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By enhancing the understanding of business and financial market globalization, and by preparing MBA students to thrive in a global environment, the initiative will help improve financial and economic decision-making around the world.

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**Foreword**

The U.S. Monetary Policy Forum (USMPF) is an annual conference that brings academics, market economists, and policymakers together to discuss U.S. monetary policy. A standing group of academic and private sector economists (the USMPF panelists) has rotating responsibility for producing a report on a critical medium-term issue confronting the Federal Open Market Committee (FOMC).

The 2013 USMPF panel includes private-sector members Michael Feroli (JP Morgan Chase), David Greenlaw (Morgan Stanley), Jan Hatzius (Goldman Sachs), Ethan Harris (Bank of America Merrill Lynch), Peter Hooper (Deutsche Bank), as well as academic panelists James Hamilton (UC San Diego), Anil Kashyap (Chicago Booth), Frederic Mishkin (Columbia), Hyun Song Shin (Princeton), Kermit Schoenholtz (New York University) and Kenneth West (Wisconsin).

This volume reports the results of the seventh USMPF conference, held on February 22, 2013 in New York, N.Y.

The seventh USMPF report, “Crunch Time: Fiscal Crises and the Role of Monetary Policy,” authored by Hamilton, Mishkin, Greenlaw and Hooper, and which reports on how concerns over fiscal solvency affect current monetary policy. Following the authors’ presentation, Jerome Powell, Board of Governors of the Federal Reserve System and Eric Rosengren, President of the Federal Reserve Bank of Boston, offered their comments.

This year’s policy panel was entitled “U.S. Fiscal Problems and Potential Solutions” and was moderated by Zanny Minton Beddoes, economics editor, The Economist. The discussion featured presentations by Douglas Elmendorf, Director of the Congressional Budget Office, Martin Feldstein, George F. Baker Professor of Economics at Harvard University, and Alice Rivlin, Senior Fellow at Brookings Institute.

The USMPF is sponsored by the Initiative on Global Markets at the University of Chicago Booth School of Business.

Anil K Kashyap and Frederic S. Mishkin, USMPF Co-Directors

Crunch Time: Fiscal Crises and the Role of Monetary Policy

Abstract

Countries with high debt loads are vulnerable to an adverse feedback loop in which doubts by lenders lead to higher sovereign interest rates which in turn make the debt problems more severe. We analyze the recent experience of advanced economies using both econometric methods and case studies and conclude that countries with debt above 80% of GDP and persistent current-account deficits are vulnerable to a rapid fiscal deterioration as a result of these tipping-point dynamics. Such feedback is left out of current long-term U.S. budget projections and could make it much more difficult for the U.S. to maintain a sustainable budget course. A potential fiscal crunch also puts fundamental limits on what monetary policy is able to achieve. In simulations of the Federal Reserve’s balance sheet, we find that under our baseline assumptions, in 2017-18 the Fed will be running sizable income losses on its portfolio net of operating and other expenses and therefore for a time will be unable to make remittances to the U.S. Treasury. Under alternative scenarios that allow for an emergence of fiscal concerns, the Fed’s net losses would be more substantial.

1 Introduction.

As recently as the 1990s, the United States government was running budget surpluses and there was serious discussion of what would happen if the federal government was able to retire its debt. While the fiscal situation deteriorated somewhat in the United States after 2000, countries in Europe, especially Ireland and Spain, were able to reduce the level of their government debt relative to national income up until 2007. However, when the global financial crisis turned virulent in 2008, everything changed. The subsequent sharp economic downturn in advanced countries reduced fiscal revenues and led to increased government spending, with the result that government debt has grown dramatically for most developed economies since 2008. At the same time, central banks have sought to stimulate their weak economies with unprecedented expansions of their balance sheets.

The challenges for policy entered a new phase in 2010 when several European countries suddenly faced rapid increases in borrowing rates on sovereign debt that rendered their current fiscal policies unsustainable. But a fiscal contraction in these circumstances had the potential to make the economic situation even worse by contracting aggregate spending, while further monetary accommodation could lead to a tipping point in inflation and currency flight. Given the suddenness with which these problems have become manifest, it is critical to understand the circumstances that give rise to tipping points in sovereign debt markets and examine the implications for monetary policy.

We start our analysis in Section 2 by sketching a simple model of debt dynamics to explore the relationship between sovereign debt loads and interest rates. Based on the mechanics of debt accumulation and economic growth, we calculate the level of the primary government surplus that would be necessary to keep debt from continually growing as a percentage of GDP. We argue that if this required surplus is sufficiently far from a country’s historical experience and politically plausible levels, the government will begin to pay a premium to international lenders as compensation for default or inflation risk. This higher interest rate in turn feeds back to make fiscal sustainability even harder to achieve, possibly leading to a fiscal crunch—a tipping point in which sovereign interest rates shoot up and a funding crisis ensues.
Section 3 then conducts an empirical examination of the recent experience of advanced economies. We look at statistical predictors of sovereign borrowing costs in a panel of 20 advanced countries over the last 12 years. We find a significant relation between debt loads and borrowing costs, with a one-percentage-point increase in debt as a percent of GDP being associated with a 4.5-basis-point increase in the yield on 10-year government bonds in a linear specification. We also find strong evidence of nonlinearities. Interest rates rise much more quickly at higher debt levels, and there is a strong interaction between debt levels and a country’s longer-term current-account balance. In countries with large current-account deficits, the borrowing cost is much more sensitive to the level of debt. We then explore case studies of a number of individual countries, identifying the specific news developments that seemed to trigger market reactions as well as the underlying fundamentals that have allowed other countries to continue to borrow at very low interest rates. We focus, in particular, on the U.S. and we attempt to use our model to quantify feedback effects in the debt dynamics that are not captured in official budget projections.

In Section 4 we turn our attention to the impact of fiscal crises on monetary policy. We first discuss the role of monetary policy in promoting successful fiscal consolidations and the challenges confronting policymakers, noting that the political and logistical capability of the central bank to control inflation is directly tied to whether the government can achieve a sustainable path for fiscal policy. We then conduct a detailed analysis of the Federal Reserve’s balance sheet and the implications for the Fed’s future cash flow of a realistic exit strategy from its current expanded balance sheet. As interest rates rise, the Fed will need to pay more to persuade banks to hold any remaining large balances of excess reserves. And, should it sell assets to shrink its balance sheet as it once indicated was likely, the Fed would realize a capital loss on long-term securities that it bought when interest rates were lower. In our baseline assumptions, these forces would result in losses equal to a significant portion of Fed capital by 2018, after which these losses could gradually be worked off. But departures from the baseline, such as large-scale purchases continuing past 2013, or a more rapid rise of interest rates (a distinct possibility given the analysis presented in Section 3) would saddle the Fed with losses beginning as early as 2016, losses that in some cases could substantially exceed the Fed’s capital. Such a scenario would at the very least present public relations challenges for the Fed and could very well impact the conduct of monetary policy.

Section 5 briefly summarizes our conclusions.
2 Understanding Fiscal Crises.

To understand fiscal crises, we first discuss the debt dynamics of sustainable fiscal paths and then go on to analyze instability and tipping points.

2.1 Sustainable Fiscal Paths.

Consider a country with nominal GDP in year \( t \) of \( Y_t \) and nominal sovereign debt of \( B_t \). Let \( S_t \) denote the nominal primary surplus, that is, government revenue less spending on all categories other than interest expense, with a primary deficit corresponding to a negative value of \( S_t \). If \( R_t \) is the average nominal interest rate on outstanding government debt, we have the accounting identity

\[
B_{t+1} = (1+R_t) (B_t - S_t). \tag{1}
\]

Dividing both sides of (1) by GDP in year \( t+1 \) gives

\[
\frac{B_{t+1}}{Y_{t+1}} = \frac{Y_t}{Y_{t+1}} \frac{1}{Y_t} (1+R_t) (B_t - S_t). \tag{2}
\]

Let lower-case symbols denote magnitudes as a fraction of GDP,

\[
b_t = B_t / Y_t \]

\[
s_t = S_t / Y_t.
\]

and let \( \tau_t \) be defined by

\[
1+\tau_t = \frac{(1+R_t)Y_t}{Y_{t+1}}, \tag{3}
\]

so that (2) can be written

\[
b_{t+1} = (1+\tau_t) (b_t - s_t). \tag{4}
\]

If \( g_t \) denotes the nominal GDP growth rate between \( t \) and \( t+1 \),

\[
Y_{t+1} = (1+g_t)Y_t. \tag{5}
\]

then notice that \( \tau_t \) in (3) is approximately the nominal interest rate \( R_t \) minus the nominal GDP growth rate:

\[
\tau_t \approx R_t - g_t. \tag{6}
\]

---

1 If \( R_t \) is interpreted as the weighted average interest rate on all outstanding government debt, equation (1) holds exactly as an accounting identity. In our empirical work, we will focus on 10-year bond yields as the key indicator of long-run concerns. Our dynamic simulations for U.S. data are based on estimates of the actual maturity structure of outstanding debt.
Suppose that a country faces a constant net borrowing cost \( r^* \) and wants to maintain a constant debt-to-GDP ratio \( b^* \). Then (4) implies that this would require a primary surplus \( \sigma^* \) satisfying

\[
\begin{align*}
b^* &= (1 + r^*) (b^* - \sigma^*) \\
\sigma^* &= \frac{r^* b^*}{1 + r^*}.
\end{align*}
\]

(7)

(8)

To understand the implications of this condition, it is useful to consider two separate cases.

2.1.1 Case 1: \( R_g > g_r \).

First suppose that the steady-state nominal interest rate is greater than the nominal GDP growth rate, so that \( r^* \) is positive. In this case, equation (8) says that the primary surplus must be sufficient to cover the steady-state interest payments on the outstanding stock of government debt \( b^* \). Note that with a constant positive value for \( r^* \), the difference equation associated with (4) is explosive:

\[
b_{t+1} = (1 + r^*) (b_t - \sigma^*).
\]

(9)

If the government were to maintain a constant value for the primary surplus equal to \( \sigma^* \) and if the debt-GDP ratio were ever to rise to some \( b > b^* \), then debt would continue to grow from that point without bound relative to GDP. The government would ultimately either need to use fiscal reform (tax increases or spending cuts) to get to a new higher primary surplus \( \sigma^* \) given by \( \sigma^* = \frac{r^* b^*}{1 + r^*} \), or else default on some of the outstanding debt to bring it back down to the level \( b^* \) that is sustainable given the steady-state primary surplus \( \sigma^* \) that the country is actually capable of maintaining. As Reinhart and Rogoff (2009) extensively documented, historically partial defaults have often been implemented at least in part by means of unanticipated inflation. This could achieve a reduction in the debt burden by raising the realized nominal growth rate \( g_r \) relative to the ex ante nominal interest rate \( R_g \). Of course, if there is any anticipation of default or inflation, it would be expected to affect the interest rate \( R_g \), a point to which we will turn in Section 2.2.

2.1.2 Case 2: \( R_g < g_r \).

Suppose instead that the nominal interest rate on government debt is less than the nominal growth rate of the economy. In this case, \( r^* \) is negative and (8) indicates that the government could maintain a primary deficit in perpetuity \( (\sigma^* < 0) \) without increasing the ratio of debt to GDP. For example, if the borrowing cost is \( R_g = 2\% \) and GDP is growing at rate \( g_r = 3\% \), government spending could exceed revenues in perpetuity by about 1% of the outstanding debt \( b^* \) without increasing the ratio of debt to GDP.

Moreover, in this case when \( r^* < 0 \), the difference equation (9) is stable. If the country started with steady-state values \( \sigma^*, r^* \), and \( b^* \) satisfying (8) and then moved to a permanently larger deficit (that is, a more negative value \( \sigma^* < \sigma^* \)), the result would be an increase over time in the debt-to-GDP ratio from the initial \( b^* \). But the path is not explosive and would eventually stabilize at a new value \( b = \frac{\sigma^* (1 + r^*)}{r^*} \).

2 See Hall (2012) for a more general characterization of ergodic distributions for the surplus and debt in a stochastic setting.
If $R_i$ corresponded to the nominal return to capital, the case when $R_i < g$ would be a violation of basic conditions for dynamic efficiency (see for example Blanchard and Fischer, 1989, pp. 103–104). Note, however, that in the present instance $R_i$ refers to the government borrowing cost, which could be much less than the marginal product of capital as a result of favorable risk and liquidity properties perceived to be associated with government debt. For example, one form of government debt (money) pays no interest, and yet the asset is nonetheless valued in equilibrium in a growing economy.

However, these advantages of government debt cannot be assumed to hold independently of how large debt becomes relative to GDP. A number of previous studies, as well as our own empirical investigations below, establish that as the ratio of government debt to GDP rises, the government’s borrowing cost $R_i$ likely rises with it. Insofar as this is the case, it means that while there may be a range of values for the steady-state primary surplus $s$ that could be consistent with long-run fiscal sustainability, once government debt becomes so large as to result in a positive value for $r^*$, sustainability of the fiscal path will once again come back to requiring that (8) be satisfied.

### 2.2 Instability and Tipping Points.

We next examine a dynamic model in which expectations of the future play a role. Consider a government that begins period $t$ owing outstanding debt as a fraction of GDP given by $b_t$, faces a net borrowing cost $r_t$, and then runs a primary surplus relative to GDP given by $s_t$. This would imply a debt-to-GDP ratio for period $t+1$ given by equation (4). Suppose that from period $t+1$ forward the government will be on a sustainable path and face a steady-state net borrowing cost given by $r^*$. Suppose also that, based on the past history of the country and its politics, creditors believe that a long-run primary surplus of $s^* = \frac{s^* (1 + r^*)}{r^*}$ could quite credibly be maintained, implying a sustainable debt-to-GDP ratio given by $b^*$. The question we consider is, what happens if the value of $b_{t+1}$ implied by equation (4) is greater than $b^*$, that is, what happens if

\[(1 + r_t)(b_t - s_t) > b^*? \tag{10}\]

One possibility is that the country will succeed in implementing permanent fiscal reform, increasing taxes or lowering spending so as to bring the permanent surplus up to the value $s^*$ that would be necessary to service the debt that would be owed next period according to the left-hand side of (10):

\[(1 + r_t)(b_t - s_t) = s^* (1 + r^*) / r^*.\]
In this case, the government’s creditors would indeed receive the promised nominal return $R$. But an alternative that creditors may contemplate is that there could be a partial default or surprise inflation on government debt, with fiscal sustainability restored by bringing the debt burden down to one that can be serviced without increasing the surplus above the current value of $s$, that is, a default or surprise inflation that brings the debt-to-GDP ratio next period back down to the sustainable value $b^*$. In the latter case, the post-default value of outstanding debt as of the start of period $t+1$ is given by $\tilde{B}_{t+1}$,

$$\tilde{B}_{t+1} = b^* Y_{t+1} - b^*(1+g_t)Y_t.$$

In the case of an outright default of this magnitude, investors would end up earning a nominal return of $\tilde{R}_t$ instead of the promised $R_t$, where $\tilde{R}_t$ is characterized by

$$\tilde{B}_{t+1} = (1+\tilde{R}_t)(B_t - \tilde{s}).$$

If $\pi_t$ denotes creditors’ perceived probability of successful reform, then the sovereign bonds yield an expected return $R^t$ given by

$$1+R^t = \pi_t (1+\tilde{R}_t) + (1-\pi_t)(1+\tilde{R}_t).$$

Substituting (11) and (12) into (13),

$$1+R^t = \pi_t (1+\tilde{R}_t) + (1-\pi_t) \frac{b^*(1+g_t)}{b_t - \tilde{s}}.$$

Dividing both sides of (14) by $1+g_t$ allows us to express this condition in terms of the interest rate net of the growth rate:

$$1+r^t = \pi_t (1+r_t) + (1-\pi_t) \frac{b^*}{b_t - \tilde{s}}.$$

Given a required expected return on sovereign debt net of the growth rate ($r^*$), a perceived probability of successful fiscal reform $\pi_t$, sustainable debt-to-GDP level $b^*$, and current fiscal situation as summarized by $b_t - \tilde{s}$, equation (15) determines $r_t$, the net interest rate that the government is required to promise on its sovereign debt. For example, if the expected return is the long-run sustainable rate ($r^* = r^*$) and if the current fiscal situation is consistent with long-run sustainability (which from (7) requires $b^* / (b_t - \tilde{s}) = 1+r^*$), then (15) states that the net interest rate $r_t$ would be characterized by

$$1+r^t = \pi_t (1+r_t) + (1-\pi_t)(1+r^*)$$

or $r_t = r^*$. In other words, under the specified conditions, the government can borrow at its long-run sustainable rate. However, as $b_t - \tilde{s}$ grows relative to $b^*$ so that $b^*/(b_t - \tilde{s}) < 1+r^*$, condition (15) means that the government’s current borrowing rate $r_t$ will exceed $r^*$ as compensation to creditors for uncertainty about a successful fiscal reform.

