Reserve's current policy is indeed one of wishing that other branches of the government would take more aggressive action to create jobs,[17] than at the moment at least the relevant piece of its monetary reaction function is not equation (3.2) for the real interest rate with a value of γ high, but is instead:

(3.5) $i_t = 0$

with the relationship between the short-term safe nominal interest rate i that the Federal Reserve is setting at "exceptionally low levels… at least until late 2014"[18] and the real interest rate $r^f$ at which firms can borrow set by:

(3.6) $r_t^f = i_t - E(\pi_{t+1}) + \rho_t$

with E(π) the expected inflation rate, and ρ the sum of default and risk premia over the short-term Treasury rate that firms must pay to borrow.

A stronger economy is one in which there are fewer bankruptcies and, plausibly, lower risk and default premia. A stronger economy is one in which expected inflation is likely to be higher. In a situation in which short-term safe nominal interest rates are at their zero nominal lower bound, equation (5.6) predicts a real interest rate relative to borrowing firms that is lower when the economy is stronger. If under the monetary policy régime of fiscal offset the policy-relevant multiplier is near 0, at the zero nominal lower bound the policy-relevant multiplier is likely to be larger than the "bare" constant-monetary-and-financial-conditions multiplier μ'.[19]

[17] See Bernanke (2011).

[18] Federal Open Market Committee (2012).

[19] See Parker (2011), on the importance of nonlinearities and on the difficulty of picking out the depressed-economy multiplier we seek to gain knowledge of. Auerbach and Gorodnichenko (2012a, 2012b) find substantial differences in multipliers net of monetary policy offset in recessions and expansions. Hall (2012a), however, cautions that this finding "has little to do with the current thought that the multiplier is much higher when the interest rate is at its lower bound of zero… [for the] authors[']… sample surely includes only a few years when any country apart from Japan was near the lower bound".

## Figure 3.1
## The Multiplier and the Monetary Policy Reaction Function


Figure 3.1 uses the IS-MP framework advocated by David Romer (2000, 2012) to illustrate this point. The relevant interest rate to plot on the vertical axis of the figure for the product-market spending equilibrium condition is the long-term risky real interest rate at which businesses and households can borrow. In a depressed economy, the second curve needed to calculate the economy's position is not the LM curve of Hicks (1937) that assumed a constant money supply but rather the MP curve that incorporates the monetary authority's decision to keep the short-term safe nominal interest rates it controls at their zero lower bound, the effects of a stronger economy on expected inflation, and the effects of a stronger economy on defaults and thus on risk and default premia. In a depressed economy at the zero nominal lower bound, this MP curve is highly likely to slope downward. Thus the "bare" constant-monetary-and-financial-conditions multiplier is not damped but rather amplified. This is in sharp contrast to what obtains in normal times, when the monetary authority interested in maintaining its credibility as a guardian of price stability commits to a very steep if not vertical MP curve, and thus a net-of-monetary-offset policy-relevant multiplier that is small if not zero.

Our suspicion is that much of the variation through time in at least American economists judgment about discretionary fiscal policy reflects changes in the nature of the central bank reaction function. From the time of the *General Theory* to the 1960s the default assumption was that interest rates would remain constant as fiscal policy changed as the central bank and fiscal authority cooperated to support demand. With the changes in macroeconomic thinking and the inflationary experience of the 1970s, the natural assumption was that the Fed was managing demand. Thus changes in fiscal policy like changes in private investment demand would be offset as the Fed pursued the appropriate balance between inflation and investment.

There is a further reason for supposing that when the zero lower bound constrains interest rate movements the impact of fiscal policy will be magnified. As Christiano, Eichenbaum, and Rebelo (2009), Eggertsson (2010), and Eggertsson and Krugman (2012) point out, the impact of upward price pressure expected from expanded aggregate demand on real interest rates at the zero nominal lower bound could have substantial quantitative significance.[20] The natural conclusion is that in a depressed economy, with short-term safe nominal interest rates at their zero lower bound and with monetary authorities committed to keeping them there for a considerable period of time, the policy-relevant multiplier is likely to be larger than econometric estimates based on times when the zero nominal lower bound does not hold would suggest.

A situation in which fiscal expansion is not accompanied by higher but rather lower real interest rates for firms fits a scenario often mentioned by observers but rarely modeled: that of "pump priming".[21] The claim that private spending will flood into the marketplace and boost demand, once initial government purchases have restored the normal channels of enterprise.[22]

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[20] Earlier the same point had been phrased in reverse, as a fear of the potentially catastrophic consequences of deflation. See Fisher (1933), Tobin (1975), DeLong (1999). Theoretical models like Tobin (1975) have the feature that for too large a deflationary shock the economy simply collapses. Since comparative statics requires comparing equilibria, no multiplier can be calculated. Nevertheless, altering policies to the point where a stable equilibrium is attained is highly desirable.

[21] See Byrd L. Jones (1978).

[22] In this context, it is worth noting that 1960s CEA Chair Walter Heller thought it possible that the effects of the Kennedy-Johnson 1964 tax cut via boosting spending and reducing real interest rates were large enough that it was possible that it came close to paying for itself. See Bartlett (2003, 2007).

Adding an inertial Phillips Curve to determine the expected inflation rate in equation (3.6):

(3.7) $\pi_{t+1} = \pi_t + \beta(Y_t - Y^*)$

means that equation (3.2) is replaced by:

(3.8) $\Delta r_t^f = -\beta \Delta Y_t$

The reduced form corresponding to equation (3.3) is then:

(3.9) $\Delta Y_t = \frac{\mu'}{(1-\alpha\beta)} \Delta G_t$

And even after stimulus is withdrawn, as long as the economy is still at the zero nominal lower bound:

(3.10) $\Delta Y_{t+i} = \frac{\alpha\beta\mu'}{(1-\alpha\beta)} \Delta G_t$

for as long a period k as the zero lower bound lasts. Thus the policy-relevant multiplier over a period in which the economy is at the zero nominal lower bound is not equation (3.4), with a large value of γ according to which the "bare" multiplier is substantially damped, but instead:

(3.11) $\mu = \frac{(1+\alpha\beta k)\mu'}{(1-\alpha\beta)}$

according to which the "bare" multiplier is amplified. Note that this amplification effect comes through the effects of expansionary fiscal policy on "monetary conditions", on the safe real interest rate alone—no account is taken of the likelihood that higher levels of production mean fewer bankruptcies and lower risk premia charged to borrowing businesses.[23]

[23] In this context it is worth noting that Kennedy-Johnson CEA Chair

For a Phillips Curve slope parameter β of one-third, a product-market equilibrium condition IS slope α of 0.6 as in Hall (2012b), and an expected duration of the zero lower bound period of three years, this amplification effect doubles the policy-relevant multiplier relative to the "bare" constant-monetary-and-financial-conditions multiplier.

