Fiscal Deficits, Economic Growth, and Government Debt in the USA

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Abstract

A simple model illustrates interactions between the “primary” fiscal deficit (total deficit minus interest payments), economic growth, and debt. The deficit/income ratio responds counter-cyclically to growth while growth may respond positively (a “Keynes” case) or negatively (à la “Merkel”) to the deficit. The recent Great Recession in the USA was atypical in that there was a weak counter-cyclical fiscal response. The increase in government net borrowing was significantly less than the decrease in private borrowing – an historically unprecedented asymmetry. Econometric estimates verify the historical pattern and further suggest that there is a strong positive effect on growth of a higher primary deficit, even when possible increases in the interest rate are taken into account.

Keywords: fiscal austerity, debt sustainability, business cycles, financial crisis.

JEL: E60, E62, E32
1. Introduction

After a renewal of Keynesian thinking in the wake of the 2007-09 Great Recession, in early 2010 economic policy debate in the United States and other rich economies became obsessed with the effects of the fiscal deficit on economic performance. In the eyes of most commentators, only severe austerity could reestablish fiscal sustainability, economic stability, and growth. In the 1930s Keynes thought he had demolished the Treasury View forever. Seventy-five years later, it had returned with a vengeance.

The German finance minister Wolfgang Schäuble made the prevailing view crystal clear. Writing in the Financial Times in mid-2010, he justified fiscal austerity as follows: “[... ] restoring confidence in our ability to cut the deficit is a prerequisite for balanced and sustainable growth. Without this confidence there can be no durable growth. [...] This is the lesson of the recent crisis. This is what financial markets, in their unambiguous reaction to excessive budget deficits, are telling us and our partners in Europe and elsewhere.”

There are two main arguments for “expansionary austerity” as a means to overcome recessionary periods.

The first is that a bigger government deficit automatically leads to lower private investment and economic growth. The reasoning is based on standard textbook theory, which suggests that government borrowing increases demand for loanable funds. Given a constant supply of savings (Say’s Law in fiscal garb), a higher fiscal deficit would crowd out capital accumulation and perhaps drive up interest rates as well.

The second argument, echoed among others by the German Finance Minister Schäuble, is even more hypothetical. It asserts that there is a threshold level of fiscal or sovereign debt beyond which
investors (the famous bond vigilantes) would fear the inability of the government to meet its obligations and so require higher bond yields. But with historically low interest rates in mid-2011, no vigilantes could be seen on the horizon of the US economy.

These two arguments animated empirical attempts to find a negative impact of high deficits or debt on capital formation and economic growth. While Alesina and Ardagna (2010) focused on providing empirical evidence for a short-term positive impact on economic activity from spending cuts, the threshold argument was fueled primarily by the study of Reinhardt and Rogoff (2010). Based on data manipulation and correlation analysis for dozens of countries over nearly two hundred years, they claimed to identify a debt level of 90% of GDP beyond which a country is likely to slide into a debt crisis.

Even if one ignores the numerous technical criticisms made to such findings (for instance the IMF World Economic Outlook (2010) and Jayadev and Konczal (2010), and Irons and Bivens (2010) provided extensive critiques of Alesina-Ardagna and Reinhardt-Rogoff respectively), it is clear that studies supporting expansionary austerity neglected the possibility that economic growth is not only affected by fiscal policy, but may improve public finances and contribute to sustainability. Such dynamic interactions are crucial for determining the causes and consequences of the recent deterioration of the deficit and prospects for the future in the USA (the principal focus of this paper).

We adopt the approach of examining the effect of changes in the deficit and its two components – spending and revenues – on economic growth, also taking into account the other direction of causality, that is the counter-cyclical response of the fiscal position to the state of the economy. The reaction of the interest rate, which is central to arguments for expansionary austerity, is also analyzed in the econometrics presented below.

The remainder of this paper is organized as follows. We begin with a summary of fiscal arithmetic and presentation of a simple model capturing the bidirectional causality between the fiscal
deficit and growth. Historical evidence about trends and cycles of these variables over 50 years in the USA is quickly reviewed. Next we present a vector-autoregression (VAR) analysis of dynamic interactions among fiscal deficits, economic growth, and interest rates. The results suggest that after the counter-cyclical response of the “primary deficit” (that is, the total deficit minus payments of net interest) to growth is taken into account, higher spending or lower taxes do lead to more rapid expansion of output. Policy implications are taken up in conclusion.