Condition (15) thus characterizes the slippery slope on which governments may find themselves as debt levels rise relative to GDP. If creditors are not certain that the primary surplus will be increased sufficiently to cover the growing interest expense, they may demand a higher interest rate in compensation for the possibility of default or inflation. However, from (4), the higher interest rate $r_t$ means that next period the debt situation will be even more tenuous than it would have been with a lower interest rate.
The above analysis assumed risk-neutral evaluation of sovereign debt, but it is straightforward to modify it to allow for risk premia.\(^5\) Let \( \tilde{R} \) denote the risk-neutral nominal interest rate and \( \pi^0 \) denote the market price at time \( t \) of a state-contingent security that promises to pay \( 1 \cdot \tilde{R} \) dollars in year \( t+1 \) if and only if the country repays creditors exactly what they were promised. If investors were risk neutral, \( \pi^0 \) would just equal the objective probability of reform \( \pi \). More generally, the value of \( \pi^0 \) would reflect both the objective probability of reform \( \pi \) as well as any risk premium the market requires, and is sometimes referred to as the \( Q \)-measure probability of reform. For example, if creditors have as their objective function

\[
E \sum_{j=0}^{\infty} \beta^j U(C_{t+j}),
\]

where \( \beta \) is a personal discount factor and \( C_{t+j} \) is future real consumption, then in equilibrium

\[
\pi^0 = \pi (1 + \tilde{R}) E \left[ \frac{\beta U'(C_{t+j}) P_t}{U'(C_t)/P_{t+1}} \left| \Omega_t, Z_{t+1} = 1 \right. \right]
\]

where \( P_t \) is the dollar price of the consumption good, and the objective expectation is taken conditional on the information set available at date \( t \) \( (\Omega_t) \), augmented by knowledge that there will be no default at \( t+1 \) (denoted by \( Z_{t+1} = 1 \)). In this case the growth-adjusted return on sovereign debt \( r \) would need to satisfy

\[
1 + \tilde{r} = \pi^0 (1 + \tilde{R}) + (1 - \pi^0) \frac{b^*}{b_t - s_t}, \tag{16}
\]

which simply replaces the objective probability \( \pi \) in (15) with the \( Q \)-measure probability \( \pi^0 \).

This analysis identifies three factors that could lead to a sudden increase in a country’s borrowing cost \( r \): (1) news that conveys a significant deterioration of the country’s fiscal situation, that is, increase in \( b_t - s_t \); (2) a decrease in the objective probability that the country will successfully complete the fiscal reforms necessary to return to a sustainable path, that is, a decrease in \( \pi \); (3) an increase in the risk premium on the sovereign debt, that is, a decline in \( \pi^0 \) relative to \( \pi \).

### 3 Recent Experience in Advanced Economies.

A large literature has looked at the determinants of currency and sovereign debt crises, much of it focusing on the experience of developing economies. Reinhart, Savastano, and Rogoff (2003) found that emerging-market economies have a lower tolerance for sovereign debt, with defaults at much lower levels of debt to GDP. Reinhart and Rogoff (2010) provided further evidence that emerging markets are different in that higher debt levels are associated with higher levels of inflation, while this has not been the case (so far) in advanced economies. Mishkin (1996, 1999) attributed the lower debt tolerance of emerging-market economies to their weaker financial institutions and greater vulnerability to international capital flows. Eichengreen, Hausman, and Panizza (2005) described the inability of emerging market countries to borrow in their own currencies as “original sin.” The denomination of debt in foreign currencies implies that a currency depreciation increases the debt burden, which can lead to financial crises, a collapse in the economy, and further exchange rate depreciation. The possibility of this vicious cycle puts limits on the amount of debt that a country can issue and constrains monetary policy options.

\(^5\) For further discussion see Caceres, Guzzo and Segoviano (2010) and Borri and Verdelhan (2011).
Unfortunately, recent experience has shown that more advanced economies are not immune to potential sovereign-debt problems similar to those widely observed in less developed economies. Our analysis will focus exclusively on the recent data for advanced economies.

3.1 CROSS-SECTION AND TIME-SERIES EVIDENCE.

We constructed an annual panel data set from IMF databases on 20 advanced economies in order to study the statistical predictors of $R_i$, the average nominal yield on long-term government debt for country $i$ in year $t$. Note that in our empirical regressions we measure $R_i$ in percentage points, which would correspond to 100 times the value of $R_i$ appearing in the formulas in the previous section.

Most of the literature on debt crises has used gross government debt, in part because this was the only series available. In our case, the data are also available for net government debt. There are arguments for using either measure. When government debt is held as an asset of separate government-run accounts, such as the U.S. Social Security Trust Fund, these accounts are typically associated with off-balance-sheet liabilities whose present value could significantly exceed the value of Treasury securities counted as assets of the trust fund. For example, the trustees of the Social Security Trust Fund estimated that the present value of future benefits to be paid to current program participants exceeds the value of targeted tax receipts by $26.5$ trillion dollars. Perception of these future Treasury obligations could be an independent factor contributing to doubts about government solvency. For this reason, the gross debt (which includes the $2.6$ trillion in Treasury securities owed to the Social Security Trust Fund) might be a more appropriate measure of the U.S. government’s fiscal health than the net measure (which acts as if there are zero net future liabilities associated with current program participants). We propose to treat as an empirical question which measure, gross or net debt, is more important for determining the cost of government borrowing. We let $b_g$ denote the gross government debt for country $i$ in year $t$ as a percentage of GDP (so that $b_g = 100$ denotes gross debt equal to GDP), and $b_n$ the net government debt.

Another important determinant of a country’s borrowing cost could be the current-account deficit. Busisierre and Fratzscher (2006) and Busisierre (2013) found this to be a key predictor of financial crises in emerging economies. Government deficits and current-account deficits often appear together, with the government effectively funding its shortfall by borrowing from abroad. The more government debt is held by foreigners, the greater the political incentives for the government to default on that debt. In a rational market, this would translate into a higher sovereign borrowing cost. Alternatively, if the government borrows from domestic banks who in turn are largely capitalized by foreign lending, the public debt may be domestically held but the political economy could work out similarly to the case when the sovereign debt is held directly by foreigners. Furthermore, a higher overall foreign debt load (both public and private) may make it more difficult for a country to continue to make interest payments on its sovereign debt. For these reasons, we also explore the relation between the interest rate $R_i$ and $c_a$, which denotes the average of the ratio of the current-account surplus to GDP for country $i$ for the five years ending in year $t$, like the other empirical variables. $c_a$ is expressed in units of percentage points, with $c_a = -1$ signifying a current-account deficit equal to $1\%$ of GDP.

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6 See Table IV.B7, 2013 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Funds.

7 Again in the previous section $b_i$ was measured as a fraction of $1$ whereas this section reports empirical results for $b_g$ measured in percentage points.
We begin with a regression that tries to predict $R_t^i$, the interest rate for country $i$ in year $t$, on the basis of the previous year’s gross debt ($b_{t-1}$), net debt ($b_{t-1}^n$), and current-account deficit ($c_{t-1}$). All our panel regressions also include both country and time fixed effects, and $t$ statistics are in parentheses:

$$R_t^i = \hat{\alpha}_i + \hat{\beta}_t + 0.0313 b_{t-1} + 0.0142 b_{t-1}^n - 0.184 c_{t-1} + e_t$$  \(17\)

$R^2 = 0.69$  log likelihood = $-288.32$.

The regression covers 20 countries for years $t = 2000 - 2011$ for a total of 240 observations. Interestingly, the coefficients on gross and net debt are both highly statistically significant. The regression suggests that if the country’s primary deficit increases by 1% of GDP (causing both gross and net debt to increase by one percentage point relative to GDP), the borrowing cost would increase by $0.0313 + 0.0142 = 0.0455$ or 4.5 basis points. The current-account deficit also is highly significant. A country that increases its 5-year-average current-account deficit by one percent of GDP would be expected to face an interest rate that is 18 basis points higher. We also tried including the previous year’s primary surplus as a separate explanatory variable, but it did not enter significantly in any of our regressions.

The coefficients in (17) are consistent with those found by previous researchers using other data sets. The general findings in Gale and Orszag (2002), Reinhart and Sack (2000), Kinoshita (2006), Laubach (2009), Baldacci and Kumar (2010), and Ichiu and Shimizu (2013) are that a one-percentage-point increase in the actual or projected debt-to-GDP ratio raises the long rate by 3-7 basis points. However, these authors generally found much larger separate contributions from the deficit itself, with an increase in the deficit of 1% of GDP raising long-term interest rates by 20-60 basis points, an effect that does not show up in our data set when estimated as a prediction equation (all explanatory variables lagged).

However, the separate contribution of the budget deficit over and above that of the debt itself that was found by other researchers may also be related to the issue of tipping points, to which we now turn.

The discussion of instability and tipping points in Section 2.2 suggests the possibility of nonlinearities in these relations. For advanced economies, a separate literature has looked at the relation between debt burdens and economic growth rates, and it also finds substantial empirical evidence of nonlinearities or tipping points. Reinhart and Rogoff (2010) and Reinhart, Reinhart, and Rogoff (2012) documented that in advanced countries, levels of sovereign debt above 90% of GDP lead to a decline in economic growth, while Cecchetti, Mohanty, and Zampolli (2011) found a threshold of around 85% for the debt-to-GDP ratio at which sovereign debt retards growth. Checherita and Rother (2010) instead looked for a possible nonlinear hump-shaped effect of debt on growth and found that debt-to-GDP levels above 90-100% have serious negative effects on growth, but confidence intervals suggest that the negative impact of debt on growth may start at levels around 70-80% of GDP. With a case study approach, the IMF (2012) came to similar conclusions using a 90-100% threshold, but noted that it matters whether a country’s debt level is increasing or decreasing. Growth is higher over the fifteen years after the threshold is crossed when the debt level is falling rather than rising.
The above considerations led us to add squared and cross-product terms to the regression (17). To keep the representations parsimonious, we report regressions based on gross debt and net debt separately rather than try to include both together as we did in (17). In a regression based on gross debt, all of the second-order terms turn out to be highly statistically significant:

\[
R_u = \hat{\alpha}_t + \hat{\gamma}_t + 0.0029 b_{t-1} + 0.245 c_{t-1} + 0.000203 b_{t-1}^2 \\
+ 0.00793 c_{t-1}^2 - 0.00636 c_{t-1} b_{t-1} + \epsilon_u
\]  

(18)

\[R^2 = 0.82 \quad \text{log likelihood} = -224.28.\]

Nonlinear terms are also extremely significant as a group in the analogous regression using net debt. A test of the hypothesis that the coefficients on the three nonlinear terms in the regression below are all zero produces an F(3, 204) statistic of 24.81, leading to rejection with a \( p \)-value below \(10^{-8}\):

\[
R_u = \hat{\alpha}_t + \hat{\gamma}_t + 0.0370 b_{t-1}^n + 0.157 c_{t-1} + 0.0000365 (b_{t-1}^n)^2 \\
+ 0.0101 c_{t-1}^2 - 0.00124 c_{t-1} b_{t-1}^n + \epsilon_u
\]  

(19)

\[R^2 = 0.76 \quad \text{log likelihood} = -259.74.\]

Note that the gross debt regression (18) has better predictive power than the net debt regression (19). This might be due to the importance of off-balance sheet liabilities, which are implicitly reflected in the component of gross debt that is owed to government trust funds but excluded from net debt, and to the possibility of added judgmental or political manipulation of net debt relative to gross debt measures. We find for example in our data that net debt exhibits more volatility than gross debt.

Again our finding of significant nonlinearities is consistent with previous studies of the relation between debt loads and sovereign interest rates. Ardagna (2009) found that large increases in the deficit (over 1½% of GDP) are associated with larger increases in interest rates (180 basis points). Baldacci and Kumar (2010) also found a larger impact of deficits on interest rates when deficits are greater than 2% of GDP, with the impact of a one-percentage-point increase in the deficit rising by 14 basis points. They also found that in their sample, which includes advanced as well as emerging-market countries, initial debt levels above 60% of GDP add about 6 basis points to the impact of a one-percentage-point increase in the deficit.
To understand the nature of the nonlinearities in the gross debt regression (18), consider first a country whose current account is exactly balanced \( (c_{t-1} = 0) \). The lowest line in Figure 3.1 plots how much higher the interest rate that the country would face in year \( t \) if it had gross debt/GDP in \( t - 1 \) equal to \( b \) (represented by a distance on the horizontal axis) compared to what it would pay if \( b_{t-1} = 0 \). Taking the debt level from 0 to 40% of GDP for such a country would only raise its borrowing cost by 44 basis points. However, going from 40% to 80% would raise its borrowing cost an additional 109 basis points, and another 40% increase from there would raise the rate by an additional 174 basis points. Values of the lowest line in Figure 3.1 for selected debt levels are reported in the first column of Table 3.1.

<figure>
  <table>
    | Debt/GDP (%) | 0 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 |
    |--------------|---|----|----|----|----|-----|-----|-----|-----|-----|-----|
    | Sovereign Yield % | 0  | 1  | 2  | 3  | 4  | 5   | 6   | 7   | 8   | 9   | 10  |
  </table>
  <caption>FIGURE 3.1: RESPONSE OF SOVEREIGN YIELDS TO DEBT RATIOS UNDER ALTERNATIVE CURRENT ACCOUNT BALANCES</caption>
</figure>

Note: CA is current account balance as % of GDP. Horizontal axis: gross debt as a percent of GDP in year \( t - 1 \). Vertical axis: amount by which a country’s interest rate in year \( t \) would be predicted to be higher (measured in annual percentage points) compared to what the interest rate would be if debt in year \( t - 1 \) were equal to 0 for indicated levels of the current-account balance.

Source: authors’ calculations.

8 Specifically, the lines in Figure 3.1 plot \( \hat{\beta}_1 b + \hat{\beta}_2 b^2 + \hat{\beta}_3 c b \) for \( \hat{\beta} \) the coefficients in equation (18), \( b \) the value on the horizontal axis, and \( c \) the indicated assumption about the 5-year average current-account balance, where \( b \) and \( c \) are both expressed as percentages of GDP.
A country with a current-account deficit is predicted by the regression to run into these problems much more quickly. For example, if the current-account deficit has averaged 2.5% of GDP over the last 5 years, going from 0% to 40% debt would raise borrowing costs by 108 basis points, and going from 0% to 120% debt would raise the interest rate by 517 basis points (see the middle line in Figure 3.1 or column 3 in Table 3.1). A country with large and persistent current-account deficits (e.g., -5%) could end up paying a very high price for running up more debt, as seen in the top line in Figure 3.1 or column 5 of Table 3.1.

Table 3.1 also reports standard errors for these calculations. It should be emphasized that these summarize only the uncertainty associated with the regression coefficients themselves. A considerably larger error is involved if the task is to predict the interest rate that a particular country facing specified circumstances would actually pay. For one thing, there is a substantial deviation between the interest rate actually paid by country i in year t and the value predicted by the regression, as represented by the error term $\epsilon_i$ in equation (18). The error $\epsilon_i$ has a standard error of 67 basis points across countries and across time. There are further significant differences in the average experience across countries, as represented by the country-specific coefficient $\alpha_i$. This has a standard deviation of 186 basis points across countries. Finally, there are important differences in the average experience across different years in the sample. This is captured by the time-specific coefficient $\chi_t$, which has a standard deviation of 82 basis points across different years in the sample. Thus, for modest levels of debt and current-account deficits, the change in yield associated with a small change in the explanatory variables is going to be swamped by other factors influencing the interest rate. On the other hand, the regressions capture a clear feature of the data: problems can arrive quickly and dramatically once the debt loads and current-account deficits get sufficiently high. For example, a country with a debt load in excess of 120% and current-account deficit of 5% or more is very likely to run into trouble.
It should be noted that the evidence for nonlinearities in our data set comes entirely from countries that are members of the European Monetary Union. De Grauwe (2011) argued that the periphery countries of the union are in a similar situation to emerging economies, forced to borrow in a currency (the euro) whose supply they do not control. However, the loss to creditors in this situation could come in a variety of forms, a leading possibility being withdrawal from the union and repayment of creditors in, for example, "Greek euros," which ultimately is an inflation risk. Either outright default or exit from the euro could be associated with substantially greater real costs than those sustained by a country that had borrowed from the beginning in its own currency and simply engineered an unanticipated inflation. This could make the threshold for a tipping point lower for periphery countries of the eurozone than for other advanced economies.

Nevertheless, the fundamental constraints on sovereign borrowing that we described in Section 2 are real, not monetary. Countries may differ in the point at which those constraints start to matter, and we allow for this in our empirical estimates through the country fixed effects in equation (18). Countries may also differ in terms of whether the resolution of an unsustainable situation comes in the form of currency reform, unanticipated inflation, or outright default. But they do not differ to the extent that any country can consider itself immune from the need to adhere to a sustainable fiscal path, as we explore further in the following section.

---

9 Iceland is an interesting example of a non-euro advanced economy that recently encountered its fiscal tipping point. When Iceland is included in our regressions, we obtained similar results as for the group of countries listed in Table 3.2. We ended up excluding Iceland from the estimates reported here, however, because of discrepancies across different data sets in the interest rate figures reported for Iceland.
3.2 IMPLICATIONS FOR FISCAL SUSTAINABILITY.

Table 3.2 reports each country’s average interest rate during 2012 for our sample of 20 advanced economies along with the 2011 gross debt-to-GDP ratio, net debt-to-GDP, and the average over 2007-2011 in the ratio of the current-account surplus to GDP. Note that these observations were not used in the preceding empirical analysis, since the yield for the full year 2012 was not known at the time of our study. The first question asked in this subsection is: suppose that each country had implemented in 2012 an immediate fiscal reform, raising taxes or lowering spending by an amount sufficient to stabilize the debt-to-GDP ratio at 2011 levels, by how much would each country have to increase its primary government surplus in order to achieve this?