It is difficult to assess the empirical evidence on multipliers without reaching the conclusion that the baseline-case multiplier of 1.0 assumed in Section II is likely to be an underestimate, and perhaps a substantial underestimate, of the policy-relevant multiplier in an economy which is, like the U.S. today, at the zero nominal lower bound on safe short-term interest rates.

## IV. HYSTERESIS

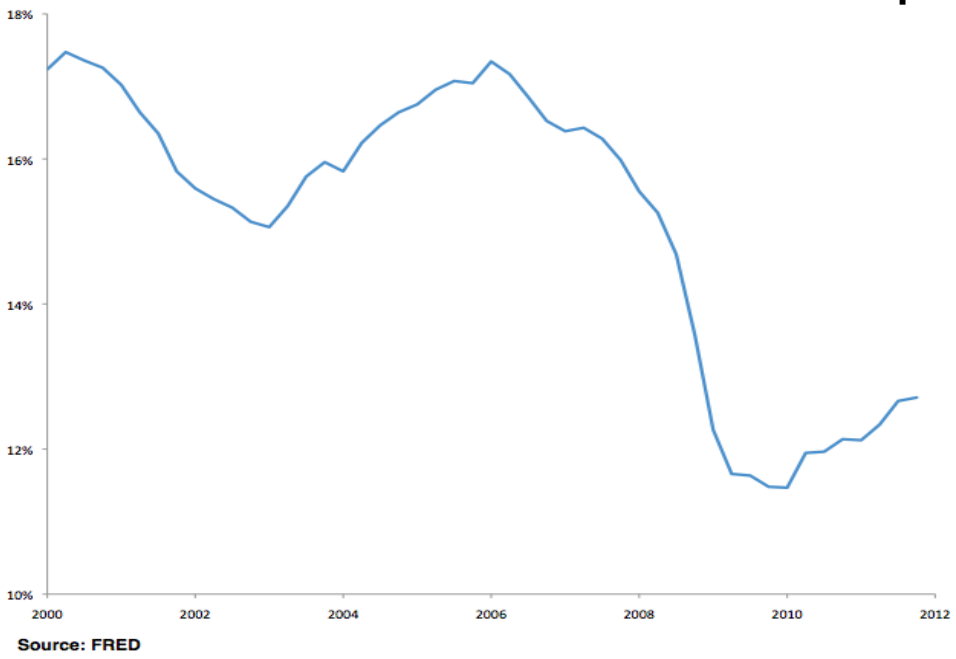
As Phelps (1972) was the first to point out, there are many reasons for believing that recessions impose costs even after they end, and that high pressure economies have continuing benefits. Because downturns and upturns are themselves caused by factors which have continuing impacts, it is not easy to identify such "hysteresis effects" or to quantify them.

Below we survey some of the evidence on investment shortfalls as a source of hysteresis and then for hysteresis effects in the labor market in an effort to come to a plausible view about η—the impact of a 1% point output shortfall on the subsequent path of economic potential.

It would indeed be surprising if economic downturns did not cast a shadow over future levels of economic activity. There is a clear and coherent logic underlying the analytic judgments that an economic downturn does cast a substantial shadow. A host of mechanisms have been suggested. These include reduced capital investment, reduced investment in research and development, reduced labor force attachment on the part of the long term unemployed, scarring effects on young workers who have trouble beginning their careers, changes in managerial attitudes, and reductions in government physical and human capital investments as social-

insurance expenditures make prior claims on limited state and local financial resources.

**Figure 4.1**
**Fixed Investment as a Share of Potential Output**




One channel through which an economic downturn casts a shadow on the future and reduces future potential output is through private investment. The financial crisis that began in 2008 brought a sharp fall in fixed investment in the American economy, especially in residential construction, from its trend average level of 16.5% of potential output to a post-2008 average of 12.5% of potential output, for a cumulative shortfall to date of 14% point-years of GDP less of cumulative investment than pre-2008 trends projected. This shortfall has two origins. The first comes from the financial stringency of the crisis. The second arises because it is hard to see why a firm would ever focus on building out its capacity rapidly if it already possessed substantial slack.

Even if the economy quickly recovers to its productive potential going forward, that productive potential will be lower because of the investment shortfall of the

past 3.5 years. A pre-tax real rate of annual return on investment spending of 10% would suggest a reduction in potential output of 1.4% flowing from the investment shortfall that has been seen since the start of 2008, and a capital-side component of the hysteresis parameter η equal to 7%. Admittedly, not all the social project of investment comes from its addition to the capital stock: Workers learn-by-doing as they interact with the capital. Other firms observe and acquire knowledge about best practices. Moreover, a substantial amount of labor time and effort not credited to investment in the NIPA may be an essential complement of the construction of new plant and the installation of new equipment.[24]

There has long been the strong association between reduced industrial capacity utilization and slow subsequent growth of industrial capacity that would be expected if reduced investment due to slack capacity were to have a powerful effect in slowing the growth of potential output. Simply regressing the two-year ahead growth of industrial capacity since the beginning of the Federal Reserve capacity utilization series in 1967 on current capacity utilization produces a slope coefficient of 1.88 with a standard error of 0.34. Under the unrealistic assumption that none of the shortfall in capacity growth is subsequently made up, the pattern of capacity utilization and capacity growth since 1967 is consistent with an η of 0.31. Since demand for industrial goods is roughly 1/3 of GDP, if a 1% shortfall in demand for two years produces a 1.88%-point reduction in capacity then a 1% shortfall in demand for one year would produce an 0.31%-point reduction in potential GDP.

There is, moreover, reason to fear that the investment shortfall is not the only factor through which the current downturn casts a shadow on the long-term future of the American economy. Large recessions may create labor-market as well as capital-stock hysteresis. Reacting to the long and large increases in the unemployment rate in Western Europe from the early 1970s to the mid-1980s, Olivier Blanchard and Lawrence Summers (1986) raised the possibility that "hysteresis" links between the short-run cycle and the long-run trend might play an important role in macroeconomics:[25] that cyclical increases in unemployment from recessions "might have a direct impact on the 'natural' rate of unemployment" around which an economy would oscillate.