2. Relationships among deficits, debt, and economic growth

Traditionally, the “burden of debt” has been analyzed in a medium- to long-term framework first constructed by Domar (1944). It serves as background for the study of the conjuncture that is the focus of this paper.

2.1 Long-term fiscal arithmetic and debt sustainability

If one ignores capital gains, the change in total government debt is the sum of the primary deficit and interest payments on debt outstanding. Let $\Delta$ be the ratio of fiscal debt to output $Y$, and $\delta$ the ratio of the primary deficit to $Y$. The growth rate of $Y$ is $g$, and $j = i - \hat{P}$ is the real interest rate with $i$ as the nominal rate and $\hat{P}$ the rate of inflation. It is well known that (in continuous time for simplicity) the change in the debt/income ratio is given by

$$\Delta = \frac{d\Delta}{dt} = \delta + (j - g)\Delta$$

This accounting shows that the debt-to-GDP ratio increases with the ratio of the primary deficit to GDP and the difference between real effective interest rate and real GDP growth. A constant debt-to-GDP ratio with $\dot{\Delta} = 0$ is achieved when the condition (2) below is satisfied.
\[ \delta = (g - j) \Delta \] (2)

The debt-to-GDP ratio is decreasing when the primary deficit-to-GDP ratio is smaller than the term in the right hand side of (2), i.e. the government can “grow out” of its deficit. Following Domar, this relationship was emphasized in World Bank publications more than 50 years ago. It is often called a solvency condition. It can be restated as:

\[ \Delta = \delta / (g - j) \] (3)

The expression in the denominator is the difference between two small numbers. A faster growth or a lower interest rate has a very large effect on reducing the steady state debt-to-GDP ratio, which is not the case for a reduction in the ratio of the primary deficit to GDP in the numerator.

Assuming that the interest rate and the growth rate of GDP cannot be influenced by the government, Buiter (2010) argued that the U.S. needs to promote a permanent tightening of the primary fiscal balance by at least 8% of GDP, or would have to inflate away the real burden of its debt in order to achieve fiscal sustainability.

If one takes into account the existence of dynamic interactions between the primary deficit, the growth rate, and the interest rate, achieving debt sustainability in terms of a constant debt-to-GDP ratio may not require this type of austerity program. It is clear from (2) and (3) that as long as the growth rate of GDP is positive and higher than the real effective interest rate on debt, a positive primary deficit-to-GDP ratio may be associated with a decrease in the debt-to-GDP ratio.

2.2 Channels of interaction in the short to medium run

Several possible relationships among the variables at hand are considered in the current debate and can be examined via econometric estimations. They are summarized in the Table 1.
<table>
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<th>Linkage</th>
<th>Direction</th>
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<td>Counter-cyclical fiscal deficit</td>
<td>$g \uparrow \Rightarrow \delta \downarrow$</td>
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<td>$\dot{g} \uparrow \Rightarrow \hat{P} \uparrow \Rightarrow j \downarrow$ (or $g \downarrow \Rightarrow j \uparrow$)</td>
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<td>Debt-deflation (with $i \approx 0$ and stable and $\hat{P} &lt; 0$ so that $j &gt; 0$)</td>
<td>$\dot{g} \uparrow \Rightarrow \hat{P} \uparrow \Rightarrow j \downarrow$ (or $g \downarrow \Rightarrow j \uparrow$)</td>
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Table 1. Possible linkages between primary deficits, interest rates and GDP

We concentrate on joint conjunctural dynamics of $\delta$, $g$, and $\Delta$. A tractable approach is to assume that the deficit/output ratio $\delta$ shows “reversion to mean” but is affected by the growth rate and fiscal policy,

$$\dot{\delta} = \alpha[\bar{\delta}(g, \gamma) - \delta]$$

(4)

where $\bar{\delta}$ is a function of economic growth $g$ with $\partial \bar{\delta}/\partial g = \bar{\delta}' < 0$ as a reflection of the inherent counter-cyclicality of the fiscal deficit, and of the shift factor $\gamma$ which stands for fiscal activism.