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<td>3.4</td>
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<td>-4.0</td>
<td>6.7</td>
<td>-4.0</td>
<td>-0.8</td>
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<td>3.2</td>
<td>3.4</td>
<td>-0.4</td>
<td>-0.7</td>
</tr>
<tr>
<td>Belgium</td>
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<td>97.8</td>
<td>81.4</td>
<td>-0.2</td>
<td>3.4</td>
<td>-0.6</td>
<td>-0.4</td>
</tr>
<tr>
<td>Canada</td>
<td>1.9</td>
<td>85.4</td>
<td>33.1</td>
<td>-1.6</td>
<td>4.2</td>
<td>-3.9</td>
<td>-2.0</td>
</tr>
<tr>
<td>Denmark</td>
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<td>44.1</td>
<td>0.2</td>
<td>4.0</td>
<td>2.6</td>
<td>-1.4</td>
<td>-0.5</td>
</tr>
<tr>
<td>Finland</td>
<td>1.9</td>
<td>49.1</td>
<td>-54.1</td>
<td>1.8</td>
<td>3.0</td>
<td>-1.0</td>
<td>-0.5</td>
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<tr>
<td>France</td>
<td>2.6</td>
<td>86.0</td>
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<td>-1.5</td>
<td>2.7</td>
<td>-2.7</td>
<td>-0.1</td>
</tr>
<tr>
<td>Germany</td>
<td>1.5</td>
<td>80.6</td>
<td>55.3</td>
<td>6.3</td>
<td>2.2</td>
<td>0.9</td>
<td>-0.6</td>
</tr>
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<td>Greece</td>
<td>22.9</td>
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<td>165.4</td>
<td>-12.1</td>
<td>2.6</td>
<td>-2.2</td>
<td>28.0</td>
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<td>1.6</td>
<td>-9.6</td>
<td>4.5</td>
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<tr>
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<td>99.6</td>
<td>-2.6</td>
<td>2.0</td>
<td>0.8</td>
<td>4.1</td>
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<td>0.8</td>
<td>229.6</td>
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<td>3.4</td>
<td>-1.0</td>
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<td>4.1</td>
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<td>2.7</td>
<td>-3.1</td>
<td>-0.5</td>
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<tr>
<td>Norway</td>
<td>2.1</td>
<td>49.6</td>
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<td>13.2</td>
<td>5.6</td>
<td>11.6</td>
<td>-1.8</td>
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<tr>
<td>Portugal</td>
<td>11.0</td>
<td>107.8</td>
<td>97.3</td>
<td>-10.0</td>
<td>2.0</td>
<td>-0.6</td>
<td>9.0</td>
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<tr>
<td>Spain</td>
<td>5.9</td>
<td>69.1</td>
<td>57.5</td>
<td>-6.5</td>
<td>3.6</td>
<td>-7.0</td>
<td>1.6</td>
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<tr>
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<td>37.9</td>
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<td>7.7</td>
<td>3.9</td>
<td>-0.8</td>
<td>-0.9</td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.7</td>
<td>46.8</td>
<td>25.9</td>
<td>9.2</td>
<td>2.8</td>
<td>0.8</td>
<td>-1.0</td>
</tr>
<tr>
<td>U.K.</td>
<td>1.9</td>
<td>81.8</td>
<td>76.6</td>
<td>-1.8</td>
<td>3.6</td>
<td>-5.7</td>
<td>-1.5</td>
</tr>
<tr>
<td>U.S.</td>
<td>1.8</td>
<td>102.9</td>
<td>80.3</td>
<td>-3.7</td>
<td>3.5</td>
<td>-7.8</td>
<td>-1.8</td>
</tr>
</tbody>
</table>

Sources: Haver Analytics, IMF, authors’ calculations
This question can be answered from equation (8) if we know the value of \( \gamma^* \), the difference between the country’s steady-state nominal borrowing cost \( R^* \) and steady-state nominal growth rate \( g^* \). To get an estimate of the latter, we applied exponential smoothing to the ten most recent observations on \( g_t \) using a decay factor of 0.9. This constructs an estimated long-run growth rate from a weighted average of the most recent decade’s observed annual growth rates \( g_t \), with more recent years receiving a greater weight, and is reported in column 5 of Table 3.2. Specifically, column 5 reports

\[
\hat{g}_t^* = \frac{1 - \delta}{1 - \delta^N} \sum_{j=0}^{N} \delta^j g_{t-j}
\]

(20)

for \( \delta = 0.9 \). To illustrate the nature of the trap that countries get into when the sovereign yield rises, we first explore the implications if the current interest rate for each country were to continue forever. Column 7 of Table 3.2 reports the primary surplus (expressed as a percentage of GDP) that would be necessary to hold the debt constant at its current value if the interest rate were to remain at its current value, while column 6 reports the primary surplus actually achieved in 2011.

If Greece were required to continue to pay a 23% interest rate on its outstanding debt, stabilizing debt at 2011 levels would be an essentially impossible task. The reason is that with debt already at 165% of GDP, 23% interest on this debt would require \( (0.23)(1.65) / (1.23) = 31\% \) of GDP each year just to make the interest payments. Similarly, a continuation of Portugal’s borrowing cost near 11%, given its debt is well above 100% of GDP, would also require a primary surplus close to 9% of GDP each year to keep debt from growing further. Ireland, Italy, and Japan would need primary surpluses in excess of 4%. For Italy, this is not too big a change from its current primary surplus near 1%, but Japan had a primary deficit in 2011 of -8.9% and Ireland faced -9.6%. Interestingly, in Japan’s case the need for a large primary surplus in steady state is not caused by a currently high borrowing cost. Indeed, Japan faced one of the lowest borrowing costs in 2012 (0.8%) of any country in our sample. Japan’s problem instead comes from a huge accumulated debt and a very slow growth rate; the country’s weighted average annual nominal GDP growth rate over the last decade is -1%. If this unfortunate record were to continue, it would imply a net annual borrowing cost for Japan of \( R^* = 0.8 - (-1.0) = 1.8\% \). If we apply that net interest factor to a debt load representing 230% of GDP, we calculate that the country would require a steady-state primary surplus of \( (0.018)(2.30) / (1.018) = 4.1\% \) of GDP. Moving to such a surplus would require higher tax revenues or spending cuts relative to current levels on the order of 13% of GDP. Pessimism about the sustainability of the Japanese situation has also been the conclusion of a number of other studies using different assumptions and methods, including Doi and Ihori (2009), Ostry et al. (2011), Doi, Hoshi, and Okimoto (2011), Ito (2011), Ito, Watanabe, and Yabu (2011), Sakuragawa and Hosono (2012), and Hoshi and Ito (2012).

By contrast, the fiscal policies of many other countries in our sample appear to be easily sustainable without any change in current conditions. Favorably situated countries include Austria, Finland, Germany, Denmark, Norway, Sweden, Canada, and Switzerland.

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10 This does not differ much from the simple average \( \bar{g}_t^* = (g_t + g_{t-1} + \cdots + g_{t-9}) / 10 \), though we feel the weighted average is slightly preferable.

11 That is, column 7 reports the value of \( b_t = (R_t - \bar{g}_t^* ) / (100 + R_t - \bar{g}_t^* ) \).
However, our nonlinear regression results imply that a country can quickly move from the group without problems to the group that faces nearly insurmountable problems if its debt rises significantly above 80% of GDP, particularly if it is running a large current-account deficit. For example, the numbers in column 5 of Table 3.1 imply that if a country with a current-account deficit of 5% of GDP were to increase its debt load from 80% to 120% of GDP, its borrowing cost would rise by about 3 percentage points. Because this higher interest rate eventually will apply to all of the country’s outstanding debt, it means that if the debt level rises from 80% to 120% of GDP, an additional primary surplus of around \((0.03)(120) = 3.6\) of GDP will be necessary just to cover the higher interest rate applied to all of its debt.

The linear specification (17) is more forgiving of added debt. On the basis of the linear specification, increasing both gross debt and net debt by 40 percentage points relative to GDP would raise the country’s borrowing cost by \((0.0313 + 0.01420)(40) = 1.8\) percentage points, requiring permanently increasing the primary surplus by about 2.1 percent of GDP in order to cope with the burden of having to borrow at a higher interest rate.

The “good” news is that if Greece were somehow able to move its primary surplus anywhere close to 28% of GDP, its borrowing cost would fall dramatically, and the assumption that Greek debt would always have to offer the very high yields of 2012 would not be appropriate. According to the theoretical model presented in Section 2.2, the factor driving Greece’s high borrowing cost in 2012 was lenders’ belief that a substantial increase in the country’s primary surplus is unlikely to occur. Our panel regressions are simply summarizing the average historical correlations in the data, which are a combination of any possible dependence of the steady-state yield \(R^*\) on debt levels plus the fact that actual yields \(R\) will exceed \(R^*\) whenever lenders have doubts about the likelihood of a successful fiscal reform. Still, even if Greece were able to lower its nominal borrowing cost to 5%, maintaining debt at 165% of GDP would require it permanently to maintain a primary surplus of \(165(5 - 2.6)/(100 + 5 - 2.6) = 3.9\) of GDP.

However, trying to deal with the problem purely by fiscal reform can put the country on a separate slippery slope. Dramatic cuts in planned spending or increases in tax rates are contractionary and will lead to a drop in GDP. This in turn aggravates the country’s fiscal challenges. Lower GDP means less tax revenue collected for any given rate, more expenditures on social-safety-net items, and a smaller denominator from which the debt-to-GDP ratio is calculated. Slower future growth further aggravates all the calculations of what would be necessary to restore sustainability. In a problem as big as that facing Greece, trying to change the situation with fiscal reform alone may be logistically extremely difficult, even if there were a political will to do so.

One way to have a more attractive set of policy options is to avoid getting into such a situation in the first place. A country with debt below 60% of GDP that can borrow at a nominal interest rate less than its growth rate may see little harm in allowing debt levels to climb relative to GDP. And if all continues as planned, there may indeed be little or no drawbacks to doing so. The difficulty arises if the country for other reasons is unexpectedly subjected to a severe economic downturn or large unavoidable fiscal shock. In response to such a situation, any country would want to allow debt to accumulate in the short run as it tries to resolve the difficulties. If the country entered the crisis with government debt at 60% of GDP, it should be able to respond appropriately without having to worry about the slippery slope of rising sovereign debt costs. However, if the country started with debt at 100% of GDP, it may find itself with few good options in such a situation.
3.3 CASE STUDIES.

The statistical models in Section 3.2 were based on year-ahead forecasts using annual data. By contrast, events over the last several years have sometimes unfolded extremely quickly, with dramatic changes in yields over the space of a few weeks or even days. In this section we review high frequency data, trying to relate it to specific news developments and the general framework developed in the preceding sections for a number of key countries.

3.3.1 GREECE.

We begin by summarizing the Greek situation prior to the crash of Lehman Brothers in the fall of 2008. The black line in the top panel of Figure 3.2 displays the general government balance for Greece as a percent of GDP as reported in the database for the IMF October 2008 World Economic Outlook (http://www.imf.org/external/ns/cs.aspx?id=28). The solid black line depicts historical values through 2007 as reported at that time, and the dashed line gives forecasts for 2008 and 2009. According to these figures, Greece was expected to maintain a deficit less than 3% of GDP. Note that this reported deficit figure includes interest payments. With debt at about 100% of GDP at the time and an interest rate of 5%, a 3% total deficit would roughly correspond to a 2% primary surplus. Moreover, Greece’s nominal GDP over the 10 years ending in 2008 grew at a weighted average rate of 6.6% per year. The official projections prior to the fall of 2008 are thus quite consistent with a sustainable fiscal path.

The weakening economy brought on by the recession reduced government revenue and increased spending demands. By September of 2009, Greece was projecting a deficit for the year of 6% of GDP. Prime Minister Kostas Karamanlis campaigned on the basis of a proposed wage and hiring freeze and possible tax increase. Karamanlis was soundly defeated in the October 4 election. New Prime Minister George Papandreou charged that the government had been underreporting the deficit, and shortly after his inauguration, projections were for a 2009 deficit in excess of 12% of GDP. On January 12, 2010, a report from the European Commission condemned the official Greek deficit and debt figures as unreliable.

The solid red line in the top panel Figure 3.2 plots the historical values for the Greek deficit as reported in October 2010. There had been a minor revision as of that date in the historical figures for the deficits reported for 2006 and 2007. But the biggest difference is in the deficits for 2008 and 2009, which were initially projected to come in at 2.8% and 2.3% of GDP, respectively. As of October 2010, these deficits were instead being reported to have been 7.7% and 13.6%. The cumulative difference over 2006–2009 in the deficit between the initial reports/projections and the values as reported in 2010 comes to 17.5% of GDP. According to equation (18), with a debt level around 100% and current account of −11.9%, this news might be expected to result in an increase in the interest rate given by

\[
(0.0029)(117.5 - 100) + (0.000203)(117.5^2 - 100^2) + (0.00636)(11.9)(117.5 - 100) = 2.1%.
\]


Figure 3.2: Greek Government Budget Balance and Debt Reported and Projected at Alternative Dates (% of GDP)

General government budget balance

Source: IMF World Economic Outlook
Figure 3.3 plots weekly yields on 10-year Greek sovereign debt from January 2007 through January 2013. These began to rise with some modest bond downgrades in December 2009, culminating in a sharp spike associated with a downgrade to junk bond status on April 27, 2010. Between October 2, 2009 and May 7, 2010, the yield rose 6.1%.

In response to the spike in Greek yields, on May 2, 2010, the International Monetary Fund and finance ministers of other European countries announced their intention to implement a €110B rescue package in the form of new loans to Greece.14 When this failed to have the desired effect on markets, it was followed by an announcement on May 10 of the creation of a European Financial Stability Facility (EFSF) to provide €440B in loan guarantees available to a number of European countries plus additional European Commission and International Monetary Fund Loans totalling €310B.15 If the problem was simply that Greece had accumulated a debt load that it was not going to be able to repay, new loans would not seem to be of much help. Nevertheless, the framework of Section 2 raises three potential mechanisms by which such a rescue program might have an effect. First, if, as Bolton and Jeanne (2011) and Park (2012) suggest, rising default risk undermines the collateral of the limited number of potential buyers of

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sovereign debt, the deteriorating Greek budget picture may have resulted in an increase in the risk premium on Greek debt as represented by the difference between $\pi$ and $\pi^D$ in equation (16). To the extent that market rates reflected this risk premium rather than an objective probability of default, the willingness of other sovereign countries or institutions like the IMF to take the place of private lenders could potentially bring the interest rate down and move the country back into a region of sustainability.

A second possible mechanism could operate if the new institutional lenders force the country to adopt fiscal reforms leading to a credible commitment to increase the country’s steady-state primary surplus. The May 2, 2010 announcement of the rescue package reported that Greece would be required to cut its 2010 deficit in half as part of the deal.

Third, the model of default in Section 2 assumed that costs would be borne by some combination of losses by creditors, increases in domestic taxes, or reduction in government spending. Another possible outcome is that other sovereign countries might be prepared to absorb some of the losses out of a desire to limit the consequences of a default by a country like Greece. If a third-party rescue package is interpreted by lenders as increasing the likelihood that other sovereign governments will absorb some of the future losses, that could be a third mechanism by which such measures could result in lower Greek borrowing costs.

The yield on Greek 10-year bonds fell by 270 basis points following the initial EFSF announcement on May 10, 2010. Unfortunately, the fundamentals in Greece continued to deteriorate and within a few months the interest rate was back above its May 10 value. One important news development was the acknowledgement that Greece’s historical deficits were significantly larger than the country had been claiming. The gray line in the top panel of Figure 3.2 shows the deficits as reported in the IMF April 2011 WEO database. This shows that the cumulative actual deficits (not the forecasts) over 2006–2008 were 10% higher as a percent of GDP than they had been reported to be the previous fall, news which immediately added 10 percentage points to the baseline debt/GDP (bottom panel), and by itself would be predicted to lead to an additional 1.3% increase in Greece’s borrowing costs.\textsuperscript{16} The actual deficit for 2009 turned out to be 15.4% of GDP, and the forecast debt/GDP for the end of 2011 was 152%. This again proved to be too optimistic, with the figure now given as 165%, compared with an assumed value of 100% just two years earlier.

Several additional interventions were attempted, though these only produced temporary jags down in a longer upward climb in Greek borrowing costs, as seen in Figure 3.3. The European Central Bank provided assistance and was estimated to have purchased €47 B in Greek bonds between May 2010 and June 2011, and to have accepted as collateral an additional €98 B from Greek banks (Nelson, Belkin, and Mix, 2011). To put these numbers in perspective, the €145 B in ECB notional exposure corresponds to 64% of Greece’s 2010 GDP (€227 B) and 44% of its 2010 sovereign debt (€330 B).

A summit of European leaders and financial institutions announced on July 21, 2011 that EFSF loan guarantees would be increased to €780 B (European Financial Stability Facility, 2012) along with an agreement from private banks to contribute €50 B through 2014 in the form of losses on Greek bond exchanges, rollovers, and debt buybacks (Nelson, Belkin, and Mix, 2011). However, strikes protesting the austerity measures in September raised new doubts about the willingness of the Greek public to

\[ (0.0029)(127.5 - 117.5) + (0.000203)(127.5^2 - 117.5^2) + (0.00636)(11.9)(127.5 - 117.5) = 1.3\% .\]
participate in the plan.\textsuperscript{17} The yield on Greek debt rose from 18.2\% on September 2 to 24.4\% on October 28. On November 1, Prime Minister Papandreou proposed that Greek citizens should hold a referendum on whether they approved of the proposed austerity measures, after which the borrowing cost shot up another 800 basis points. Given this reaction, Papandreou resigned, and a new prime minister was inaugurated November 10.

Once again, any relief from the change in leadership was only temporary, and the yield on Greek sovereign debt reached almost 40\% at the beginning of March 2012. On March 8, Greek Finance Minister Venizelos announced that a majority of private holders of the country’s sovereign debt had agreed to accept "PSI" notes from EFSF or new Greek debt at a 53.5\% haircut on outstanding bonds.\textsuperscript{18} This represents the key measure that would actually make a difference for the underlying core problem. Venizelos expected the agreement to reduce outstanding debt by €105 B, which would reduce the 2011 debt/GDP from 165\% to 117\%. Equation (18) predicts that such a measure would lead to a drop in the interest rate of almost 700 basis points.\textsuperscript{19} In fact, the Greek interest rate fell by over 2100 basis points, from 39.6\% on March 9 to 18.5\% on March 16. However, by June it had drifted back up above 29\%, about a thousand basis points below its peak.