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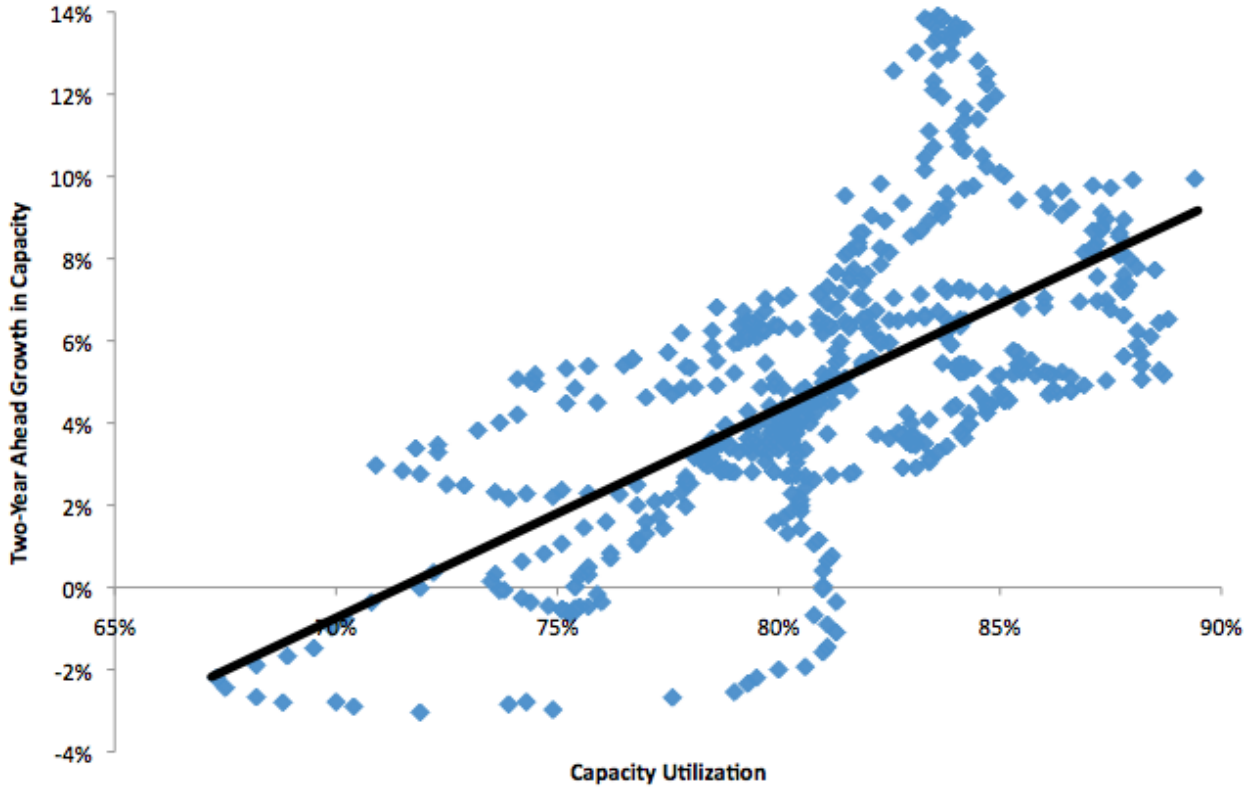
[24] Certainly the productivity boom of the late 1990s made it more plausible that a high-pressure high-investment economy is one that generates substantial technological and organizational spillovers. See Brynjolfsson and Hitt (1998).

[25] See Olivier Blanchard and Lawrence Summers (1986).

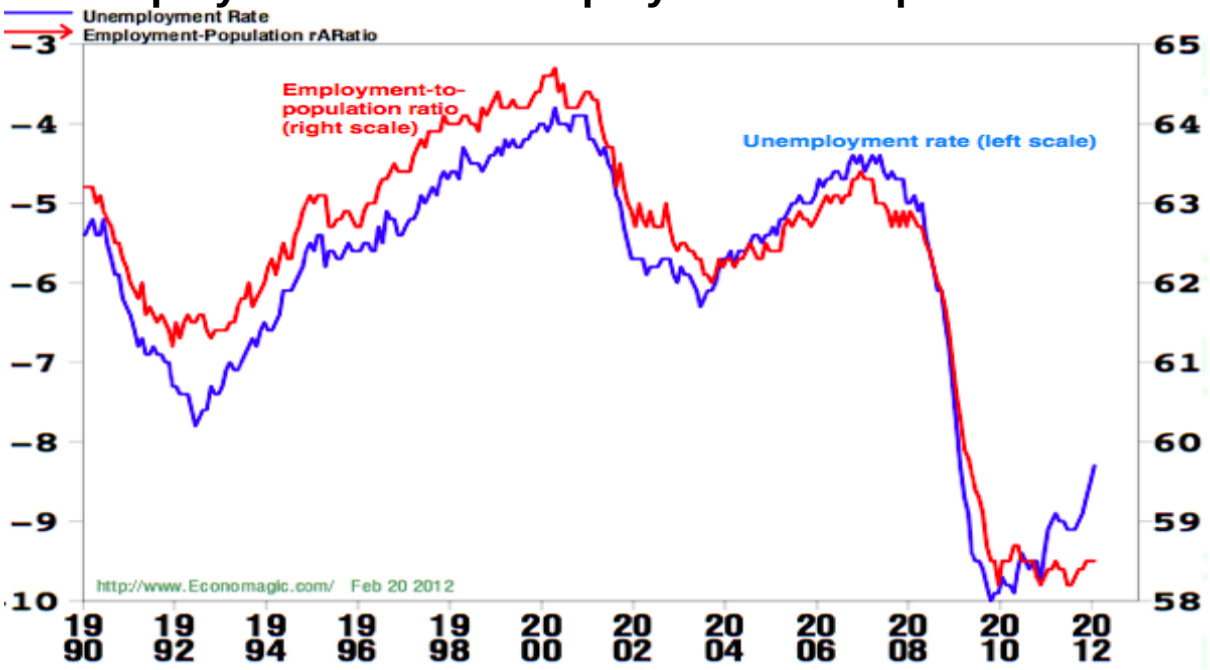
**Figure 4.2**
**Industrial Capacity Utilization and Subsequent Two-Year Growth of Capacity**




It is in this context that attention is drawn to the divergence between the behavior of the measured U.S. unemployment rate and the behavior of the measured U.S. adult employment-to-population ratio over the past two and a half years. Since the late-2009 business cycle trough, there has been little movement in the civilian employment-to-population ratio, but a substantial decline in the unemployment rate from 10.0% to 8.3%.[26]

[26] See Stehn (2011).

## Figure 4.3
## Unemployment and the Employment-to-Population Ratio




Such divergent movements in unemployment and the employment-to-population ratio are unusual in the United States. There may, since the late 1990s, be a developing demographic trend in the United States relating to the retirement of the "baby boom" generation leading to lower employment-to-population ratios at a constant unemployment rate.[27] But this is a slow-moving generational trend amounting to 0.05%/year.[28] And there are counteracting pressures stemming from the financial crisis.[29]

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[27] See Elsby, Hobijn, and Sahin (2010).