Similarly suppose for the law of motion of $g$ that

$$\dot{g} = f(\delta, g, \gamma)$$

(5)

The sign of $\partial \dot{g}/\partial \delta$ can be either positive (generally Keynesian worldview) or negative (following Schäuble and his chief Angela Merkel). Presumably $\partial \dot{g}/\partial g < 0$ (growth is self-stabilizing) and $\partial \dot{g}/\partial \gamma > 0$. Taken together, equations (4), (5) and (1) represent a system of three differential equations with the following Jacobian matrix:
The well-known Routh-Hurwitz local stability conditions for a three-dimensional system of differential equations are Trace < 0, Determinant < 0, and Sum > -Determinant/-Trace, where Sum is the sum of the three 2 x 2 determinants for the differential equations taken pairwise.

The determinant of the above Jacobian matrix is \( \text{Det} = (ab - a\alpha\delta)(j - g) \). It is straightforward to show that if \( j > g \), then even if \( \delta \) and \( g \) are self-stabilizing and \( a > 0 \) the determinant will be positive and the system will be unstable. The Sum condition may be violated as well.\(^3\)

We can analyze the dynamics of (2) and (3) in the \((\delta, g)\) plane shown in Figure 1. Along the horizontal axis, \( \delta \) will usually take positive values with primary surpluses (or \( \delta < 0 \)) being sporadic or non-existent in most countries (Brazil is a notable exception in recent decades.) The locus of points or nullcline along which \( \delta = 0 \) will have a negative slope – faster growth is associated with a lower deficit in steady state.

One can postulate a hump or concave shape for the \( \dot{g} = 0 \) nullcline. Presumably, if growth is slow then increasing the primary deficit from a low (possibly negative) value should stimulate the economy from the demand side, as well as allowing higher public investment with private sector crowding-in, etc. The usual orthodox arguments suggest that (especially) if the primary deficit is “too high,” then reducing it should increase growth.

The outcome for the conjuncture is something like Figure 1. In the “Keynes” situation toward the left, raising \( \gamma \) and thereby \( \bar{\delta} \) will generate faster long-term growth at the point where the nullclines cross with a higher long-term ratio of debt to output. “Merkel” presumably thinks the opposite, i.e. \( \gamma \) and \( \bar{\delta} \) should be reduced to increase \( g \) and decrease \( \Delta \).
In more formal terms the comparative static behavior of the 2 x 2 dynamical system for \( \delta \) and \( g \) around a steady state is summarized in the equations

\[
\begin{bmatrix} -\alpha & \alpha \delta' \\ a & -b \end{bmatrix} \begin{bmatrix} d\delta' \\ dg \end{bmatrix} = \begin{bmatrix} -\phi \\ 0 \end{bmatrix}
\]

in which \( \alpha \) can take either sign and \( \phi = \alpha \partial \delta / \partial \gamma \) is a policy-determined shift in the target ratio of the deficit to output. Solving the system shows that with a positive determinant (that is, a very strong destabilizing Merkel effect with \( a \ll 0 \) does not apply), an increase in \( \phi \) will raise \( \delta \) in steady state. The growth rate will increase if \( a \) is positive (the Keynes case in Figure 1) and decrease otherwise (Merkel).

**Figure 1: Conjunctural dynamics of the primary deficit and the growth rate.**

In Figure 1, the dashed line represents the effect of a fiscal expansion in the Keynes case. From an initial equilibrium at point A there would be counter-clockwise cyclical convergence toward a new steady state at B. As will be seen below, such cycles show up in the data. The dynamics work differently in the Merkel case. A reduction in the primary deficit from point C will give rise to monotonic – not
cyclical – convergence to a new steady state at D. Besides the empirical evidence presented below, this simple dynamic observation casts further doubt on the Merkel- Schäuble (or, in the UK, the Cameron-Osborne) worldview because fiscal deficits regularly adjust counter-cyclically.

Space limitations preclude a full analysis of the three-dimensional system in the variables $g, \delta$ and $\Delta$. But four conclusions can be verified easily. In the “Merkel” case, a “permanent” reduction in fiscal stimulus $\gamma$ will shift the steady state debt/output ratio $\Delta$ downward. This effect is reversed in the “Keynes” case.