Two further important measures came later in the year. On September 6, 2012, the European Central Bank indicated its willingness to conduct outright monetary transactions to buy troubled sovereign debt on the secondary bond market, doing "whatever it takes" to redress "unfounded fears on the part of investors."\textsuperscript{20} A week later, the German Constitutional Court ruled on September 12th that it would be lawful for Germany to ratify the European Stability Mechanism, which would provide up to €500 B in loans to European countries. The yield on Greek debt declined substantially after these announcements and the full German ratification of the ESM which followed shortly after (see Figure 3.3).

However, our framework suggests that the underlying problems could hardly be described as "unfounded fears on the part of investors." Equation (8) implies that if Greece were to reduce its outstanding debt by another third (to get debt/GDP back to 80\%) and move to a permanent primary surplus of 2\% of GDP, it would be able to borrow again at 5\% and sustain the situation indefinitely, even if Greece’s nominal growth rate does not recover from its recent low 2.5\% recent trend. With faster growth, a more modest primary surplus would be needed to achieve sustainability. But such scenarios seem optimistic. A more important contribution of the OMT and ESM might be their signal that significant resources from broader Europe will be available to Greece to cover the primary surplus shortfall. Even with these, it is very easy to imagine that Greek yields could climb again to 2012 levels if there is no satisfactory resolution of Greece’s longer-run fiscal challenges.

\textsuperscript{17} "Greek taxis, doctors, dentists on strike," Business Week, September 8, 2011 (http://www.businessweek.com/ap/financialnews/DyPKBeCo.htm).
\textsuperscript{19} (0.0029)(165 - 117) + (0.000203)(165^3 - 117^3) + (0.00636)(12.1)(165 - 117) - 6.58\%.
3.3.2 Ireland.

The black line in the top panel of Figure 3.4 shows the historical and projected Irish budget surplus as of October 2008. An economic downturn is reflected in these projections, with deficits of 4 to 5% of GDP anticipated for 2008 and 2009. With debt in 2007 at only 25% of GDP, one would hardly have expected Ireland shortly to be added to the list of countries whose sovereign debt would be questioned.

**Figure 3.4: Irish Government Budget Balance and Debt Reported and Projected at Alternative Dates (% of GDP)**

Source: IMF World Economic Outlook
After the stresses associated with the failure of Lehman, Irish banks started to face problems obtaining financing. The Irish government responded on September 30, 2008 by guaranteeing “all deposits (retail, commercial, institutional and interbank), covered bonds, senior debt and dated subordinated debt”\(^{21}\) of the 6 major banks, a potential liability estimated by Cussen and Lucey (2011) at €352 B.

Underappreciated at the time was the fact that, like the United States, Ireland had experienced its own real estate price bubble that was about to collapse. During 2009, Irish house prices fell by 19%, ending the year 29% below their 2007 peak and ending 2010 37% below the peak (see Figure 3.5). By the end of 2009, impaired loans for the top 3 banks were up to €59 B and criticized loans at €102 B.\(^{22}\)

As bank losses mounted, the government nationalized Anglo Irish Bank in 2009 and set up the National Asset Management Agency (NAMA) in December of 2009, which was to issue government debt and use the proceeds to purchase troubled assets at a discounted price. In addition, Anglo Irish Bank and Irish Nationwide Building Society received €30.6 B (20% of Ireland’s 2010 GDP) in emergency lending from the Central Bank of Ireland, whose monetary effects were sterilized through issue of “promissory notes” by the fiscal authority. An interesting feature of the budget numbers as of October 2010 (red lines in Figure 3.4) is that while the 2010 budget deficit was projected at only 14% of GDP in the IMF’s October 2010 database, that same projection called for gross government debt to grow from 65% of GDP in 2009 to 94% in 2010. The discrepancy between the anticipated size of the 2010 deficit and anticipated value for 2010 debt appears to come from the fact that while the promissory notes were included in the gross debt figures, they were mostly excluded from the reported deficit. By April 2011, the deficit estimate for 2010 followed the Eurostat convention of counting the new notes as part of the deficit, which was revised up to 32% of GDP (see the gray lines in Figure 3.4).


\(^{22}\) Data source: annual reports for Allied Irish Banks, Bank of Ireland, and Anglo Irish Bank.
Again quick calculations using (18) suggest that if perceptions of true net government debt/GDP grew by 20 percentage points as a result of this news in the fall of 2010, the country would have expected to see its borrowing cost rise by 1.2%. The yield on 10-year Irish sovereigns rose from 5.0% on August 6, 2010 to 9.0% on November 26. On November 28, the EU approved €85 B in loans to Ireland, which temporarily stabilized the upward trajectory of borrowing costs (see Figure 3.6).

Unfortunately, house prices in Ireland fell an additional 17% during 2011. In July the government injected an additional €16.5 B (11% of GDP) into the banking system, and on July 12, Moody’s downgraded Irish debt to junk status. The yield peaked at 14% on July 15, but fell sharply following EFSF2.

**FIGURE 3.6: IRISH 10-YEAR GOVERNMENT BOND YIELD**

![Graph of Irish 10-year government bond yield](image)

Sources: Haver Analytics and Financial Times

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23 \((0.0029)(85-65) + (0.000203)(85^{2}-65^{2}) + (0.00636)(4.1)(85 - 65) = 1.2\%\).


Although the rescue of Irish banks entailed a huge debt issuance by the government, in the process the government also acquired and preserved the value of an asset, namely the ongoing enterprise value of the banks themselves. Should these expenditures be viewed as pouring money down a hole? One perspective is provided by noting that Ireland’s 6 largest banks held €400 B in customer loans in 2009, about half of which were for property and construction or mortgages. If all of the property loans had been made at the peak of house prices, and if all of the 50% decline in house prices from the peak were absorbed as a loss to the banking system (rather extreme assumptions), one arrives at an upper bound on the loss of €100 B. For comparison, Cussen and Lucey (2011) calculated injections of funds into the banking system in 2010 and 2011 at €64 B. This simple calculation suggests that the convention of regarding all of this sum as “government spending” is overly conservative, and that there is some compensation in the form of acquisition of a positively valued asset.

Moreover, Irish property prices appear to have stabilized in 2012, and in December 2010 the Irish government agreed to €4 B in spending cuts and €2 B in tax increases as terms of the EU assistance. The most recent projections of future Irish debt are more optimistic than those of a year ago (see the green line in Figure 3.4). We thus conclude that although the effective nationalization of property losses put a huge fiscal strain on Ireland, there is reason to believe that the country has turned the corner and will emerge with a sustainable situation.


### 3.3.3 Other European Countries

Figure 3.7 plots debt levels for three other countries that have seen significant increases in borrowing rates. Spain’s situation is similar to Ireland, having started from a low debt level but experiencing a very significant decline in property values. The key unresolved question is how much of the loss in property values will ultimately end up as a direct fiscal charge to the Spanish government. Portugal seems to involve a mix of the issues facing Spain and Greece (Maior, 2011).

![Figure 3.7: Historical and forecast debt/GDP for Spain, Portugal, and Italy](image)

Italy presents an interesting case, having maintained debt levels above 100% of GDP for a quarter century. Why should debt levels be raising concerns about Italy today that were not present a decade ago? One answer is suggested by the second panel of Figure 3.8, which shows that the nominal growth rate in Italy has been steadily falling over this period. Slower growth $g$ means a higher net borrowing cost $r$ from equation (6). From equation (8), that in turn means that a higher primary surplus would be necessary to maintain any given level of debt. To illustrate the implications of this, the dashed red line in the bottom panel of Figure 3.8 plots the primary surplus that Italy would have needed in each year in order to hold debt/GDP constant at its observed value for that year under the assumption that it could borrow at a nominal interest rate of 5% and that its long-run nominal GDP growth rate would continue at the weighted average seen over the previous decade. With the solid growth of the 1990s, Italy could have run a small primary deficit and still reduced its debt/GDP ratio. Given that it actually realized a significant primary surplus, debt fell significantly as a percentage of GDP in the 1990s. But with slowing growth rates, by 2000 it would have been necessary to run a primary surplus to stabilize debt even at its new lower levels. If Italy’s recent slow growth is projected forward, a primary surplus of 4% of GDP would be necessary for a stable path.
Figure 3.9 plots weekly interest rates for 6 different European countries. One of the striking features of these high-frequency data is that the yields of the 5 troubled countries (Greece, Ireland, Portugal, Spain and Italy) often moved together in response to the same news events. For example, the interest rates for Ireland and Portugal followed very similar paths in the early part of 2010. Although news of deteriorating economic fundamentals such as falling real-estate prices are doubtless correlated across countries, something else is clearly going on in the data. One interpretation is that news was affecting not just the objective probability of default $\pi$ but also the market price of default risk $\pi^0$ in equation (16), and that this risk premium was highly correlated across countries. Bolton and Jeanne (2011) and Park (2012) suggested that this could arise if there is a single set of investors who are willing to hold the sovereign debt of risky countries, and that deteriorating fiscal fundamentals in one country erode the investors’
working capital and cause them to seek higher risk compensation for holding similar assets. Another possibility is that a key determinant of sustainability would be outside financial assistance for the country. News that such assistance would be forthcoming (for example, EFSF1 and EFSF2) would bring yields down together, while doubts about the funds’ adequacy, brought about for example by deteriorating fundamentals in any one of the countries, would result in higher borrowing costs for all.

But note that despite the high-frequency correlation, ultimately the rates facing different countries diverged significantly. For example, Ireland’s interest rate has now pulled dramatically below those of Greece or Portugal. We conclude that, despite the strong comovement of yields across countries and possible correlated risk premia, the basic framework for thinking about debt sustainability and tipping points presented in Section 2 appears to be the correct way to interpret recent European experience. Additional evidence supporting this conclusion was provided by Caceres, Guzzo, and Segoviano (2010) and Caporin et al. (2012).
3.3.4 JAPAN.

The most dramatic outlier in our data set is Japan, whose gross debt is now 230% of GDP but whose borrowing cost is below 1%. Our regression (18) would attribute this low interest rate to the fact that Japan maintains a significant current-account surplus (with $c_p = +3.4\%$) and enjoys a country fixed effect that implies there is something very special about Japan. In fact, the sum $\alpha_{\text{Japan}} + \gamma_T$, which gives the predicted nominal interest rate from the quadratic specification if Japan had zero debt and zero current-account balance, is -3.7%.

Hoshi and Ito (2012) argue that a key feature that makes Japan special is its very high domestic saving rate coupled with extreme home bias. They report that 95% of the Japanese sovereign debt is domestically held by institutions such as banks, insurance companies, and pension funds. Our measure of Japanese government debt after netting out that owed to other Japanese government entities is only 126% of GDP, and the difference between gross and net debt certainly accounts for some of Japan’s “specialness” in the gross debt regression; for example the sum from the net-debt regression (19) is just -1.2%.

Nevertheless, Hoshi and Ito argue that, given Japan’s aging population, its private saving rate is likely to fall significantly over the next decade. Once Japan is forced to sell its debt to international investors and not just domestic institutions, the yield on Japanese debt should start to behave much more like that of other countries. Given its high debt load, even modest increases in its borrowing cost could quickly make the sustainability issues we have been discussing become much more significant. Hoshi and Ito conclude that policy-makers should not be reassured by Japan’s current low borrowing costs, and argue that Japan will need to adopt significant fiscal reforms if it is to avoid a future fiscal crisis.

3.3.5 UNITED STATES.

The United States is another country with a significant debt load (with gross debt at 103% of GDP in 2011) and low interest rates. The country-fixed-effects term in (18) imputes special borrowing privileges for the United States that would allow it to enjoy a borrowing cost of only $\alpha_{\text{US}} + \gamma_T = +1.1\%$ if it had zero debt and a balanced current account. Again an important portion of the U.S. debt is held by government institutions such as the Social Security Trust Fund, leaving the net debt load in 2011 at only 80%. Another key reason that U.S. rates have historically been low is that the use of the U.S. dollar as the world’s reserve currency creates a special demand for U.S. Treasury securities. We note, for example, that although public debt of the United Kingdom was never below 170% of GDP between 1922 and 1936 (Abbas et al., 2010), the annual average yield on British consoles (infinite-maturity sovereign debt) was never above 4.6% over those same years (Homer and Sylla, 2005, Table 59).

Recent projections from the Congressional Budget Office (2013) called for U.S. gross debt/GDP to rise to 107% by 2014 and decline modestly for the next several years before resuming a gradual upward ascent. The underlying revenue and outlay assumptions behind these projections are detailed in Figure 3.10. We show the standard CBO (2013) baseline through 2023, with an adjustment for some relatively minor items (such as the so-called doc fix and tax extenders). The data beyond 2023 reflect our own efforts to reproduce the methodology that CBO used in their most recent long-term projections (see Congressional

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28 In order to allow for cross country comparisons, we have used IMF data on public debt to this point in the paper. In the remainder of this section, we refer to the standard US definitions for gross debt and debt held by the public. However, it’s important to note that the IMF figure of 103% for US gross public debt at the end of 2011 is very close to the CBO reported value of 99%.
Budget Office, 2012) to allow for significant changes in policy that have occurred in the interim. On the revenue side, note that tax receipts only amounted to 15.8% of GDP in 2012. That’s quite low by historical standards. However, tax revenues are low for understandable reasons. The U.S. economy has suffered through a severe recession, and a considerable amount of slack still exists. Moreover, there have been a number of tax cuts over the last decade or so—specifically, the Bush era tax cuts in 2001 and 2003 as well as the payroll tax cut that was in place during 2011 and 2012. But, if the U.S. economy fully recovers over the next several years and the unemployment rate eventually gets all the way back down to 5.25%, as the CBO (2013) assessment assumed, then tax receipts should gradually rise to about 19% of GDP—slightly above the long-run average of 18.5% seen during the post-war period in the U.S.

Next, let’s take a look at the spending side. Figure 3.10 also shows our adjusted CBO outlook for federal government expenditures as a share of GDP. In 2012, federal spending amounted to 22.7% of GDP. However, a number of factors should lead to higher spending levels in coming decades. Take, for example, outlays for Social Security, which are now about 5% of GDP. The aging of the population will help to push Social Security benefits up to about 6% of GDP as we approach the middle of the century (by the way, the COLA change that has recently been under consideration would cut that only slightly—to 5.8% of GDP). Some of this pickup is expected to be offset by a decline in defense and nondefense discretionary spending. However, health-care-related expenditures are slated to explode if no policy action is taken. For example, CBO (2012) baseline estimates show federal government spending for Medicare and Medicaid rising from 5.5% of GDP in 2010 to more than 9% of GDP by 2030. The dramatic escalation in projected Medicare and Medicaid outlays is being driven by two factors—demographics and rising per patient expenses.

29 Again, we have used CBO (2013) projections through 2023 and have attempted to adapt CBO (2012) assumptions to recent legislation in order to extend these projections through 2037.
Finally, let’s factor in interest costs. In 2012, debt service was quite low (less than 1.4% of GDP) because interest rates were so low. Roughly one-quarter of the Treasury debt outstanding is in the bill sector (meaning an original maturity of 1 year or less) and borrowing costs at the short end of the yield curve have been close to zero for the past several years. Even longer-term notes and bonds issued by the Treasury in recent years have had a very low coupon. But, if the U.S. continues to pile on more debt and if we assume, as CBO (2013) does, a normalization of interest rates over the course of coming years (to roughly 4.0% for 3-month T-bills and 5.2% for 10-year notes), then debt service costs will eventually skyrocket.

The bottom line is that a CBO-type baseline forecast shows large structural primary budget deficits and an escalation in debt service leading to higher debt levels in the future even if the economy achieves full employment.

Given an initial debt level, an assumed path for revenue and non-interest expenditures, and an assumed path for interest rates, one can then calculate a path for the debt/GDP ratio. The CBO’s baseline estimates (and similar projections produced by the White House Office of Management and Budget) assume that long-term interest rates rise gradually to reach a level of 5.2% in 2018 and then remain constant at that level despite a continued escalation in the amount of public debt outstanding. The theoretical analysis and historical experience reviewed in Sections 2 and 3 suggest that this assumption could lead to a significant understatement of the potential deterioration in the budget picture because yields are assumed to hold steady at normalized levels as debt continues to accumulate.

If we instead allow yields to adjust as implied by the model specified in Section 3.1, then debt service—and public debt outstanding—would rise even more than in the CBO projections. The dashed black line in Figure 3.11 plots the 10-year yield assumed in our adjusted CBO simulations, whereas the solid gray line (labeled Simulation I) gives a predicted yield from a dynamic simulation in which changes in debt feed back into changes in the interest rate. To calculate the latter, we used equation (18) to predict how much higher the interest rate would be if the gross debt/GDP were at the level implied by the simulation relative to what the interest rate would be predicted to be if debt remained at 103%, the level in 2011. We then added this predicted premium to the CBO’s assumed interest rate for the year, made a calculation of how that higher interest rate would change the debt load the following year, and continued in a dynamic simulation.

According to our model, one key determinant of the effect of debt on the interest rate is the current-account balance. The U.S. has run an average current-account deficit of 3.7% over the last 5 years and 4.3% on average since 2000. However, favorable trends in U.S. energy production and consumption helped narrow the deficit to 2.8% of GDP in 2012. Our baseline simulations shown in Figure 3.11 assume that the U.S. will maintain an average current-account deficit of only 2.5% of GDP over the next several decades.