[28] See Daly, Hobijn, and Valetta (2011). This reduction in labor-force participation since the end of the downturn in the employment-to-population ratio in 2009 is an order of magnitude too large to be attributed to the slow-moving demographic changes in the structure of the potential labor force. There is a potential argument for an interaction effect: perhaps the older labor force of today is more likely to be induced into early retirement by the experience of unemployment.

[29] There is a potential argument for an interaction effect: perhaps the older labor force of today is more likely to be induced into early retirement by the experience of unemployment. But there is also a potential argument for an offsetting labor-force participation effect: that the collapse of first housing equity and second risky financial wealth in the Great Recession should lead to a rise in labor force participation as the negative wealth shock causes people to delay retirement. There

The past two and a half years have seen the civilian adult employment-to-population ratio diverge by 1.3% points from what would have been anticipated, given 1990-2009 comovement patterns and the behavior of the unemployment rate since late 2009. There would be a number of ways to map this employment shortfall given the unemployment rate onto a contribution to η. The first would be to assume that the missing workers are now permanently and structurally unemployed, to hold potential labor productivity constant, and to divide a 1.3% point shortfall by a cumulative 14% point-year output gap to obtain a contribution to η of 0.093. Alternatively, allowing potential labor productivity to vary with this shift in the employment-to-population ratio at potential output and taking the labor income share of 0.6 as labor's marginal product would lead to a contribution of 0.56. Noting that unemployment and missing labor force participation are concentrated among the less skilled and less educated might lead to using the "raw" income share unrelated to human capital of 0.3, and to a contribution of 0.28.

And perhaps the divergence between the behavior of the unemployment rate over the past two and a half years and the behavior of the employment-to-population ratio will turn out to be a transitory cyclical anomaly.

Empirical studies of the possibility of labor-side hysteresis are, regrettably, close to analyses that rest on one single data point or case: the rise and then persistently high level of unemployment in western Europe in the 1980s. Nevertheless, the case that high European unemployment in the 1980s and 1990s was a result of a long cyclical depression starting in the late 1970s is quite strong.[30] Blanchard and Summers's (1986) original line of thought carried the implication that the U.S. was likely to be largely immune from permanent labor-side effects of what was originally transitory cyclical unemployment. They stressed the "insider-outsider" wage-bargaining theory of hysteresis: workers who lose their jobs no longer vote in un-

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are some signs of this at work in the increasing employment of those past retirement age since 2007.

[30] The principal alternative theory was that high unemployment in Europe in the 1980s and 1990s was principally a supply-side phenomenon, driven by the interaction of a technological change-driven secular fall in the demand for low-skilled workers and rigid labor market institutions that did not allow for a decline in the relative earnings of the unskilled. See Krugman (1994). Ball (2009) points out that while this competing theory fit the contrast between the United States and western Europe, it did not fit the cross-country within-Western Europe experience at all. Siebert (1997) is more optimistic about relating a hysteresis-elevated NAIRU to labor-market rigidities.

ion elections, and so union leaders no longer take their interests into account in negotiations and focus instead on higher wages and better working conditions for those remaining employed. Since union strength and legal obligations on employers to bargain were much weaker in the United States, insider-outsider dynamics generated by formal labor market institutions seemed to give the United States little to fear.[31]

Ball (1997)[32] argued that the link between labor-market rigidities and the transformation of cyclical into structural unemployment in western Europe in the 1980s had been overdrawn. In his estimation:

> countries with larger decreases in inflation and longer disinflationary periods have larger rises in the NAIRU. [Measured] imperfections in the labor market [had] little direct relation to change in the NAIRU, but long-term unemployment benefits [appeared to] magnify the effects of disinflation...

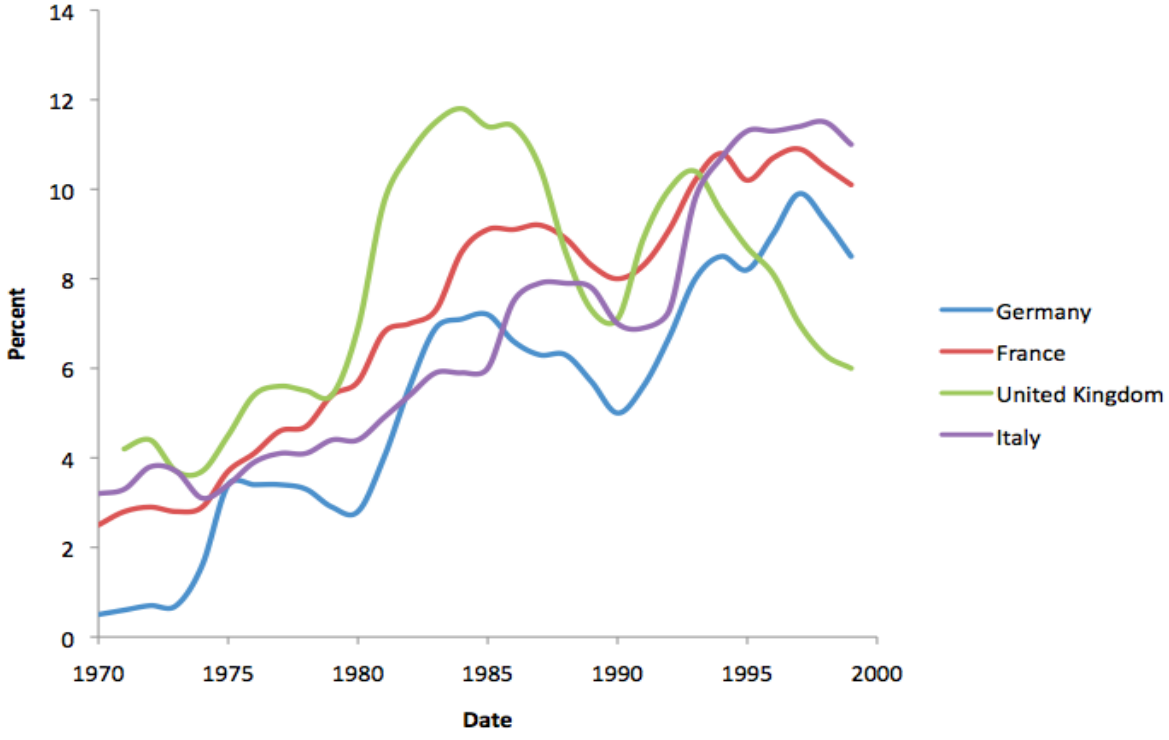
The implications of Ball's (1997) attribution of the overwhelming bulk of unemployment increases in western Europe from the early 1970s to the late 1990s to hysteresis effects produced by the long disinflation of the years around 1980 are striking. In countries that pursue long, slow rather than short, sharp disinflations, the natural rate of unemployment rises, apparently by as much as the cyclical rate of unemployment rises during the disinflation. This suggests an $\eta$ equal to one over the length that disinflation is actively pursued: if disinflation is actively pur-

[31] Indeed, Ball (2009) cites Llaudes (2005), who finds that between 1968 and 2002 the United States and Japan were the only OECD economy in which there was no statistically significant sign that the long-term unemployed exerted less downward pressure on wage and prices than the short-term unemployed. An alternative also put forward by Blanchard and Summers (1986) focuses on how the long-term unemployed become detached from the labor market. See, again, Granovetter (1973).