It is more interesting to consider the solvency condition $g - j = g - i + \hat{P}$ with $i$ as the nominal interest rate and $\hat{P}$ the inflation rate. Suppose that the growth rate is relatively low and the nominal interest rate is close to zero so that $g - j \approx g + \hat{P}$. A reduction in $g$ (perhaps to a level less than zero) could also force price deflation with $\hat{P} < 0$. The implication is that the solvency criterion $g - j$ could turn negative and destabilize the system. In a Keynesian situation the growth rate would steadily fall and the deficit/output ratio increase without limit. We are back to Irving Fisher’s (1933) debt-deflation scenario.

In a Merkel economy, the deficit hawks’ nightmare is a similar catastrophe that could play out if aggressive inflation targeting of the nominal interest rate $i$ in response to an increase in $g$ (and presumably $\hat{P}$ makes $g < j$. The targeting could be courtesy of the central bank, or perhaps more likely in the folklore, the vigilantes.

Finally, adjustment in the debt ratio $\Delta$ will be “slow” in comparison to $\delta$ and $g$. The implication is that shifts in $\Delta$ will affect the other variables in situations in which $\dot{\delta}$ and $\dot{g}$ are “close” to zero. In other words we can trace the impacts of a changing debt ratio by observing how the nullclines in Figure 1 shift in response. Through the various crowding-out arguments, presumably a higher $\Delta$ will reduce the growth rate, shifting the $\dot{g} = 0$ nullcline downward. In the Keynes case, the outcome would be lower $g$, higher $\delta$, and a higher steady state level of $\Delta$ itself.
It is not obvious why the primary deficit should be affected by the level of debt. Perhaps on political grounds austerity hysteria would create a negative effect of $\Delta$ on $\delta$, making the nullcline shift to the left. The outcomes in a Keynesian world would be lower $g$ and a reduced level of $\delta$.

In sum, a higher debt ratio could slow growth with an ambiguous effect on the primary deficit. The steady state debt ratio would probably rise, worsening the long run outcome. Active fiscal policy could offset these shifts, but as of autumn 2011 such moves did not appear to be on the cards.

3. Fiscal trends and cycles in the United States: 1960-2010

In the United States fiscal decisions emerge from a political process involving the executive and legislative branches of several levels of government – there is no decision center about fiscal policy per se. The Federal government, the central player, collects only about two-thirds of total government revenue, with state and local governments receiving the rest. The key difference between the levels is that while the federal government can easily sell Treasury securities to finance its deficit, states and localities largely have to cover current expenditures with current revenues. The Federal government thereby plays the major role in determining overall fiscal trends and cycles.

3.1 Recent and historical patterns

The primary deficit of the federal government (current spending on goods and services minus revenue) is the best single metric for fiscal policy, rising when real GDP declines and falling when GDP increases. This countercyclical pattern helps stabilize the economy against shifts in private sector demand. A larger primary deficit in a downswing is partly due to “automatic stabilizers” (such as lower tax receipts and higher social spending) and partly the result of ad-hoc fiscal policy measures. As we have seen, the change of net federal debt is the sum of the primary deficit and net interest payments (or total net borrowing) of the federal government. In 2010 real debt was growing about 4% per quarter, with the primary deficit providing around 3.5% of the increase.
Figure 2 shows the primary deficit and net Federal interest payments as shares of GDP. The shaded areas signal recessions as dated by the National Bureau of Economic Research (NBER). In the wake of the recession in the early 2000s the deficit rose by about 8%, and by about 10% after 2007 (it fell by 1% after the third quarter of 2009). Net interest outlays are relatively stable and small (about 1.7% of GDP), so that the primary deficit and total government net borrowing move closely together.

As illustrated in Figure 3, in the early 1960s, the government debt to GDP ratio was around 50%. It then fell to around 30% in the 1970s, and started to grow again in the 1980s, fell in the 1990s when the government ran a primary surplus and interest rates declined, and shot up during the recent recession as the primary deficit rose and GDP dropped.