Our dynamic simulation then used this sequence of predicted yields and the maturity structure of gross federal debt to calculate the interest-inclusive deficit for each year and the level of debt for the following year that it would imply. As seen in Figure 3.12, debt levels are much higher in our simulation than in the adjusted CBO baseline by the end of the 25-year forecast horizon (176% vs. 159%).

As mentioned, we have assumed the U.S. current account deficit holds at 2.5% of GDP—a level that matches the best result seen in the past decade and is slightly narrower than the 2.8% of GDP recorded in 2012. If, instead, we assume that the current account deficit reverted to the 3.7% of GDP average seen over the prior five years, then the projected debt burden would reach 180% of GDP in 2037.
We can also examine a scenario in which policy actions and economic outcomes produce a less favorable path for the primary budget deficit (using our baseline current account deficit assumption of 2.5% of GDP). For example, suppose that the budget sequester that went into effect on March 1 was cancelled and that the steady-state unemployment rate turns out to be 6% (as opposed to the 5.25% in our adjusted CBO simulations). In this case (which we refer to as Simulation II), the budget deficit would be quite a bit higher than in the initial scenario. The debt/GDP ratio would rise much more rapidly, hitting 304% of GDP by 2037 (Figure 3.13) and bond yields would skyrocket, eventually getting above 25% (see Figure 3.14).
Finally, note that the above simulations were all based on a first-difference approach—we used equation (18) only to predict the change in the interest rate premium, rather than its prediction for the overall level. One reason for this conservative approach is that our levels model would already be predicting an interest rate for the United States for 2012 that is higher than what we actually observed; the large-scale purchases by the Federal Reserve may be one factor that has helped keep interest rates down up to this
point. For completeness, we display in Figure 3.15 the debt levels that would prevail if long-term yields were to rise immediately to the level predicted by our model as opposed to the adjusted CBO baseline assumptions and the gradual adjustment specified in our initial simulation.

We should emphasize that we are not presenting these alternative simulations as more realistic forecasts. In a country like the United States, the debt premium presumably would arise from inflation fears rather than concerns about outright default. And if we are talking about a higher inflation rate, forecasts of nominal GDP should be adjusted as well. Instead, we view these simulations as illustrating the extent to which the path implied by baseline CBO projections could quickly become much more difficult to manage than some policy-makers may be assuming—something dramatic will need to change well before U.S. interest rates reach double–digit rates. Our main conclusion is that higher debt levels can have a significant impact on the interest rate path and that feedback effects of higher rates on the level of indebtedness can lead to a more dramatic deterioration in long-run debt sustainability in the United States than is captured in official baseline estimates.

**Figure 3.15: Gross Debt as Percent of GDP with Immediate Adjustment of Interest Rates**

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Simulation with Immediate Adjustment  --- Simulation I  --- CBO Projections

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4 Implications for Monetary Policy.

We turn now to the interaction between fiscal policy and monetary policy during periods of sovereign debt stress. Our ultimate objective here is to consider the practical implications of how rate increases induced by fiscal stress could affect the conduct of monetary policy, with an emphasis on the situation in the U.S. over the balance of this decade. The literature on fiscal and monetary interactions is vast. We focus on two strands in introducing this topic. If fiscal policy is shifting in a desirable direction, from an unsustainable path to a sustainable one, monetary policy can play an important role in ensuring a successful outcome. Here we review the debate over “tough love,” or how accommodative monetary policy should be in the face of fiscal contraction in the next subsection. In doing so, we consider the potential implications for Fed policy of a “Grand Bargain” that would put the U.S. debt ratio on a sustainable downward trajectory, should such an agreement materialize.

However, given a still polarized political system in the U.S., a less favorable outcome seems more likely. So we turn next to the opposite case: implications for monetary policy of an unsustainable fiscal policy. In subsection 4.2 we briefly review the literature on fiscal dominance, where the central bank ultimately is forced to finance the fiscal deficit via inflation. While fiscal dominance is not an immediate risk, there are important elements in the current makeup of U.S. fiscal and monetary policy that suggest increasing attention will be paid to this risk in the years ahead.

The primary focus of our analysis in this section is then presented in subsection 4.3. Here we consider how a sovereign risk shock stemming from growing concern about the unsustainable U.S. debt trajectory under current policy could affect the Fed’s exit from its ongoing extraordinary policy easing in the years ahead. In doing so, we focus on the growing importance of the Fed’s own contributions to the fiscal picture, a heretofore minor item labeled “remittances to the Treasury”—one that has the potential to impinge on the flexibility of Fed policy given the growing size of its balance sheet and the undesirable trajectory of U.S. fiscal policy.

4.1 Fiscal consolidations and monetary policy.

Because fiscal consolidations are likely to be contractionary, the standard prescription for monetary policy, whose objectives are to minimize output and inflation gaps, is to ease when fiscal tightening is underway. A more contentious issue is whether tighter monetary policy, which Hellebrandt, Posen, and Tolle (2012) characterize as a “tough love” policy, makes it more likely that there will be a successful fiscal consolidation.

One view supporting a “tough love” policy that is prominent in European policy circles and among critics of the Federal Reserve’s quantitative easing is that expansionary monetary policy reduces the incentives for fiscal consolidation. Another argument for tighter monetary policy is that concerns about fiscal imbalances might un hinge inflation expectations, which could lead to a rise in interest rates that makes fiscal consolidation more difficult, and so tighter monetary policy is needed to anchor inflation expectations and keep interest rates low.

An alternative view is that easier monetary policy facilitates successful fiscal consolidations because it encourages higher nominal GDP growth, thereby raising the denominator of the debt-to-GDP ratio, and lowering this ratio. Furthermore, in contrast to the “tough love” view, anticipation of easier monetary policy which results in higher nominal GDP growth and lower interest rates may encourage fiscal authorities to implement a successful fiscal consolidation because it will have a higher likelihood of success.
Jeanne (2012) provides a simple model that suggests “tough love,” which he describes as “hard monetary dominance,” may reduce the probability of successful fiscal consolidations because it makes default more likely and fiscal adjustment harder to achieve. Using data from 1978-2009, Hellebrandt, Posen, and Tolle (2012) find strong evidence that successful fiscal consolidations tend to be preceded by greater monetary easing (measured by lowering of policy rates). And Chapter 3 of the IMF World Economic Outlook (IMF, 2012) comes to a similar conclusion by examining one hundred years of public debt overhangs in advanced countries with a case study methodology.

The most striking example that casts doubt on the “tough love” policy is that of the United Kingdom in the interwar period. In the aftermath of World War I, the United Kingdom’s debt-to-GDP ratio climbed to close to 140% of GDP, and the price level had doubled from prewar levels. The U.K. government then implemented a massive fiscal austerity, with primary surpluses in the 1920s of around 7% of GDP, while at the same time pursuing very tight monetary policy with policy rates raised to 7% to get back to prewar parity, despite ongoing deflation. The remarkable outcome of this monetary/fiscal policy mix was that instead of the debt-to-GDP ratio falling with the primary surpluses, it continued to rise, reaching 170% by 1930 and then rising further to 190% with the onset of the Great Depression.

Both theory and evidence suggest that a policy of “tough love” is counterproductive. This has important implications for the current situation in the Eurozone, which is pursuing short-run fiscal austerity and at the same time has a significantly tighter monetary policy than the United States or the United Kingdom. The key lesson as stated in IMF (2012) is that easier monetary policy is a necessary condition for successful fiscal consolidations.

The IMF (2012) case studies also indicate that successful fiscal consolidations do require a shift to primary surpluses; therefore, some fiscal austerity is needed. However, the fiscal austerity needs to be permanent and structural. Successful debt reductions take a long time, with improvements greater than 10 percentage points over a ten-year period exceedingly rare. Fiscal consolidations involving temporary measures, as in Italy before 1992, do not seem to work. In addition, poorly designed fiscal consolidations, for example where spending is cut across the board (as in Canada in the 1980s), are typically short-lived because they do not engender sufficient political support and thus do not result in sustainable fiscal consolidation. At this juncture in the U.S., we expect that the surprise emergence of a grand bargain of entitlement and tax reforms that puts the debt ratio on a sustainable downward trajectory would be accompanied by Fed policy that would aim to slow the exit from extraordinary accommodation enough to offset much, if not all, of the associated fiscal drag. However, as we noted in Section 3, while some limited progress has been made toward stabilizing the debt ratio in the near term, U.S. fiscal policy remains on a clearly unsustainable trajectory for the longer term. The political polarization that has consistently stymied efforts to change this picture has hardly abated in the wake of the most recent election. Therefore, it seems safe to assume that sovereign risk remains alive and well in the U.S., and that it could very well intensify in the period ahead. One could easily imagine that the spending cuts called for under the Budget Control Act of 2011 (sequestration, etc.) will not be allowed to go through and that the prospective path of U.S. debt will exceed current expectations. This brings us to a more ominous branch of the literature.
4.2 Fiscal Dominance and Monetary Policy.

In the extreme, unsustainable fiscal policy means that the government’s intertemporal budget constraint will have to be satisfied by issuing monetary liabilities, which is known as fiscal dominance, or, alternatively, by a default on the government debt. Fiscal dominance forces the central bank to pursue inflationary monetary policy even if it has a strong commitment to control inflation, say with an inflation target. As Sargent and Wallace (1981) pointed out in their famous paper on “unpleasant monetarist arithmetic,” fiscal dominance at some point in the future forces the central bank to monetize the debt, so that despite tight monetary policy in the present, inflation will increase. Indeed, as Sargent and Wallace pointed out, tight monetary policy may result in inflation being even higher than it would be otherwise.

Ultimately, the central bank does not have the power to avoid the consequences of an unsustainable fiscal policy. As Reis (2013) noted, all that the central bank really brings to the unified fiscal-monetary government balance sheet is the ability to collect seigniorage or generate an unanticipated increase in inflation. If the central bank is paying for its open-market purchases of long-term government debt with newly created reserves, and if banks are induced to hold these reserves by payment from the central bank of a market interest rate, then ultimately all the open-market purchase does is exchange long-term government debt (in the form of the initial Treasury debt) for overnight government debt (in the form of interest-bearing reserves). It is well understood from the literature on sovereign debt crises30 that any swap of long-term for short-term debt in fact makes the government more vulnerable to what we have described in this paper as a fiscal crunch, namely, more vulnerable to a self-fulfilling flight from government debt, or in the case of the U.S., to a self-fulfilling flight from the dollar.

To see how this would play out in practice, we need to recognize that fiscal dominance puts a central bank between a rock and a hard place. If the central bank does not monetize the debt, then interest rates on the government debt will rise sharply, causing the economy to contract. Indeed, without monetization, fiscal dominance may result in the government defaulting on its debt, which would lead to a severe financial disruption, producing an even more severe economic contraction. Hence, the central bank will in effect have little choice and will be forced to purchase the government debt and monetize it, eventually leading to a surge in inflation.

We could already be seeing the beginning of this scenario in Europe. The threat of defaults on sovereign debt in countries such as Ireland, Portugal, Spain and Italy has led the ECB to purchase individual countries’ sovereign debt, with the latest manifestation being the announcement in September 2012 that it will engage in what it has called Outright Monetary Transactions (OMT). These OMT transactions involve purchases of sovereign debt in the secondary markets of these countries, subject to their governments accepting a program of conditionality from the European Financial Stability Facility/European Stability Mechanism and the IMF. The ECB describes these transactions as monetary in nature because they “aim at safeguarding an appropriate monetary policy transmission,” with the reasoning that they are “monetary” because low ECB policy rates are not translating into low interest rates in these countries. Nonetheless, these transactions are in effect monetization of individual countries’ government debt (even if they are sterilized for the Eurosystem as a whole). The ECB’s purchase of individual country’s sovereign debt arises from the difficult position it faces. If the ECB does not do what ECB President Mario Draghi has described as “doing whatever it takes” to lower interest rates in these

30 See for example Jeanne (2009), Chatterjee and Eyigungor (2012), and Arellano and Ramarayanan (2012).
countries, the alternative is deep recessions in these countries or outright defaults on their debt, which would create another "Lehman moment" in which the resulting financial shock could send the Eurozone over the cliff.

It is true that the ECB’s bond purchasing programs will not result in inflation if the sovereigns whose debt is being purchased get their fiscal house in order and fiscal dominance is avoided. However, this is an important if. Significant progress is being made on the fiscal front in some of these countries, but as noted in Section 3, much remains to be done in other cases. Indeed, there is still a danger that Europe may find itself with what we will refer to as the “Argentina problem.” Argentina has had a long history of fiscal imbalances that have led to high inflation, and this continues to this day. The problem in Argentina is that its provinces overspend and are always bailed out by the central government. The result is a permanent fiscal imbalance for the central government, which then results in monetization of the debt by the central bank and high inflation. While the Euro area’s overall fiscal path looks a good deal more benign than that of the US (with a smaller debt ratio that is on a downward trajectory going forward), significant risks remain. With bailouts of some sovereigns in the Eurozone, the incentive to keep fiscal policy sustainable in individual countries may have been weakened, leading to a significant moral hazard problem. Budget rules have been put in place to eliminate this moral hazard, but as the violation of the Stability and Growth Pact rules by Germany and France a number of years ago illustrates, budget rules can be very hard to enforce, even though we have seen success in some countries on this score, with Chile being a notable example.

Thus we see at least a risk that the Eurozone is on a path to become more like Argentina (which of course is why German central bankers are most concerned), with fiscal dominance a real possibility and high inflation the result. This possibility is a real one despite what the Maastricht Treaty specifies about the role of the ECB and what policymakers in the ECB want.

Although the US federal fiscal picture is bleaker than Europe’s, the United States is not in as dire a situation on the state and local government front. This is because the no-bailout policy for state and local governments that has evolved over many years avoids significant elements of the "Argentina problem.” Nevertheless, the possibility of fiscal dominance is real given the federal budget and debt situation. As we have noted, with sufficient political will, the U.S. government would be fully capable of avoiding fiscal dominance and achieving long-run fiscal sustainability by reining in spending on entitlements (Medicare/Medicaid and Social Security) while increasing tax revenue (but not necessarily tax rates). Indeed, a number of plans, including most famously by the majority recommendations of the Simpson-Bowles Commission, have already been laid out to show the way. Unfortunately, the political will is clearly not there yet, and the apparent gulf between the two political parties shows no signs of narrowing. If U.S. government finances are not put on a sustainable path, we could see the scenario outlined above, where markets lose confidence in U.S. government debt, so that bond prices fall and interest rates shoot up, and then the public might expect the Federal Reserve to be forced to monetize this debt. What would then unhinge inflation expectations would be the fear of fiscal dominance, which could then drive up inflation quickly. The bottom line is that no matter how strong the commitment of a central bank to an inflation target, fiscal dominance can override it. Without long-run fiscal sustainability, no central bank will be able to keep inflation low and stable.

Against this backdrop, there has been a great deal of attention paid to the Federal Reserve’s quantitative easing policies as a potential threat to price stability in the United States. The concern is that the expansion of the Federal Reserve’s balance sheet as a result of quantitative easing will unhinge inflation
expectations and thus create inflation in the near future. However, as we will see in what follows, the Fed’s greatly expanded balance sheet also introduces into the picture another channel through which sovereign risk can impinge on monetary policy and exacerbate inflation expectations—the heretofore little-noted Fed remittances to Treasury.

4.3. POSSIBLE IMPLICATIONS FOR THE FEDERAL RESERVE’S EXIT STRATEGY.

An important issue raised by the possible emergence of concerns about U.S. fiscal sustainability is how it could affect the Fed’s exit from the extraordinary policy easing it has undertaken since the onset of the financial crisis. Although Rudebusch (2011) concluded that the Fed’s net interest income provided a substantial cushion against possible capital losses on its portfolio, much has changed since he performed those calculations. Many observers have expressed concern about the magnitude of balance sheet expansion that the Fed and other central banks have engaged in, noting the potential costs in terms of market interference, disruption to the markets upon exit, potential losses effectively resulting in a drain on the Treasury, and rising inflation expectations eventually leading to rising inflation. Evidently, there is some concern within the Fed itself on these issues as well. The minutes to the December 2012 FOMC meeting indicated that such costs, including the potential effects of further balance sheet expansion on the Fed’s remittances to Treasury when it comes time to exit, would have to be factored into upcoming decisions on how much further to push balance sheet expansion. A recent Fed staff paper by Carpenter, Ihrig, Klee, Quinn, and Boote (2013) has reported the implications of various Fed policy scenarios for the Fed’s remittances to Treasury and found that under some conditions, the Fed could suffer substantial net income losses as it exits its current extraordinarily accommodative policy stance in the years to come. Given such concerns in what remains a remarkably calm fiscal environment (given near record-low Treasury yields), how much worse could the picture become if sovereign debt concerns heat up? And to what degree could U.S. monetary policy be constrained as a result?

To address this issue with respect to Fed policy, we begin by considering prospects for the Fed’s balance sheet, income statement, and remittances to the Treasury under some plausible baseline expectations for Fed exit. We then consider alternative scenarios and, in particular, how the picture would be affected by a significant rise in inflation expectations stemming from market concerns about fiscal sustainability and fiscal dominance of monetary policy. To produce these baseline and alternative projections, we have constructed a model of the Fed’s balance sheet and income statement using detailed data made available to the public on the current composition of its balance sheet (down to the level of individual securities held) as well as the guidance the Fed has provided on both further expansion in the near term and on the exit process when the time comes. The model allows us to project the size and composition of both the asset and liability side of the Fed’s balance sheet, as well as income, expenses and capital gains or losses booked on asset sales. It produces results very similar to those reported by Carpenter et al. (2013) when we use comparable assumptions.
4.3.1. Baseline Simulations.