[32] See in addition Stockhammer and Sturn (2008), who also conclude that the degree of labor-side hysteresis is likely to have only weak connections with labor-market institutions but rather strong associations with the persistence of high unemployment and the failure of activist stabilization policies to quickly fill in the output gaps created by downturns. In their results, hysteresis has "strong [associations with] monetary policy, and... [perhaps] the change in the terms of trade, but weak (if any) effects of labour market institutions during recession periods. Those countries which more aggressively reduced their real interest rates in the vulnerable period of a recession experienced a much smaller increase in the NAIRU..."

sued for three years in the average western European economy, than the average η is 1/3.[33]

**Figure 4.4**
**The Rise in Western European Unemployment in the 1980s**



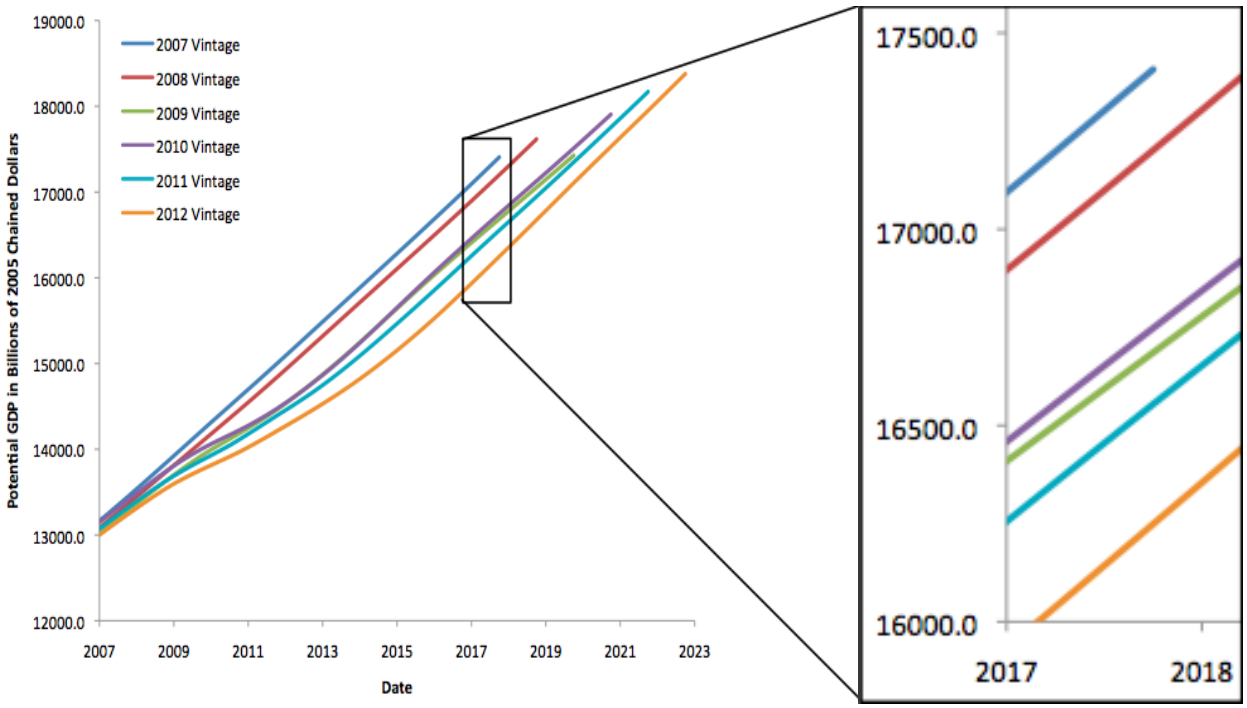

Source: FRED; adjusted annual unemployment rates.

[33] Blanchard (1997) put forward a political-economic rather than an purely economic rationale for such an extraordinarily high value of η: "These factors point to a more general and more diffuse effect at work here, namely that society, in its many dimensions, also adapts to higher persistent unemployment. When unemployment and the proportion of long-term unemployed becomes high, society is compelled, mostly through the political process, to make life bearable… through unemployment benefits, safety nets, real or pseudo-training programs, governments basically make sure that people do not starve. This is the normal response…. [I]t has very much the same effect as the factors I discussed earlier, namely that, by making unemployment more bearable, it increases the natural rate of unemployment…"

The labor market dynamics of the past two-and-a-half years raise the possibility that the United States is not, after all, largely immune from the considerations raised by Blanchard and Summers (1986). They raise the possibility that the transformation of cyclical unemployment into structural unemployment is underway as the output gap continues to remain large. This adds another channel to hysteresis, in addition to the capital formation channel.

Economic forecasters' revisions of their projections of the U.S. economy over the next decade certainly incorporate substantial hysteresis effects into their projections.