Figure 3 also presents the history of annual real effective interest and growth rates. Prior to the late 1970s the interest rate tended to lie below the growth rate. It spiked upward with the Federal
Reserve’s anti-inflationary monetary shock, and drifted downward since then, falling abruptly during the recession.

\[\text{Figure 3. Federal Net Debt-to-GDP ratio, real GDP growth, and real effective interest rate (annualized moving averages) in the United States (1960-2011)}\]

\[\text{Figure 4. Peak-to-peak fiscal counter-clockwise cycle (2001-2007)}\]
Figure 4 illustrates the counter-clockwise cycle modeled in Figure 1 between the fiscal deficit and growth, for the period 2001-07.

Figure 5 summarizes background data on primary spending and revenue of the Federal Government in the USA. Since the 1980s both variables have varied in the range of 16% to 21% of GDP. Except for a short period in the mid 1990s when Federal receipts reached 21% of GDP, confirming the observation in Figure 2, there has been an overall primary deficit, the normal situation in developed economies.

![Figure 5. Primary Revenues and expenditures of the Federal government as a share of GDP in the United States (1960-2011).](image)

3.2 The asymmetric Great Recession

Figure 6 shows “net borrowing” or deficit finance as practiced by the overall government and private sectors, with the shaded areas again representing periods of recession as defined by the NBER. A positive level of net borrowing by a sector signals that it is adding to the level of aggregate demand.
Private net borrowing (or spending on investment, consumption, interest, and taxes minus income) typically rises as the economy emerges from a recession while government net borrowing falls.

![Graph showing government and private net borrowing as a share of GDP in the United States (1960-2011).](image)

**Figure 6. Government and private net borrowing as a share of GDP in the United States (1960-2011).**

Private borrowing usually peaks soon before a new recession, when government borrowing starts to rise. Government revenue declines and spending rises during and after recessions due to the functioning of automatic stabilizers, which leads the overall fiscal deficit to have the counter-cyclical pattern described above. In effect, changes in the government deficit stabilize the system against fluctuations in private borrowing. Historically, private net borrowing has led the cycle, with government borrowing lagging behind.

These observations are well known. The recent period, however, differs from the historical pattern in a crucial dimension. In previous recessionary periods swings in net borrowing by the government and private sectors have been by and large symmetric. But during the 2007-2009 crisis the
reduction in net private borrowing was not matched by the increase in net government borrowing. Indeed, Figure 6 shows that the (roughly) 8% increase in government net borrowing as a share of GDP did not offset a fall of about 12% in private spending minus income.

Figure 7. General government real revenues and expenditures as compared to private domestic components of effective demand (2007Q3=100)

Large decreases in the different components of private spending as compared to the evolution of real government revenues and expenditures can be seen in Figure 7. Both diagrams suggest that the government did not offset the decrease in private sector effective demand, as it had in prior recessions (as can be observed from the nearly offsetting movements of the solid and dashed curves in Figure 6). Figure 7 also shows that household residential investment, which has historically led previous upswings in GDP, did not recover. The recovery of business investment was also on the weak side. Consumption is thus the only component of private spending that reached again its prior real value of the second quarter of 2007. Small wonder that government receipts also recovered slowly.
4 Econometric analysis

Using quarterly data from the Bureau of Economic Analysis (BEA) from 1961 to 2011 (first quarter), we studied relationships among the core variables discussed in Section 2 – GDP, federal net debt, primary deficit, primary revenues, primary spending, and the effective interest rate. All variables were deflated using the GDP deflator. With the exception of the primary deficit and the real effective interest rate, which can assume both positive and negative values, all variables were used in their logarithmic form in the models.

4.1 Methodology and results

The presence of unit roots was tested for all variables using the augmented Dickey-Fuller (ADF) test. There was evidence of a unit root in all series, indicating that they were all non-stationary in levels and stationary in first differences. These results supported the use of a VAR model in first differences or, in case of cointegration, of a Vector Error Correction (VEC) in levels for the study of the short- and long-run relationships outlined in Table 1. In order to determine how many lags to use in the regressions, several selection criteria were used, namely the Akaike information criterion (AIC) and the Schwartz Bayesian information criterion.\(^4\)