Our baseline projections of these variables are based on assumptions that are essentially the same as assumptions employed in the Carpenter et al. (2013) paper, with the exceptions of currency growth and bank capital. These assumptions are summarized in Table 4.1, discussed in more detail below, and illustrated in a sequence of figures as indicated in the right hand column of Table 4.1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Assumed growth path</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Asset purchases</td>
<td>Continue at current pace through December 2013, slow to maintenance levels (stock stable) through 2014, stop (stock declines) in 2015</td>
<td>4.1</td>
</tr>
<tr>
<td>2. Asset sales</td>
<td>MBS sales start late 2015, completed in 2019</td>
<td>4.1</td>
</tr>
<tr>
<td>3. MBS prepayment</td>
<td>Follows market models</td>
<td></td>
</tr>
<tr>
<td>4. Liabilities</td>
<td>Currency grows at 7% AR (2pp above Blue Chip forecast for nominal GDP growth per historical experience); required reserves grow at 4% AR</td>
<td>4.3</td>
</tr>
<tr>
<td>5. Interest rates</td>
<td>Driven by Blue Chip consensus forecast</td>
<td>4.4</td>
</tr>
<tr>
<td>6. Fed capital</td>
<td>Grows at 10% AR per historical average</td>
<td>4.5</td>
</tr>
<tr>
<td>7. Operating expenses</td>
<td>Grow on historical trend</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Assets: As shown in Figure 4.1, we assume that the Fed’s purchases of Treasury securities continue at a rate of $45B per month and MBS purchases at a rate of $40B per month through December 2013 (in the maturity buckets specified as of the December 2012 FOMC announcement) and are stopped thereafter. The Fed’s principal reinvestment program is assumed to continue through 2014, after which assets are allowed to run off as they mature. Following Carpenter et al., we assume that the Fed’s active selling of assets is limited to MBS and that these sales commence on a small scale in 2015, proceed more aggressively in 2016, and continue until 2019, by which time the Fed’s portfolio is returned to its “normal” size (i.e., excess reserves have been run down to close to zero). The different shaded areas in Figure 4.1 illustrate the shifting maturity composition of the Fed’s Treasury holdings over time. Because MBS rates are projected to be higher when these assets are sold than they were when they were purchased, capital losses are recorded on these sales as discussed further below.
Under these assumptions, the duration (average term to maturity) of the Fed’s portfolio peaks at nearly 11 years in 2013 with the end of new quantitative easing (Figure 4.2). The duration is important because as it rises, it increases the potential losses on the Fed’s portfolio as the Fed strives to return its portfolio to a more normal level upon exit in a rising rate environment. It is worth noting that in comparison to the Fed, the Bank of Japan and the ECB, both of which have expanded their balance sheets to several times their pre-crisis levels, have kept the duration of their portfolios much lower—on the order of three years.31 Beyond 2013, the Fed’s portfolio returns gradually toward a more normal composition under our baseline assumptions and the average duration recedes as securities held by the Fed mature over time, as the reinvestment program stops, as MBS sales proceed, and as the Fed begins to purchase shorter-term Treasury securities in 2019 once excess reserves have been run off. These assumptions return the average duration of the Fed’s portfolio most of the way to its pre-crisis level by 2020. In the absence of outright asset sales, the reduction in average maturity declines a bit less—the effect here is small because the average maturity of the securities being sold is not much above the maturity of the overall portfolio at the time.

31 The BOJ’s portfolio is dominated by relatively short-term JGB’s, and the ECB’s by three-year LTROs. The ECB’s holdings of sovereign debt account for less than 10% of its total assets.
**MBS prepayment:** The rate at which the Fed’s holdings of MBS run off is determined in part by assumptions about the rate of prepayment of mortgages, which varies with the level of interest rates. Our MBS prepayment assumptions were calibrated to match current market expectations about the sensitivity of prepayment rates to interest rates; in particular, prepayment rates are assumed to decline gradually to levels consistent with standard prepayment model assumptions over the next five years.

**Liabilities:** We assume that currency, the primary liability on the Fed’s balance sheet in normal times, grows at a 7% annual rate—two percentage points faster than the Blue Chip/consensus forecast for nominal GDP growth over the next several years (Figure 4.3). This is in line with average experience over the past several decades; it is also a more favorable assumption than used by Carpenter et al., which assumed currency growth at 5% per year. The 7% assumption is more favorable in terms of its implications for the Fed’s working capital position because the conversion of reserves into currency helps reduce the Fed’s future costs associated with interest-bearing reserves. We also assume that bank deposits and required reserves grow roughly in line with their pre-crisis historical average of about 4%. The results of our analysis are not sensitive to this assumption, given the relatively small size of required reserves in the Fed’s balance sheet. Excess reserves run down over time in line with the asset side of the balance sheet. We will also consider as an alternative scenario the possibility that the Fed avoids asset sales and just allows its holdings to run down as a result of mortgage repayment and prepayment, as well as the maturing of Treasury debt. This would delay the Fed’s exit by two years, as indicated by the red and white shaded area in the chart.\(^3\) Once excess reserves reach zero, asset purchases are driven by rising currency and required reserves.

\(^3\) The corresponding change on the asset side, not shown in Figure 4.1, would entail a larger red area as MBS sales are dropped, and a smaller increase in the black area as purchases of Treasury bills to accommodate growth in currency during 2019–208 are dropped.
**Figure 4.3: Baseline Liabilities**

- Currency
- Required Reserves
- Excess Reserves
- Excess Reserves w/ No Asset Sales

Sources: FRB, Haver Analytics, authors’ calculations

**Figure 4.4: Interest Rate Assumptions**

Sources: Blue Chip and authors’ calculations
**Interest rate paths:** To compute (1) interest income earned on the Fed’s portfolio of assets, (2) interest paid to banks on reserve balances held at the Fed, and (3) capital gains or losses on securities that are sold, projected paths of policy rates and the Treasury yield curve are needed (Figure 4.4). Our baseline simulations assume that the 10-year Treasury yield evolves according to the most recent consensus forecast from the Blue Chip economic indicators and that spreads to the 10-year rate within the Treasury yield curve begin to normalize in 2014. In line with FOMC central-tendency and Blue Chip expectations, we assume that the fed funds rate and the rate paid on excess reserves begin to rise in 2015 and reach a “more normal” value of close to 4% beginning in 2018. From 2018 onward, these rates are near their longer-term values. In projecting the yield curve, as well as MBS yields, we assumed that the 1-year yield is tied to the fed funds rate and longer-term (including MBS) yields are tied to the 10-year Treasury yield via historical average spreads. Our driving assumptions about the fed funds and 10-year rates are roughly in line with those made in Carpenter et al.

**Baseline net income statement:** Based on these asset, liability, and interest rate assumptions, we can project much of the Fed’s net income account, as outlined in Figure 4.5, and ultimately cumulative income gains or losses. The key components of the income statement are interest income on the Fed’s portfolio net of premiums, interest payments on reserves and other liabilities, operating expenses, contributions to capital plus dividends paid on capital, and gains or losses on asset sales.

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**Figure 4.5: Baseline Income Receipts and Expenses**

![Baseline Income Receipts and Expenses](chart)

Sources: FRB, authors’ calculations
Dealing with net premiums: Because the Fed reports securities in its portfolio at par value, an adjustment must be made to projected interest income earned when the securities were originally purchased at a premium (or discount) relative to par. The premiums are amortized over the life of the security in the Fed’s income statement. In the absence of comprehensive information about the magnitude of these premiums, we use an estimate reported by Carpenter et al. for net premiums at the end of 2012 and additional premiums associated with further securities purchases during 2013. Under these assumptions, the cumulative net premiums on the Fed’s holdings of Treasuries and MBS have recently been on the order of $200 B, implying a downward adjustment to the Fed’s earnings stream approaching $20 B per year relative to a par-value calculation of interest income. This amortization has been netted out of the income receipts shown in Figure 4.5. When assets are sold, remaining premiums are also subtracted from the computed proceeds of asset sales.

Other net expenses: We assume that “other expenses,” including administration costs and so on, grow on trend (as shown in Figure 4.5).

Capital and dividends: The Fed’s contributions to capital surplus and dividends paid to member banks on their capital paid into the Fed are assumed to grow at 10% per year, roughly equal to the average annual growth of U.S. bank capital over the past decade. Carpenter et al. assume a higher 15% growth in capital, a less favorable assumption, but the results are not terribly sensitive to this assumption. The Fed’s contributions to capital surplus are continually set equal to capital paid in by member banks. Private banks that are members of the Federal Reserve System are required to keep their capital held at the Fed equal to 6% of their own capital, and the Fed pays them a dividend of 6% on that capital each year. These capital contributions and dividends are taken out of net income before the balance is remitted to the Treasury.

Baseline net interest income, net capital losses, and remittances to the Treasury: Net interest income (the difference between the red and pink areas in Figure 4.5) remains substantially positive in our baseline scenario, dipping to around pre-crisis levels in 2017 and rising thereafter (see also Figure 4.6 below). Under our baseline assumptions, capital losses on MBS sales (the gray area in Figure 4.5 and red line in Figure 4.7) build to a peak rate of about $35 B in 2018. These losses are large enough to reduce net income available for remittance to Treasury to below zero in 2017-18 (Figure 4.8), after which that income gradually recovers toward more normal levels. (Recall that net income available for remittance to the Treasury is essentially equal to interest income minus the sum of interest payments on reserves, operating expenses, net capital losses, dividend payments on capital, and contributions to capital surplus.)

What would a negative remittance from the Treasury to the Fed look like? That is, if the Fed’s net income fell below zero, how would it fund its interest payments on reserves and its operating expenses? Would it have to draw down its capital or take out a loan from the Treasury, asking the Treasury to issue new debt to do so? The answer is no. Under the Fed’s new accounting practices adopted in January 2011, when net income available for remittance to Treasury falls below zero, this does not eat into the Fed’s contributions to capital or threaten the Fed’s operating expenses. Rather, the Fed would create new reserves against an item called the Fed’s “deferred asset” account on the asset side of its balance sheet. For example, to pay interest on reserves, it would simply credit the payee bank’s account at the Fed with the interest being paid, thus creating new reserves. The deferred asset account being run up in the process would serve as a claim on future earnings or remittances to the Treasury. The idea is that when the Fed subsequently

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From a cash flow perspective, much the same could be done to deal with payment of dividends on member bank contributions to Fed capital and losses on asset sales. Fed contributions to surplus capital could simply be credited to the deferred asset account. And there would be more than enough interest income coming in to meet the Fed’s operating expenses.
returns to earning a profit, rather than return that profit to the Treasury, it would use the funds to run
down the deferred asset, and the extra reserves having been created in the process would be run down as
well. In our baseline simulation, the deferred asset account would rise to a bit over $20 B by 2018, and it
would run back down to zero by 2020.

**FIGURE 4.6: REALIZED NET INTEREST INCOME RECEIPTS**

- Baseline
- QE through 2014 at current pace
- Baseline plus 1% pt higher interest rates beg in 2016
- No asset sales

*Sources: FRB, authors’ calculations*

**FIGURE 4.7: NET VALUATION GAINS OR LOSSES REALIZED ON ASSET SALES**

- Baseline
- QE through 2014 at current pace
- Baseline plus 1% pt higher interest rates beg in 2016
- No asset sales

*Source: Authors’ calculations*
In the present environment, when the demand for excess reserves is infinitely elastic, the creation of new reserves would not be a problem. But in the baseline exit scenario we are discussing, short-term assets have a positive yield and the demand for reserves would not be infinitely elastic. To persuade banks to hold a higher volume of excess reserves in such an environment, the Fed would need to increase the interest rate paid on excess reserves, otherwise the new reserve creation could, on the margin, become inflationary. It should be noted that this reserve creation is a second-order effect of the selling of assets by the Fed with the aim of running down excess reserves (and raising longer-term rates) in our baseline scenario. The capital losses incurred in this case would push up the deferred asset account enough to offset only a relatively small part of the intended reduction in reserves. However, even if the Fed were able to create additional reserves with no effects on the interest rate on those reserves, a cessation of positive interest payments from the Fed to the Treasury for a significant period could bring Fed policy decisions under greater public scrutiny, potentially leading to controversy that could even threaten central bank independence.

We also report an alternative gauge of remittances. Because the periods of reduced Fed income ahead will follow a period of “excess” Fed income, it is of interest to consider how the excess and losses will average out over time. Figure 4.10 shows the Fed’s cumulative net remittances to Treasury relative to the pre-financial crisis trend in those remittances. A value of zero in this chart indicates that cumulative remittances have been in line with the pre-crisis trend. Under our baseline scenario, cumulative net remittances to Treasury remain higher than they would have been if they had followed the pre-crisis trend through 2020.
Figure 4.9: Deferred Asset Account

- Baseline
- QE through 2014 at current pace
- Baseline plus 1% pt higher interest rates beg in 2016
- No asset sales

Source: Authors' calculations

Figure 4.10: Cumulative Net Income Relative to Pre-Crisis Trend

- Baseline
- QE through 2014 at current pace
- Baseline plus 1% pt higher interest rates beg in 2016
- No asset sales

Source: Authors' calculations
4.3.2. Alternative Scenarios.

We consider a number of alternative scenarios, several of which are shown in Figures 4.6-4.10, and all of which are summarized in Table 4.2 in terms of the peak deferred asset level reached and the cumulative net income gain or loss (relative to pre-crisis trend) as of 2020. The first three alternatives shown in Table 4.2 reflect different assumptions on currency growth, asset purchases and sales. Reducing currency growth by two percentage points through 2020 (line 2) yields essentially the same deferred asset result as reported by Carpenter et al. as noted above. Cutting out asset sales and letting excess reserves run for another couple years (line 3) has a powerful positive effect on net income by eliminating capital losses (see also Figure 4.7). But to account for the increase in excess reserves that this scenario implies, we assume that supply would equal demand for reserves if the Fed raised the fed funds target by 100 basis points during 2016-18, and this has a significant negative effect on net interest income (Chart 4.6).

Meanwhile, the deferred asset account is close to zero in the no asset sale scenario. Extending the current pace of asset purchases for another year through 2014 (line 4) is costly in terms of losses—it nearly triples the peak deferred asset relative to baseline. But the extended purchases do not affect cumulative gains/losses relative to trend by much because the higher purchases raise excess income relative to baseline initially (see Figure 4.8).

<table>
<thead>
<tr>
<th>Table 4.2 Impact of Alternative Scenario on Fed’s Deferred Asset and Cumulative Income Gains/Losses Relative to Pre-Crisis Trend.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak deferred asset ($ Bn)</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Baseline</td>
</tr>
<tr>
<td>Baseline with 2% pts slower currency growth</td>
</tr>
<tr>
<td>No asset sales</td>
</tr>
<tr>
<td>QE through 2014 at current pace</td>
</tr>
<tr>
<td>Baseline plus 1% pt higher interest rates begin 2016</td>
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<tr>
<td>Baseline plus 2% pt higher interest rates begin 2016</td>
</tr>
<tr>
<td>Baseline plus 2% pt higher interest rates begin 2016 but no asset sales</td>
</tr>
<tr>
<td>QE through 2014 at current pace and 2% pt higher interest rates begin 2016</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations

The next four scenarios (lines 5-8) look at fiscal shocks, drawing in part on our analysis in Section 3. In particular, we consider how a Fed exit would be affected by a sudden and sharp shift in market sentiment about U.S. Treasury debt. Our baseline U.S. fiscal simulation from Subsection 3.3.5 (the gray line in Figure 3.11) suggested that a rising debt load could produce a 100-basis-point premium relative to current values in the 10-year rate by 2021 and a 200-basis-point premium by 2027; effects of this magnitude could show up much sooner under some of our alternative scenarios. For a country such as the United States, we would interpret this premium as a compensation for the inflation risk that rises with higher debt levels, and would expect it to be manifest in an increase in both the long-term rate as well as the short-term rate necessary to equate supply and demand for excess reserves. We thus consider two alternative scenarios, one in which all yields are 100 basis points above our baseline balance-sheet.
simulation by 2016, and a second in which concerns about a fiscal crunch show up as a 200-basis-point increase relative to the baseline. In all of these scenarios, the risk premium shock is assumed to commence in 2016 and run through 2020 as markets look forward to ongoing failure of the U.S. political system to deal with its longer-term debt problems. Finally, we consider a “worst case” scenario that combines the extension of Fed asset purchases through 2014 with the 200-basis-point risk premium shock commencing in 2016.

As indicated in Table 4.2, three of these scenarios involving fiscal risk shocks (lines 5, 6, and 8) would have very large negative effects on the Fed’s net income. Even in the smaller 100-basis-point case, the deferred asset account would rise to a level (in excess of $100 B) that significantly exceeded the likely level of Fed capital at the time (Fed capital is currently running at about $54 B). The losses relative to pre-crisis earnings trends would also more than wipe out the cumulative excess income that the Fed has returned to the Treasury in recent years. In all of these cases, net interest income would be hit by rising policy rates, and capital losses spurred by the premiums on longer-term rates. In the scenario where the Fed does not sell assets, the losses are reduced significantly.

4.3.3. IMPLICATIONS FOR FED POLICY.

Our analysis and the analysis in Carpenter et al. (2013) have indicated that continued expansion of the Fed’s balance sheet significantly raises the chances that the Fed will, for an extended period, cease to make positive remittances to the Treasury, especially if the Fed elects to sell some of its assets to speed up the runoff of excess reserves. In the presence of an unsustainable debt trajectory, political concerns surrounding any reduction in Fed remittances to the Treasury would be heightened. And the effect of the fiscal imbalance on interest rates would exacerbate this problem. The magnitude of the Fed’s cumulative net income losses could be increased substantially—even approaching several times the size of Fed capital—if failure to deal with the unsustainable long-term fiscal position results in a sizable increase in the inflation risk premium. This unfavorable fiscal arithmetic might tend to push the Fed toward delaying its exit from the extraordinary easing measures it has taken in recent years; it could even affect decisions this year about how much further to expand the Fed’s holdings of longer-term government securities.