## Figure 4.5
## CBO Revisions of End-of-2017 Potential Output Forecasts, 2007-2012

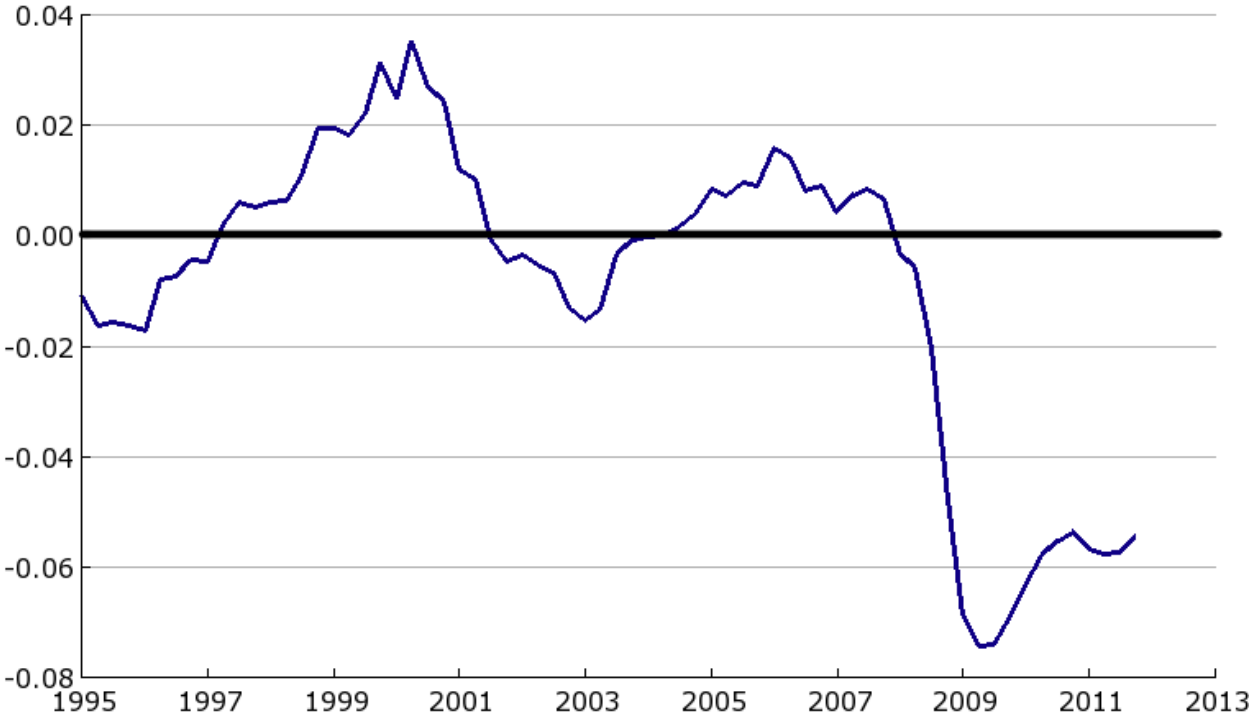



*Source:* U.S. Congressional Budget Office.

Between January 2007 and January 2009 the U.S. economy slid into what was clearly a very deep financial crisis-driven recession, in spite of an extraordinary

shift to stimulative policy by the Federal Reserve supported by extraordinary interventions to stabilize financial markets by the U.S. Treasury. Over this period the U.S. Congressional Budget Office—in near-lockstep with private-sector forecasters—marked down its estimate of potential GDP for the end of 2017 by 4.2%.

**Figure 4.6**
**The Output Gap Between Real GDP and Potential Output**
**1995-2012**




*Source:* U.S. Department of Commerce Bureau of Economic Analysis and U.S. Congressional Budget Office, via the Federal Reserve Bank of St. Louis's FRED database.

The fact that the expansion had not continued through 2007 and 2008 at a pace of between 2.5% and 3.0% per year, coupled with the form the downturn took and CBO's estimates of its likely duration reduced, in CBO's judgment, expectations of the long-run productive potential of the U.S. economy by 4.2%. Between January 2009 and January 2010 the CBO raised its estimate of end-of-2017 potential GDP by 0.4%: the recession appears to have been not as deep and the trough was reached sooner than CBO had feared in January 2009. Then over the subsequent

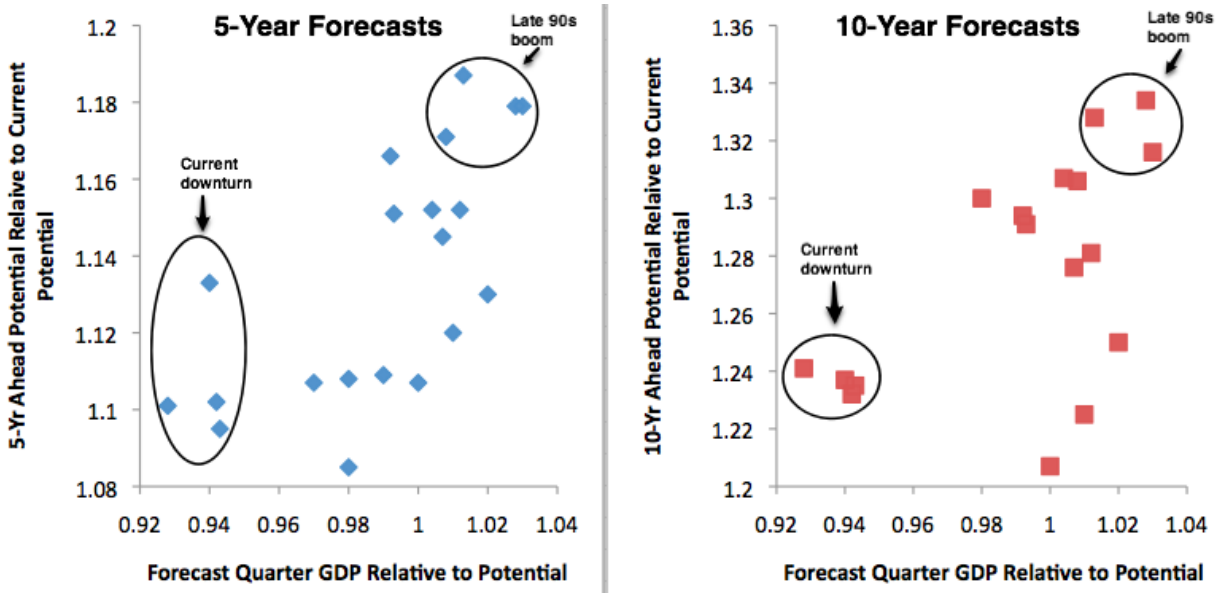
two years from January 2010 to January 2012 CBO—again, in near-lockstep with private forecasters—has marked down its forecast of potential GDP as of the end of 2017 by an additional 3%. The sluggish recovery in output and the flatlining of the employment-to-population ratio since its late 2009 trough have conveyed to the CBO staff bad news not just about the state of the current economy but about the long-run productive potential of the United States.

As of the end of 2011, CBO's estimates of potential output and the U.S. Bureau of Economic Analysis's estimates of real GDP together gave a cumulative shortfall of U.S. GDP below potential output since the start of the recession of 18.2%-point years, with a forecast 10%-point years of additional negative output gap to come before the episode ends. Dividing the 6.8% cumulative markdown of end-of-2017 potential output by the 28.2%-point years of past, present, and expected future output gap would yield a hysteresis coefficient $\eta$ in the framework of Section II equal to 0.241.

This marking-down in the current downturn by forecasters of future potential output when current GDP falls below current potential estimates is part, albeit the largest part, of a more general pattern. Over the past two decades economic forecasters have tended to raise their forecasts of future potential output relative to current potential when the economy is cyclically strong, and lower them when the economy is cyclically weak.