We estimated three models with differing characteristics. The first is a 2-dimensional VEC directly relating federal net debt (\(\ln\text{Debt}\)) to real GDP (\(\ln\text{GDP}\)), with the real effective interest rate as an exogenous variable in order to control for its possible effect on the two variables of interest. This model therefore examines the long-run relationship of cointegration between debt and GDP, while providing estimates of the short-run interactions between real debt growth and real GDP growth in its two directions of causality. The same model is then estimated adding an NBER recession dummy (taking value 1 during recession periods and 0 otherwise) as a control variable, which allows us to identify the influence of the business cycle on the resulting dynamics. The importance of timing for the effectiveness
of fiscal policy shocks on economic activity has been emphasized in recent econometric studies, e.g. Mittnik and Semmler (2010), Fazzari et al. (2011), and Baum and Koester (2011).

Motivated by the results of this first model (to be discussed in detail below), a three-dimensional VAR further examines the short-run relationships in Table 1 by distinguishing the two components of real debt growth that enter into fiscal accounting: the interaction between the first differences of the real primary deficit ($DPriDef$), the real effective interest rate ($DIntRate$) and real GDP growth ($DlnGDP$).

Finally, we further break down the primary deficit in its revenue ($DlnRev$) and spending ($DlnSpend$) components in a four-dimensional VAR, therefore allowing for a more precise study of spending and tax multipliers and their cyclicality.\(^5\)

### 4.2 Effects on the fiscal position of economic growth

As already observed in Figures 2, 5 and 6, the shares in GDP of both total government net borrowing and the federal primary deficit rise during recessions (when GDP growth slows down), highlighting the counter-cyclical role of fiscal policy. This effect is made clear in all the three models estimated (regression coefficients and statistics are shown in the Appendix). The impulse response functions in Figure 8 suggest that after controlling for the impact of interest rates, a 1% contraction in quarterly real GDP would increase real debt by about 0.7% after one year, which based on 2011 levels would lead to an increase of at least 5% in the debt-to-GDP ratio of the Federal government (equivalently, if real GDP grows one percent, real debt would contract 0.7% in a year).

This result is broadly consistent with the findings of Reinhardt and Rogoff (2010) associating high debt-to-GDP ratios with low real GDP growth rates, except that causality runs the other way: high debt-to-GDP ratios are a consequence, and not the cause, of low growth.
The strong counter-cyclicality of the fiscal position is also clear in the results of the three-dimensional VAR, as represented by the impulse response function in Figure 9. If the growth rate of real GDP jumps down by 0.25% in one quarter, the primary deficit would increase by around 1.5% of GDP after 3 years. According to these estimates, the decrease in real GDP growth of 0.5% between the last quarter of 2008 and the first quarter of 2009 alone would have left the primary deficit at least 2% higher as a share of GDP by the end of 2010. These numbers are broadly consistent with data presented in Figure 5 prior to the Great Recession.

These results also imply that given the value of the primary deficit in the first quarter of 2011-I of 8.3% of GDP, a further drop of 1% in the annual GDP growth (initially from 2.7% to 1.7%, but leading to lower rates for many quarters) would make the primary deficit as a share of GDP jump to almost 10% in 2012.

Conversely, a return to growth can substantially improve the fiscal position of the government. An increase of 1% in the annual growth rate of GDP (say, from the current rate of 2.7% to 3.7% next year) would reduce the primary deficit from 8.3% of GDP to 6.8% in one year.
Figure 9. Accumulated impulse responses to one standard deviation innovations in a three-dimensional VAR

Estimates of the four-dimensional VAR as represented in Figure 10 show that the previous results are mainly driven by the response of federal revenues to the state of the economy. A decrease of 0.25% in quarterly real GDP growth in the last quarter of 2007 would have reduced the share of primary revenues in GDP by around 1.1% in 5 quarters, from 18.7 to 16.6% of GDP in the first quarter of 2009.6

4.3 The reaction of economic growth to fiscal policy (and bond vigilantes)

As shown in Figure 8, the VEC indicates that there is a significant positive impact of an increase in federal debt on real GDP, providing evidence against expansionary austerity. After controlling for the
impact of interest rates, an increase in real debt of 5% would lead to a 0.6% growth of real GDP after one year. Figure 8 also highlights the importance of the state of the economy for the impact of an increase in debt on economic activity -- the response of $\ln GDP$ to $\ln Debt$ is significantly smaller when recessionary periods are controlled for. In other words, the response of GDP to an increase in public debt is likely to be substantially larger during a recession than in expansionary periods. Conversely, the results indicate that the implementation of a debt consolidation plan may affect the economy more negatively during a recession.