The Fed could cut its effective drain on the Treasury significantly by putting off asset sales and delaying policy rate increases. But such a response would presumably feed rising inflation expectations. In brief, the combination of a massively expanded central bank balance sheet and an unsustainable public debt trajectory is a mix that has the potential to substantially reduce the flexibility of monetary policy. This mix could induce a bias toward slower exit or easier policy, and be seen as the first step toward fiscal dominance. It could thereby be the cause of longer-term inflation expectations and raise the risk of inflation overall.
5 Conclusions.

In the aftermath of the global financial crisis, concerns about fiscal sustainability have come to the forefront in discussions of monetary policy. In this paper, we examined sovereign debt dynamics and concluded that countries with high debt relative to GDP cannot be complacent, even if they currently face low sovereign interest rates. Such countries are always vulnerable to an adverse feedback loop in which high debt leads to higher interest rates and hence higher debt loads, culminating in a tipping point—or fiscal crunch—in which the interest rate on sovereign debt shoots up.

Recent sovereign debt crises among advanced economies have provided a rich data base for empirical analysis of the sensitivity of sovereign yields to debt levels and other aspects of fiscal risk. Our empirical work used both econometric analysis and event studies and suggests that countries with debt above 80% of GDP and persistent current-account deficits are vulnerable to a rapid fiscal deterioration as a result of these tipping-point dynamics.

Many standard projections for the U.S. assume constant borrowing rates as debt loads rise. If there is instead some feedback, as historical experience suggests there could well be, the problems facing the U.S. in the next decade could easily escalate into an unmanageable situation.

The dangers of a fiscal crisis raise issues about the appropriate response of monetary policy. Overly tight monetary policy may make fiscal consolidations harder to achieve, while unsustainable fiscal policy could lead to a situation of fiscal dominance in which the central bank is no longer able to keep inflation under control. A fiscal risk shock occurring within the next five years would complicate matters greatly for a Fed that will be in the process of exiting from its massive balance sheet expansion. Unsustainable fiscal policy could result in a large increase in the inflation risk premium for U.S. government debt, leading to possible substantial losses on the Fed’s balance sheet. This could further feed back into rising longer-term inflation expectations, raising the risk of an unwelcome surge in inflation.

If long-run fiscal policy consolidation occurs, consistent with a gradual decline in the debt burden, accommodative monetary policy would help counter any potential weakness in the economy. If long-run fiscal policy were shifting in the right direction, consistent with a gradual decline in the debt burden, accommodative monetary policy would be the appropriate response to a weak economy. Unfortunately, such a shift in U.S. fiscal policy is still far from apparent, complicating significantly the choices for monetary policy makers.
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The issue of fiscal sustainability and its interaction with monetary policy is certainly timely. Many advanced economies are in an extended period of slow growth and high deficits, and face long-term fiscal pressures from aging populations.

I agree with much in this broad-ranging paper. In particular, the authors join others in finding that accommodative monetary policy is often associated with successful fiscal consolidations. They conclude that a “tough love” alternative, which would call for the Federal Reserve to withhold monetary accommodation until fiscal policymakers enact legislation to reduce budget imbalances, is likely to be counterproductive. Indeed, I would argue that the tough love approach also would require the Fed to deviate from the dual mandate that the Congress has assigned it, while assuming a role in influencing fiscal policy that the Congress has not assigned it.

I find myself in disagreement, however, with the paper’s assessment that the current fiscal policy challenges might interfere in the near-term with the conduct of monetary policy in the United States.

Three important propositions underlie the authors’ argument on this issue:

1. The federal government’s fiscal path is unsustainable under current policies.

2. If the market concludes that a government either cannot or will not service its debt, the central bank may be forced to choose ultimately between monetization leading to inflation or standing by as the government defaults—the threat of “fiscal dominance.”

3. The Federal Reserve’s balance sheet is currently very large by historical standards and still growing. The process of normalizing the size and composition of the balance sheet poses significant uncertainties and challenges for monetary policymakers.

I believe all of these statements to be true. They are also widely, if not universally, accepted. However, based on these points and, importantly, on their empirical findings, the authors set out to show that fiscal difficulties present a near-term threat to the conduct of monetary policy. The paper argues that rising fiscal pressures, exacerbated by Federal Reserve losses on asset sales and low remittances to the Treasury,

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1 The views expressed here are my own and not necessarily those of my colleagues in the Federal Reserve System. I am indebted to members of the Board staff—Eric Engen, Edward Nelson, David Lopez-Salido, and Jon Faust—who contributed to the preparation of these remarks.


CRUNCH TIME: FISCAL CRIOSES AND THE ROLE OF MONETARY POLICY
could lead the Federal Reserve to delay balance sheet normalization and to fail to remove monetary accommodation as needed to keep inflation expectations stable and inflation in check. In that case, the market could perceive the onset of fiscal dominance, thus setting off a vicious cycle of rising inflation expectations, increasing interest rates, and ever greater fiscal unsustainability.

In my view, this proposition seems highly unlikely. At a minimum, it is premature.

**U.S. Fiscal Position.**

The paper led me to look back over the past century of U.S. sovereign debt history. On two prior occasions, federal debt as a percentage of gross domestic product (GDP) increased significantly—during the Great Depression–World War II era and, to a smaller extent, the two decades ending in the mid-1990s.³

After each of these high-debt periods, fiscal policy responded by running sustained primary surpluses and reducing debt to levels below 40 percent of GDP. In a recent paper, Henning Bohn observed that “the foundation of U.S. debt policy is the promise of safety for bondholders backed by primary surpluses only in response to a high debt–GDP ratio.”⁴ That nicely captures our recent history and suggests a principal reason why the federal debt of the United States still has the market’s trust.

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³ Figure 1 shows federal debt held by the public and primary budget surpluses—that is, the difference between federal revenues and federal noninterest outlays—as a percent of nominal GDP from fiscal year 1912 through fiscal 2012.

The Great Recession has generated a third substantial increase in federal debt, from about 35 percent of GDP in 2007 to around 75 percent at the end of this fiscal year, an increase that is consistent with other increases in sovereign debt for advanced economies after severe financial crises during the post-World War II period.\(^5\) History and common sense suggest that the federal government should again run primary surpluses sufficient over time to reduce debt to pre-crisis levels of perhaps 35 to 40 percent of GDP. That would leave fiscal space to address the coming wave of health and pension costs, as well as unexpected new shocks.

In the past two years, spending cuts and tax increases totaling about $3.5 trillion over the next 10 years have been enacted. Assuming these measures are not rolled back—in particular, that the spending sequestration either takes effect or is replaced by equivalent deficit-reducing measures—a reasonable “current policy” projection is that the ratio of debt to GDP will be roughly stable at around 75 percent through about 2020.\(^6\) After that, under current policy, health-care costs and, to a much lesser extent, pension costs will produce a sharp, sustained increase in the ratio of debt to GDP.

**Fiscal Sustainability and Monetary Policy.**

The authors review empirical evidence of sovereign borrowing costs for 20 advanced economies. They join others in finding a statistically significant relationship between sovereign debt levels and borrowing costs.\(^7\) They also find nonlinear increases in borrowing costs beginning at debt–to–GDP ratios of around 80 percent. But the nonlinearities they find are driven to a great extent by the experience of smaller euro-zone nations that, of course, borrow in euros. The United States borrows in its own currency—the world’s primary reserve currency. That difference is crucial for investors, along with the fact that the United States economy remains the world’s largest and most productive. The United Kingdom and Japan are also high-debt countries that borrow in their own currencies; neither shows any detectable rate increase, let alone a nonlinear one. These countries present a serious problem for the authors’ case.

Of course, the United States is not exempt from concerns about the potential long-term effects of an unsustainable fiscal path. There is almost certainly a level of debt at which the United States would be at risk of an interest rate spike. However, we should expect that level to be substantially above one identified based on the experience of smaller euro-zone nations.

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\(^6\) See Loren Adler, Shai Akabas, and Brian Collins (2013), “Key Takeaways from the 2013–2023 CBO Budget and Economic Outlook,” Bipartisan Beat Blog, Bipartisan Policy Center, February 7. Numbers are modified to assume that the spending sequestration either takes effect or is replaced by equivalent deficit reducing measures.

The argument also has a serious timing problem. The Federal Reserve’s balance sheet likely will be normalized by late this decade, before the federal debt-to-GDP ratio even increases materially from today’s level. Under the reasonable projection mentioned above, the debt-to-GDP ratio will remain roughly stable until 2020 before rising significantly in the next decade. That’s not a favorable longer-term forecast, all the more so because it is importantly the result of demographic changes that have been expected for decades. But the forecast doesn’t support the authors’ claim that fears of fiscal dominance could materialize in the United States within the next five to seven years, during the period when the Fed is normalizing its balance sheet.

No current market signal suggests that the United States is near the point of losing the market’s confidence. In my view, nothing in the Congressional Budget Office debt forecasts or the authors’ empirical findings provides grounds for such an event during this decade. The market has every reason to believe—and apparently still does believe—that the United States will continue the difficult task of fiscal consolidation until the job is done.

Terribly difficult fiscal adjustments lie ahead. Although there is still time to make them, delay will sharply increase the pain of adjustment. The time to act is now. In my view, the problem is not principally one of economics or fiscal policy; it is one of governance. The real threat to the fiscal standing of the United States is that of inaction caused by a long period of political polarization and dysfunction. That would be a self-inflicted wound. And that is a problem that can’t be derived from the traditional fiscal metrics.

We may have more room than other economies around the globe, but I do not intend to project any sense of complacency around this topic. The authors’ basic message seems just right to me: We don’t know where the tipping point is; wherever it is, we are clearly getting closer to it, and the costs of misestimating its location are enormous and one-sided. The benefits to long-term fiscal consolidation—conducted at the right pace, and without jeopardizing the near-term economic recovery—would be substantial.

**Balance Sheet Losses and Remittances.**

The authors’ work on Federal Reserve income and remittances to the Treasury overlaps with a paper published last month by Federal Reserve Board staff members Seth Carpenter, Jane Ihrig, Beth Klee, Daniel Quinn, and Alexander Boote. Both papers provide a basis for public discussion of these matters, which is a highly positive development. Some of the assets acquired through the Federal Reserve’s large-scale asset purchases (LSAPs) may be sold at a loss, and it is important to be transparent about this possibility.

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8 This is the alternative baseline scenario presented in Adler, Akabas, and Collins, “Key Takeaways,” in note 6.

Thus far, the Federal Reserve’s asset purchases have greatly increased our income and remittances to the Treasury. Indeed, remittances have run at an annual level of about $80 billion from 2010 to 2012. Both papers show that remittances are likely to decline substantially from these elevated levels as interest rates rise and the Fed balance sheet normalizes, and there may be a period of zero remittances. If so, the balance sheet would show a deferred asset representing a flow of future income to be retained and not remitted to the Treasury. Nonetheless, we expect that the LSAPs, which began in late 2008, will result in a net increase in remittances over the life of these programs. Moreover, any temporary losses should be weighed against the expected social benefits of the increased economic growth generated by the LSAPs, which would include higher tax revenue from increased output.

Greenlaw and his coauthors also note that we have the flexibility to normalize the balance sheet more slowly. For example, a “no asset sale” plan—under which assets would simply run off as they mature—would push out the date of normalization by only a year or so. That approach would also address concerns over potential market disruption from the sale of off-the-run agency mortgage-backed securities. And it would also smooth remittances.

Remittances averaged about $25 billion per year, or 0.2 percent of GDP, over the decade before the crisis. After the balance sheet is normalized, these remittances should return to a similar, modest share of GDP. From the standpoint of the sustainability of federal fiscal policy, remittances are not a first-order concern. That said, an extended period of zero remittances could certainly bring the Federal Reserve under criticism from the public and the Congress. The question is whether the Federal Reserve would permit inflation and thereby abandon its post in the face of such criticism. There is no reason to expect that to happen.

The Federal Reserve was created as an independent agency, and a broad consensus has emerged among policymakers, academics, and other informed observers around the world that better overall economic performance is achieved when the conduct of monetary policy is free from political control. Of course, we are accountable to the Congress and the American people. The Congress has given us a job to do, and as long as I am a member of the Federal Reserve Board, I will do my utmost to carry out our mandate.

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Other Observations.

The authors note that Federal Reserve asset purchases shorten the duration of debt held by the public, by the issuance of reserves to fund purchases of long-term securities. And shortening the maturity of the public debt does make any government more susceptible, in theory, to fiscal dominance. There is also a general assumption that under fiscal dominance any government has a strong incentive to allow inflation to reduce the real value of the debt. In the case of the United States, there is less to that than one might expect. By shortening the duration of debt held by the public, asset purchases have also reduced any benefit to the government of an unexpected inflation. More fundamentally, the liabilities that matter in the long term for the federal budget are those associated with health care and pension costs. These liabilities are not nominal but real, and cannot be inflated away.

Conclusion.

I am not suggesting, and I do not expect, that the path ahead for monetary policy will be an easy one. There are legitimate concerns associated with the costs and benefits of continuing asset purchases. We may face challenges related to financial stability, as well as market function and inflation expectations. I do not personally see fiscal dominance as high on the list of near term risks.

I thank the authors for their interesting work.
The paper "Crunch Time: Fiscal Crises and the Role of Monetary Policy" by Greenlaw, Hamilton, Hooper, and Mishkin provides both a theoretical and empirical look at the fiscal challenges facing many advanced economies. The first part of the paper focuses on the sustainability of current trends, given the number of countries with high levels of fiscal debt to GDP and serious trade imbalances.

The paper makes some observations with which I concur:

1. That unsustainable fiscal policies need to be made sustainable.

2. That the "tipping point" for fiscal policies in many developed countries should be an area of concern and continued attention.

3. That the tipping point can be difficult to precisely determine for individual countries, but the range of debt-to-GDP levels in many advanced economies should make policymakers attentive to imbalances.

I would like to split my discussion of the paper into two parts. First, I will discuss the authors’ empirical work on tipping points. In that discussion I will emphasize that the empirical work is a good first step in analyzing the potential of reaching a tipping point, but that the empirical work would probably benefit from a more extensive examination of other factors that influence tipping points.

In the second part of my comments today I will discuss the costs and benefits of the large-scale asset purchase (LSAP) program as an instrument of monetary policy. While remittances – which the authors focus on – are one potential factor worth considering when estimating the costs of this program, I will suggest that a fuller set of benefits and costs of the program for the economy are needed.

As always, I would note that the views I express here today are my own, not necessarily those of my colleagues at the Federal Reserve Board of Governors or on the Federal Open Market Committee (the FOMC).
Empirical Work on Tipping Points.

The paper provides an empirical model of long-term government bond rates. The basic model estimates the government bond rate as a function of debt to GDP (both net and gross), the current account deficit, and time and country dummy variables. This model is in the spirit of much literature that looks at the probability of a sovereign default or tries to empirically estimate sovereign debt default premiums. While much of the earlier literature was focused on problems with sovereign default for less developed countries, this study focuses on the potential for sovereign default premiums to rise in a set of advanced economies.

From this rather parsimonious model the authors draw a number of conclusions. In particular, that at the level of current account deficits and debt-to-GDP ratios currently experienced in many advanced economies, the risk of rising sovereign default premiums is quite high. Furthermore, if unaddressed, these premiums could reach a tipping point that becomes unsustainable.

While this degree of parsimoniousness in a model can be a virtue, I would suggest that if there are important omitted variables from the empirical work then the coefficient estimates can be biased, and the effects attributed to the variables in the model can be a proxy for effects that are really driven by movements in the omitted variables. Because the model includes both dummy variables for countries and time, the omitted variables would need to be variables that could drive long-term rates that vary over time and by country. How likely is that to be the case with this simple regression?

Consider the example of Ireland. Figure 1 shows that in 2006 Ireland had a very low debt-to-GDP ratio. In fact, debt to GDP was substantially lower than that of the U.S., U.K., and France. The current account deficit was better than that of the United States, similar to that of the U.K., and somewhat worse than that of France. Despite this relatively sanguine situation in 2006, Ireland was close to the tipping point. Debt to GDP was about to rise quickly, as seen in Figure 2, and Ireland was about to lose the ability to issue long-term debt.

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<td>Ireland</td>
<td>24.8</td>
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<td>France</td>
<td>64.1</td>
<td>-0.6</td>
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<td>United Kingdom</td>
<td>43.0</td>
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<td>Unites States</td>
<td>66.6</td>
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Sources: IMF World Economic Outlook, October 2012, Financial Times, U.S. Treasury / Haver Analytics
The problem in Ireland was that while fiscal debt was well controlled, the country was facing a serious financial stability problem. So, what type of financial stability variables might capture the impending tipping point in a way that is not captured by the simple empirical model?

One example of a potentially important omitted variable is the financial strength of the banking sector. For example, non-performing assets of the banking sector relative to GDP would capture the impact of building banking pressures. In Ireland, banking problems rather than fiscal problems were an important driver in hitting the tipping point. Another variable that varies over time and by country would be the percentage change in real estate prices or possibly the difference between the return on owning and the return on renting. These types of variables would try to capture the growing risk of bubbles in Ireland and Spain.

A second set of potential omitted variables relates to the political determinants of risk premiums. One frequently sees that credit default rates spike around elections, and that countries that are politically destabilized have difficulty generating the political will to address problems – particularly if public opinion is as fragmented as the political process. This might be captured by how frequently national elections were held over the past four years, or by other political variables capturing the difficulty in obtaining a stable majority political party in some countries at some times.

Another political variable that might be relevant is a variable that captures whether there is stable fiscal federalism in a country. For example in Spain, debt and banking problems have been exacerbated by the reality of regions that were autonomous but not necessarily fiscally responsible. A variable that might capture this impact is state and local government debt to GDP.