Such estimates of the general pattern over the past several decades are not precise, and are not fully relevant. Over the past twenty years, two major shocks dominate shifts in both GDP relative to potential output and in the expected future growth of potential. In the first, GDP rises relative to potential and then falls as the opportunities of the dot-com boom of the late 1990s become clear and then recede, and thus as business investment in high-tech first booms and then declines and as forecasters mark up and then mark down their estimates of potential output growth. This is, properly, not a "hysteresis" effect at all: it is not that higher output now is causing higher future potential output, but rather that higher expected future output is causing higher investment and output now to take advantage of anticipated opportunities.

## Figure 4.7
## The Output Gap and CBO Potential Forecasts
## 1992-2012




In the second, GDP falls relative to potential as the impact of the financial crisis of 2007-8 spreads throughout the economy, and forecasters write down their forecasts of future potential output as a result. This is properly a hysteresis effect.

However, even this shift in forecasts of future potential GDP may well simply reflect the fact that economic forecasters are not much better than average in keeping current euphoria or pessimism from contaminating their judgments of the long run.

Nevertheless, hysteresis effects of a size larger than those assumed in Table 2.2 appear built into how forecasters view the economy.

The historical macroeconomic evidence on the existence and size of hysteresis effects is distressingly thin, as is inevitably the case when attempting to generalize from few previous historical episodes. Thus the conclusions are weaker and shakier than would be wished. The question of how large a shadow is cast on future potential output by a deep cyclical downturn rests on no more than three historical cases: the Great Depression, the long western European downturn of the 1980s, and Japan's "lost decades" starting in the 1990s. In the U.S., the Great Depression

of the 1930s was followed by the great boom of total mobilization for World War II, and if the Great Depression cast a shadow it was erased.[34]

Our reading of the experience of western Europe since the late 1970s and Japan during the 1990s, however, is that there is strong reason to believe that hysteresis effects at least as large as those assumed in Table 2.2 are a reality. And our call for further research in this area is especially urgent.

[34] See DeLong and Summers (1988). However, Field (2011) argues that in the U.S. the Great Depression was a period of unusually rapid creative destruction.

## V. CONCLUSION

The analysis in Section II demonstrates that, as a matter of arithmetic, if the short run multiplier is even moderate and if there are even modest hysteresis effects, then temporary expansionary fiscal policy will not impose future fiscal burdens.[35] Our subsequent analysis in Sections III and IV has made the strong case that short-run fiscal multipliers are likely to be substantial enough and that hysteresis effects are likely to be present in an environment like the present one in the United States, where the economy is operating well short of potential and where interest rates are constrained by zero lower bound.

It is crucial to stress as that this result does not speak to the question of the long run sustainability of fiscal policy, or to the importance of addressing unsustainable fiscal policies. If committed spending and committed revenue plans are inconsistent, then as a matter of arithmetic adjustments will be necessary. Nothing in our analysis calls into question the widely held proposition that it is desirable for those adjustments to be committed sooner rather than later.

Our analysis simply demonstrates that additional fiscal stimulus, maintained during a period when economic circumstances are such that multiplier and hysteresis effects are significant and then removed, will ease rather than exacerbate the government's long run budget constraint.

In drawing policy implications from this result, three crucial questions arise:

- First, Doesn't the argument prove too much? Surely it cannot be the case that most governments at most time can take on increased debt relying on the benefits of induced growth to pay it back?

- Second, is the kind of temporary fiscal stimulus envisioned in our model feasible in the world or does temporary stimulus inevitably in reality or perception become at least quasi permanent?

- Third, whatever the merits of fiscal stimulus, should not monetary policy be

[35] We are not alone in this conclusion. See also Denes *et al.* (2012) and Cottarelli (2012) for other, somewhat different arguments that many economies now are at least near the edge of the region where stimulative deficit spending is self-financing, and fiscal austerity is self-defeating.

relied on as an alternative and superior instrument?

We very briefly consider these questions in turn.

Does not our argument prove too much? It surely cannot be the case that at most places and times expansionary policy is desirable, nor that at all times when economies are severely depressed fiscal policy should be pursued without limit. This is why we stressed that, outside of extraordinary downturns where the zero lower bound constrains interest rates, we believe that the right assumption is that the fiscal multiplier is effectively zero. Increases in demand will run up against supply constraints.[36] And to the extent they do not, increases in demand will be offset by monetary policy. With a zero policy-relevant multiplier, judgments about fiscal policies should be on allocative rather than stabilization-policy grounds.

Moreover, the nature of the hysteresis effects described in Section IV are such that, even if fiscal policy is stimulative in normal times, hysteresis effects are unlikely to be significant in normal times. Policies that alter the variability but not the average level of output over long intervals will not give rise to hysteresis effects. Further, it is much more likely that deep downturns in which, for example, labor withdrawal increases substantially have disproportionate impacts on potential.

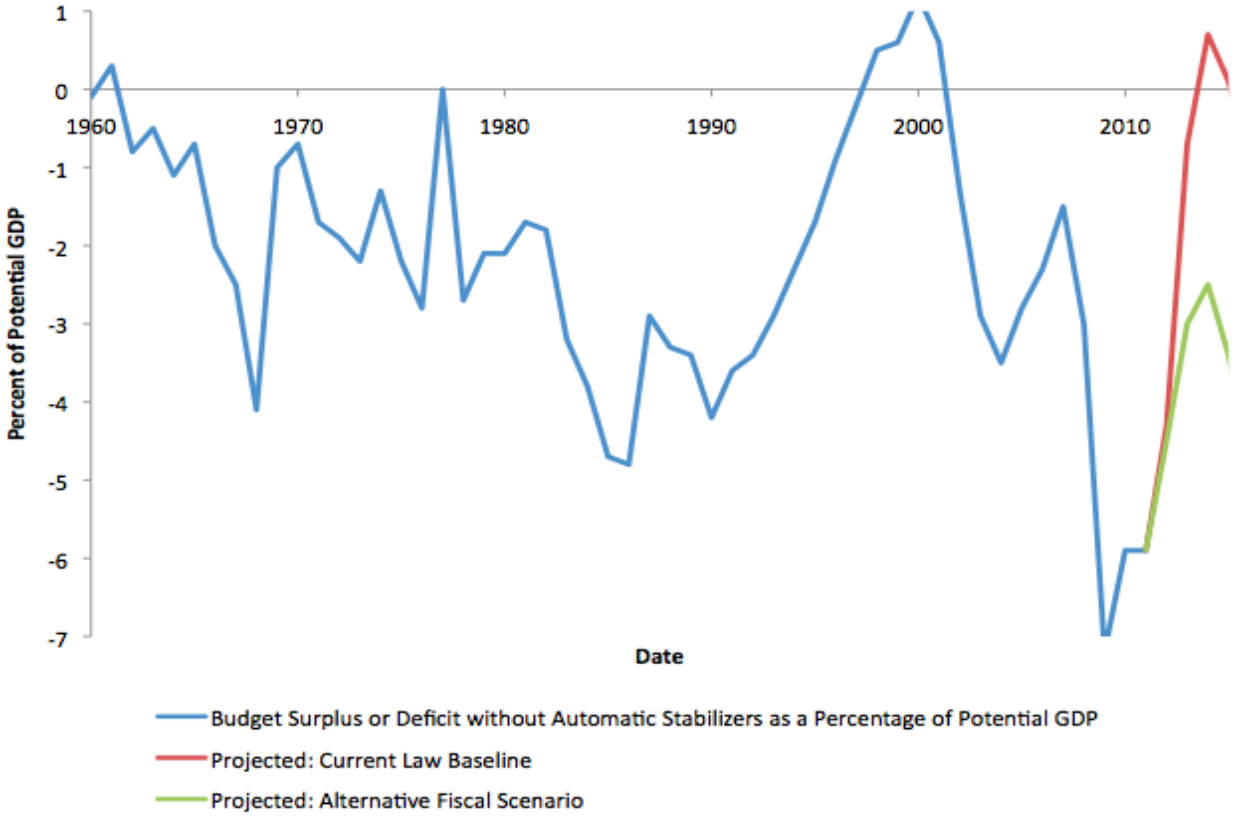
While we believe that our analysis has relevance to the question of fiscal policy in the United States and probably a number of other countries at present, we do not think it is likely to have much bearing on policy after the economy has recovered and has exited the zero lower bound.