Figure 10. Accumulated impulse responses to one standard deviation innovations in a four-dimensional VAR
Results from the three-dimensional VAR imply that this response is even stronger if the increase in real debt growth fully comes from an increase in the primary deficit: a one time jump of about 0.5% in the share of the primary deficit to GDP would raise the rate of quarterly real GDP growth for more than four years by around 0.1% per quarter (or 0.4% annualized), with the maximum increase being 0.15% after 5 quarters.

Conversely, a decrease in the share of the primary deficit to GDP from its early 2011 level of 8.3% to, say, 5% by the introduction of a sharp austerity program could reduce the growth rate of GDP by around 2.5% per year for a few years ahead.

Figure 10 shows a positive response of real GDP growth to an increase in spending which persists for more than 20 quarters, with the highest impact being after one year. A one-time shock in the quarterly growth rate of primary spending of 0.5% would generate an increase of 0.2% in annual real GDP growth in the first year (equivalently, a cut of 0.25% in quarterly spending growth, say from 0.4% – as in the third quarter of 2010-III to 0.15% would reduce the annual rate of real GDP growth by up to 0.1% for a few years)

A negative response of real GDP growth to increases in revenue can also be observed in Figure 10, but the impact seems to be smaller than the one observed for changes in spending. An exogenous increase in the growth rate of primary revenues of 0.5% would reduce the annual growth rate of GDP by much less than 0.05% in the first two years.

Finally, the response of real GDP growth to changes in the real effective interest rate on federal debt is ambiguous and not persistent, as observed in Figures 9 and 10. The same applies to the response of the interest rate to changes in the primary deficit and its components. The implication is that in the historical record as captured by the VAR models, bond vigilantes have not ridden in when the U.S. federal primary deficit has gone up.
5 Implications for the policy debate

The bottom line as of autumn 2011 was that the Treasury View dominated policy discourse (in extreme form in the USA thanks to the Tea Party and its allies) even though the results just reviewed show that in order to achieve a situation with a low fiscal deficit and high economic growth, the federal government should focus on further stimulating economic activity through fiscal policy. One way to do this is to increase public spending, which would accelerate growth, and subsequently increase revenues. However, this course of action appeared to be blocked by political aversion to raising the primary deficit from its already high level, even if the bigger gap would just be temporary.

Given this constraint, another alternative is to follow an old but still useful result of Keynesian macroeconomics (Haavelmo 1945): a balanced increase in taxes and spending, with the gain in government revenues coming mostly from the rich and the increase in spending going mostly toward the middle class and poor, in the form of income transfers and public investment with large multiplier effects on employment. Since the propensity to spend of the wealthy is smaller than the propensity to spend of those receiving the increase in spending, the net effect of a balanced increase in taxes and spending would be expansionary for income. This course of action might even reduce the primary deficit in the short run because of the impact of faster growth on government revenues.

Unfortunately, mainstream economic thought in the USA appeared to be too ideological to recognize straightforward answers from economic history and, more importantly, the political climate may have become too polarized to implement even a fiscally neutral stimulus.
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Notes

1 The simplifying assumption for equation (1) is that short-term decisions are taken without paying attention to the debt ratio. As discussed below, one could bring in such effects by including a non-zero value in the second row of the third column in the Jacobian matrix, and seeing if that shifts the nature of a steady state.

2 The real effective interest rate in the diagram is real interest payments divided by the real level of debt lagged one quarter minus the quarterly inflation rate, annualized. It closely tracks real 10-year returns given by the Fed.


4 Results are available from the authors upon request.

5 Because the VAR models discussed here were estimated using the (stationary) first differences of the macroeconomic variables previously mentioned, the following results have a clear short-term focus. However, estimates of analogous vector-error-correction (VEC) models (which are able to capture long-term relationships) delivered comparable results.

6 These simulations were based on the impulse response functions given the initial values of the variables in the period in question.