With regard to the second question, the premise of our analysis is that expansionary fiscal policy can be both timely and temporary. Thus it can be delivered when output is severely depressed and the zero nominal lower bound binds, and stopped

[36] Note that Gordon and Krenn find a multiplier of 1.88 for the pre-Pearl Harbor mobilization for World War II at the zero nominal bound when they end their sample in the still demand-constrained first half of 1941, but of only 0.88 when they end their sample at the end of 1941 hen supply constraints begin to bite. This feature does not make it into modern models. As Robert Hall (2012a) comments: "The simple idea that output and employment are constrained at full employment is not reflected in any modern model that I know of. The cutting edge of general-equilibrium modeling—seen primarily in the DSGE models popular at central banks around the world—incorporates price and wage stickiness that makes supply quite elastic both above and below full employment."

as the economy recovers. Thus it makes a case only for as much fiscal stimulus as can be delivered in a timely and temporary way. If, as Taylor (2011) argues, fiscal stimulus enlarges government deficits but does not increase spending, then its benefits will not be realized. If, in a political sense, stimulus will not in fact be temporary, or if there are substantial lags in implementation, than the calculus of costs and benefits considered here is altered.

**Figure 5.1**
**Cyclically-Adjusted U.S. Federal Budget Deficits**




*Source:* Congressional Budget Office.

There are limits to the scale of the fiscal stimulus that can be both timely and temporary.

Our reading of the recent US experience is encouraging as to the feasibility of significant timely and temporary stimulus. Contrary to Taylor's assertions, the work

of Seidman (2011), Chodorow-Reich *et al.* (2011), and Serrato and Wingender (2010), and others suggests that a very substantial fraction of the fiscal stimulus enacted in the 2009 Recovery Act translated rapidly into increased spending. The recent US experience also suggests that fiscal stimulus can be reversed. The large-scale support for states and localities provided in the Recovery Act has already been withdrawn. Federal infrastructure spending has largely run its course. Unemployment-insurance expansions are already being run down. The vast majority of observers of Congress do not expect tax cuts for households legislated in 2009 and at the end of 2010 to become permanent. More generally, the cyclically adjusted Federal deficit suggests that there exists considerable scope for temporary action.

There remains the question, on which our analysis is mute, of whether temporary fiscal stimulus is inconsistent with a perception of long run fiscal consolidation. There is no necessary inconsistency. There is experience with temporary expansions, and also with phased-in long-run deficit reductions (e.g. The 1983 Social Security bipartisan agreement of the Greenspan Commission). But it is possible that short run fiscal expansion undercuts the credibility of long-run fiscal consolidation. It is also possible that, in a world with limited political energy and substantial procedural blockages, that effort towards one objective compromises the other. On the other hand, as Cottarelli (2012) warns, if countries that have committed themselves to short-term deficit reduction as a down payment on a move to long-term sustainability find that "if growth slows more than expected… [they are] inclined to preserve their short-term plans through additional tightening, even if hurts growth more" then: "my bottom line:… unless you have to, you shouldn't." His fear is that fiscal austerity will be counterproductive because "interest rates could actually rise [even] as the deficit falls" if "growth falls enough as a result of a fiscal tightening."

We do not see a good way to address this issue analytically or empirically. Clearly, the risks of short run fiscal stimulus having adverse effects on long-run credibility will be greater in settings where government debt already carries a significant risk premium. Clearly, it will be larger when there is evidence that deficit fears are impacting on stock market valuations and on investment decisions. But even in the absence of such evidence, there is always the risk that market psychology can change suddenly.

Even if it is granted that the stimulus can be both timely and temporary, the ques-

tion of how large it can be while preserving these attributes remains for future reseach.

Our analysis has simply taken it as given that, when the zero lower bound constrain,s monetary policy does not change when fiscal policy is altered. As is clear from the actions around the world, central banks do have room for maneuver even when there is not room for changes in interest rates. The room for maneuver principally takes the form of (i) the ability to operate directly on a wider than normal range of financial instruments, and (ii) the ability to precommit future policy.

As a matter of logic, it is possible that increased fiscal actions would call forth a contractionary monetary policy response by causing central banks to use these measures less expansively. We doubt the realism of this concern. At least in the United States, the Federal Reserve has sought to encourage short run fiscal expansion. There are limits to the efficacy of nonstandard measures, so even if they were contracted, the impact is likely to be to only partially offset fiscal expansions. Moreover, expansionary fiscal policies may operate to call forth a more expansionary monetary policy response by, for example, raising the credibility of commitments to monetary expansion after the economy has recovered, or increasing the extent of debt monetization in the short run.

Perhaps, though, as Mankiw and Weinzerl (2011) suggest, arguments for temporary fiscal expansion are even better arguments for expansionary monetary policy. Here too we are skeptical. While a much richer model would be necessary to fully address the issue, it seems to us that if fiscal policy is self financing it will be desirable to use as an instrument once it is recognized that (i) with uncertainty about multipliers diversification among policy instruments is appropriate as suggested by Brainard (1967), (ii) expansionary monetary policies carry with them costs not represented in standard models (including distortions in the composition of investment, impacts on the health of the financial sector, and impacts on the distribution of income), and (iii) the historically-clear tendency of low interest rate environments to give rise to asset market bubbles.

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