A third set of potential omitted variables would reflect labor market conditions. With a currency union, persistent differences in competitiveness can push countries to the tipping point. Measures of labor market productivity might capture this impact, which may vary over countries and over time. Another potential important variable would be differences in unfunded pension liabilities relative to GDP.
Countries with growing unfunded pension liabilities relative to GDP may need to eventually raise government debt to fund these liabilities, pushing a country to the tipping point.

A variety of other potential omitted variables could be explored. Credit default swap rates tend to move as countries approach high rollover periods. A debt management variable might capture this rollover risk by looking at short-term debt relative to GDP. And demographic variables may also be relevant. Countries with fast-growing, well-educated populations may be less at risk of tipping points than countries with declining populations that are not well educated.

While this is not an exhaustive list of omitted variables, it does highlight that such a pared-down model may ignore important drivers of tipping points. In addition, one cannot be sure that the coefficients used in simulations might not change significantly with a more richly specified model.

While this paper provides a good discussion of tipping points, the coefficients and simulations should be viewed as indicative of a more general point—that policymakers should consider how a variety of public policies, including fiscal policies, can influence tipping points.

Benefits and Costs of LSAPs.

The final section of the paper discusses the expansion of the Federal Reserve’s balance sheet. It highlights a potential problem—that if monetary policy is successful in returning us quickly to full employment, or if interest rates rise for other reasons such as reaching a tipping point, remittances to the Treasury would be impacted. The baseline scenario the authors provide reflects gains overall for the LSAP, but under the authors’ most pessimistic scenarios significant losses are generated.

Unfortunately, this discussion does not do justice to the policy trade-offs, in my opinion. To take them into account, ideally one would do a more complete comparison of how the economy and fiscal policy would evolve with and without large-scale asset purchase (LSAP) programs in place.

The purpose of the LSAP is to reduce long-term interest rates to stimulate the economy. Analysis of the LSAP program requires looking at more than remittances. Ideally one would start with how well policy—with and without LSAPs—fulfills the Federal Reserve’s dual mandate, provided by Congress. Even if one wanted to focus on the more narrow fiscal impact, I believe one would need a much fuller analysis.

And to capture the benefits of the LSAP you need a fuller model. One of the models currently used by the Federal Reserve Bank of Boston provides a relatively conservative estimate of the economic benefits of a hypothetical additional $750 billion LSAP. Based on historical experience, the model implies that such a purchase would lower long-term rates by 20 to 25 basis points, relative to not making the additional purchases. The impact of this large a reduction in long-term rates is a cumulative gain in real GDP, relative to the base, of 1.6 percent or $260 billion. In our model such a purchase also results in a decline in the unemployment rate of 0.25 percent or 400,000 jobs. Some of the models we run provide a larger impact to such purchases.

Nonetheless, such estimation provides a baseline for considering the economic benefits of additional purchases. These estimates are subject to a considerable degree of uncertainty, and the impact could easily be higher or lower than that implied by our model. However, based on our statistical work using historical data, we believe these are reasonable estimates of the benefits.
Even if one wanted to focus on the fiscal impact of the LSAP program, I would suggest that the impact goes beyond remittances provided to the Treasury. The first effect would be to examine the path of interest rates on government debt with and without the LSAP program. Since the LSAP reduces interest rates, such a simulation would show that the debt-to-GDP ratio is reduced by the lowered cost of financing fiscal deficits as a result of the LSAP program.

The second fiscal impact would be from faster economic growth. Faster economic growth produces more tax revenue and, by reducing unemployment, reduces government entitlement expenditures on programs such as unemployment insurance. Thus, LSAPs actually produce a much more positive fiscal impact than the authors suggest.

Moreover, the evaluation of the program needs to include the contributions of LSAPs to achieving the goals of the dual mandate for U.S. monetary policy. We currently have an unemployment rate of 7.9 percent in the country and PCE inflation of 1.3 percent. Had we not undertaken LSAP policies, we would be even further away from achieving each element of our dual mandate, with an unemployment rate higher and an inflation rate lower than we currently have (assuming we have been successful in improving the economy).

As Figure 3 shows, loan rates on mortgages and autos have declined since the zero lower bound for the federal funds rate was hit, and home and auto sales have been improving. These interest-sensitive sectors have been among the fastest growing components of real GDP over the past year. Some of this improvement is the result of our LSAP policies.

**Figure 3: Housing and Auto-Related Indicators**

- **Rate on 30-Year Fixed-Rate Mortgage**
  - Percent: 5.0, 4.5, 4.0, 3.5, 3.0
  - Jan-2011, Jan-2012, Jan-2013

- **New Single-Family Home Sales**
  - Thousands, SAAR: 450, 400, 350, 300, 250, 200
  - Jan-2011, Jan-2012, Jan-2013

- **Auto Loan Rate at Banks**
  - Percent: 6, 5, 4, 3
  - Jan-2011, Jan-2012, Jan-2013

- **Auto and Light Truck Sales**
  - Millions, SAAR: 16, 14, 12, 10
  - Jan-2011, Jan-2012, Jan-2013

SAAR - Seasonally Adjusted Annual Rate
Sources: FHLMC, Census Bureau, WSJ, BEA / Haver Analytics
Finally, extended periods of unemployment may have long-run costs that have both fiscal and broader economic impacts. If an extended period of high unemployment causes more workers to drop out of the labor force and places many new workers on a permanently lower income growth path — as many studies have shown — then failing to undertake LSAPs can have much broader impacts on fiscal and economic policies.

Concluding Observations.

The authors of this paper have provided a useful contribution to the literature by highlighting the impact of not considering fiscal tipping points. As their work highlights, hitting fiscal tipping points can have dire consequences for all citizens — and predicting when such a tipping point will be hit is difficult. As a result, fiscal and monetary policymakers need to be mindful of the potential of their actions to impact tipping points.

But I hope my discussion today has highlighted that, with respect to monetary policy, the LSAP program improves the broader fiscal outlook by lowering interest rates and providing more economic growth. In addition, it returns the economy to full employment and an inflation rate at the 2 percent target more quickly than would have occurred in the absence of such actions. We do well to also consider these benefits, and the costs of inaction, when evaluating policy.

Thank you.
Zanny Minton Beddoes (moderator):
Welcome to this afternoon’s panel discussion: U.S. fiscal problems and potential solutions. We have three amazing speakers: Doug Elmendorf now obviously Director of the Congressional Budget Office, but Doug has also worked at the CEA, he’s been Deputy Assistant Secretary at the Treasury, he’s worked, as you all know, at the Fed. Martin Feldstein now, George Baker, Professor of Economics at Harvard, but he was of course Chairman of the Council of Economic Advisors in the Reagan Administration, and advisor, sounding board I would think, to every major policy maker since then; and Alice Rivlin, now Senior Fellow at Brookings, but Alice as you know was the founding director of the Congressional Budget Office. She also directed the Office of Management and Budget in the Clinton Administration, so I think it’s really no exaggeration to say that these three know more about the problems of fiscal policy in Washington and if anyone has any idea how to fix them I suspect it will be on this panel. So Doug, let’s start with your initial comments.

Douglas W. Elmendorf:
Thank you. It’s very nice to be here and to be joining this panel with Zanny, and Alice, and Marty. CBO released its latest outlook for the budget and economy a few weeks ago. I’d like to summarize briefly what that outlook shows and the problems that the outlook presents, and then review some criteria for evaluating possible changes to policy. CBO does not make policy recommendations, so I will not endorse particular courses of action, but I expect that Alice and Marty will be less reticent than I’ll be.

Under current laws, the federal budget deficit will shrink in 2013—for the fourth year in a row—to an estimated size of 845 billion dollars. The deficit would actually be the first in five years under a trillion dollars, and at 5 ¼% of GDP it would be only about half as large relative to the size of the economy as the deficit in 2009. Our projections based on current laws show deficits continuing to fall over the next few years before turning up again later in the decade and totaling roughly 7 trillion dollars for the decade as a whole. Federal revenues, which are the lower line in that picture, are projected to rise relative to the size of the economy and reach about 19% of GDP in 2015 and beyond. The rise occurs because of both the expanding economy and because of scheduled changes in tax rules. That 19% figure for most of the decade compares to an average of about 18% over the past 40 years. At the same time, if current laws remain in place, federal spending will fall relative to the size of the economy over the next several years, but then rise again. The decline can be traced to the caps on discretionary funding and a drop off in spending that tends to go up when the economy is weak, like unemployment benefits. But later in the decade the return of interest rates to more normal levels will push up interest payments to nearly their highest share of GDP in 50 years. And throughout the decade, the aging of the population, a significant expansion of federal health care programs, and rising health care costs per person will push up spending on the largest federal programs. By 2023 spending reaches about 23% of GDP in our projection compared with a 40-year average of 21%.
What does all of that mean for federal debt? We project the debt held by the public will reach 76% of GDP this year, the largest percentage since 1950. Under current laws, we project the debt in 2023 will be 77% of GDP, far higher than the average of 30% over the past 40 years, and the debt will be on an upward path in the second half of the decade.

Such high and rising debt relative to the size of the economy is a significant concern for several reasons. First, high debt means more crowding out of capital investment, it means that lawmakers will have less flexibility to use tax and spending policies to respond to unexpected challenges like a recession or war, and it means there would be a heightened risk of a fiscal crisis of the sort discussed this morning, in which the government would be unable to borrow at affordable interest rates.

The second reason we’re concerned about the outlook is that debt would be even larger than we project here if current laws were modified to delay or undo certain schedule changes and policy that many lawmakers have actually called for modifying or undoing. For example, suppose that lawmakers eliminated the automatic spending cuts scheduled to take effect next week and then over the next several years. If they also extended all the tax provisions that are still scheduled to expire and if they prevented the sharp reduction in Medicare’s payments to doctors scheduled for the end of this year, that collection of policies, if not offset by other changes in policy, would mean substantially larger deficits over the coming decade. Debt held by the public would reach 87% of GDP by the end of the coming decade rather than the 77% that we project under current law.

Third, debt might also be larger than our projections because even the original caps on discretionary funding set by the Budget Control Act might not be met. The original caps would reduce discretionary spending to just 5.8% of GDP in 2023. That would be a smaller share than for any year in at least the past 50, which is the longest we’ve been collecting data on that basis. The allocation of discretionary funding is determined by annual appropriation acts. So the caps essentially set a target but don’t embody decisions about which specific government services or benefits will be constrained to satisfy the caps, and given that these caps are out of the range of our historical experience, satisfying them would be quite difficult.

And fourth, the projections for the ten-year period covering this report do not fully reflect the long term budget pressures. In our last long term budget outlook last summer which looked at 25 years, we projected that spending on social security and the major health care programs would rise by more than 5% of GDP over the next 25 years. Basically because of the aging of the population and the rising costs of health care that we discussed earlier, a wide gap exists between the future costs of benefits and services that people are accustomed to receiving from the government, especially in the form of benefits for older Americans and the tax revenues that people have been sending to the government.

So what might be done to reduce future deficits and debt? CBO, as I said, does not make policy recommendations. Our job is to offer a menu of options to policy makers. I will not try to run through all the specific items on the menu; instead let me just highlight three criteria that might be used to evaluate proposed policy changes.

The first one would be simply how much debt would be reduced relative to our projections under current law. And there is a trade–off here. The more the debt is reduced the more the harms caused by high debt would be avoided, but also the greater the loss of government benefits and services or the greater the burdens on individuals and businesses with higher taxes. So it is not clear from an economics point of view how much deficit reduction is appropriate, but let me give you an example of the sort of logic that
might be used. Federal debt held by the public was 36% of GDP at the end of 2007. As I said, we estimate that it will be 76% of GDP by the end of this year. Suppose one wanted to go back to that 36% figure, which is pretty close to the historical average, and one was patient about doing it so one was willing to spend 40 years getting back. That would require, if you did it in a linear way, debt to come down 1 percentage point per year as a share of GDP. Starting at 76% this year, that would put us at 66% at the end of the decade relative to the 77% we project under current law; pushing debt that much further down from 77 to 66% would require about 2 ¾ trillion dollars of deficit reduction relative to the projections under current law. If one wanted to also turn off some features of current law one didn’t like, then one would need to find greater total savings. That 2 ¾ trillion dollars could come from 2 ¼ trillion of tax increases or spending cuts, and then another half trillion would come from the savings in debt service resulting from those tax increases or spending cuts. Of course there are a variety of paths, some more ambitious and some less ambitious than that one, but it gives you a sense I think of the magnitudes.

A second criterion for evaluating proposed policy changes is how quickly deficits will be reduced. Once again there is a trade off. The sooner deficits are cut, the less debt that is accumulated but the greater the drag in economic activity over the next few years. Indeed several provisions of current law that are bringing down the deficit will weaken output and employment this year. We project that inflation-adjusted GDP will rise about 1 ½% this year, but that it would increase roughly 1 ½ percentage points faster than that if not for the restraint on government and private spending coming from the expiration of the payroll tax cut, the higher tax rates on income above some thresholds, and the cuts in spending scheduled to take effect very shortly. So under current law we expect the unemployment will remain above 7 ½% through 2014, which will make that year the sixth consecutive year with unemployment so high. And we think that output will remain below its sustainable level, what economists call potential output, until 2017, almost a decade after the recession began at the end of 2007.

A third criterion for evaluating proposed policy changes is how the government’s resources would be allocated. Under current policies we are on track to have a federal budget that will look very different from the budgets of the past. As the population ages and health care costs per covered person rise, a much larger share of federal spending will go toward benefits for older people—and a much smaller share will go to other types of benefits and services. Those other benefits and services include all of the means-tested programs apart from health care, including food stamps and family support and subsidized housing; they also include defense spending, transportation, law enforcement, research, education and much more. That whole collection, everything except for Social Security and Medicare and Medicaid and the subsidies to be provided through health insurance exchanges, is on track already to be a greatly reduced share of the economy relative to what we’ve seen in the past. If additional deficit reduction were achieved by cutting those benefits and services relative to what would happen under current policies we would move even further away from our historical experience. It doesn’t make that wrong—we are unavoidable moving away from our historical experience in some respects or others—but it’s an implication that’s important to understand.

Given the allocation of projected spending and the wide gap between projected spending and projected revenues, I think the following conclusions are clear: it is possible to keep tax revenues at their historical average percentage of GDP, but only by making substantial cuts relative to current policies and the large benefit programs that aid a broad group of people at some point in their lives. Alternatively, it is possible to keep the policies for those large benefit programs unchanged but only by raising taxes substantially for a broad segment of the population. Beyond those three criteria for evaluating proposed policy changes
there are others that are very important and that we’ve written about, including who would bear the burden of the changes and how policy changes would affect incentives and thereby long-term economic performance. But in the interest of time I will stop here and save those issues for later discussion if you like. Thank you.

**Zanny Minton Beddoes:**
Thank you, Doug. Before you moving on, you mentioned your projections have interest rising back to normal levels. There was a lot of discussion this morning about fiscal tipping points and potential rising risk premia. How do you at the CBO think about that and could the picture be even worse than you project?

**Douglas W. Elmendorf:**
In our long-term budget outlook last summer we did an economic analysis of the effects of the rising debt beyond the 10-year window. We went out 25 years total, and the higher debt that would arise under current policies in that projection last summer effect pushed up interest rates by nearly 2 percentage points relative to what they were at the end of the ten-year period. So we are well aware of this issue and try to capture it in some of our work on the consequences of the crowding out of capital that comes from higher debt. But what our projections don’t capture is an anticipation of the problems. They don’t capture a panic point about rising debt, we simply keep track of the whittling away of the capital stock and the effects on the return to capital. We worry about and have written prose about the risks that were discussed this morning. We are currently engaged in a very focused effort to better present the uncertainties that surround our forecast and do a better job of conveying the range of possible outcomes, and I hope you’ll see some of that in our long term budget outlook this summer. So we think these risks are very real and we are wrestling with how best to convey that.
Zanny Minton Beddoes (moderator):
Martin Feldstein the floor is yours and I hope you have some solutions for us.

Martin Feldstein:
Well I hope I do, too.

I think we’re really looking at two interrelated problems: an economic problem and a political problem. And the economic problem is how to reduce the enormous fiscal deficits that everybody’s been talking about without pushing the economy into recession. The political problem is the fiscal impasse between Republicans and Democrats that Governor Powell talked about under the rubric of governance this morning. Republicans say yes, we have to reduce the deficit, but we want to do it just by reducing spending, government spending; and the Democrats say yes, we want to reduce the deficit, but that must include increased revenue as well as reduced government spending.

Let me speak briefly about my thoughts about the economic problem because it’s the easier of the two. I think we should start small, aiming for small deficit reduction so that we don’t push the economy into recession, and we should gradually increase the magnitude over time, and we should include long term reductions of entitlements, social security, and Medicare, but they have to be phased in gradually.

But, I recognize that strategy makes the political problem more difficult, especially because the Democrats appear willing to accept reductions in entitlements only if it’s part of a package that includes considerable amounts of additional revenue. So I’ll focus on the political problem of this fiscal impasse: Republicans wanting reductions in government spending and Democrats wanting revenue as part of the solution. I think the key to reconciling this is to focus on tax expenditures, the features of the tax code that substitute for direct government spending.

Once you focus on tax expenditures, this distinction between cutting government spending and raising revenue becomes a false dichotomy. Limiting tax expenditures is a way for cutting government spending that also increases revenue. Deficit reduction that comes about by cutting tax expenditures, that deficit reduction shows up on the revenue side of the budget, but the reality, the substance, the economics, is all about reduced government spending, and those tax expenditures include credits, deductions, exclusions. For example, if I buy a hybrid car or an efficient refrigerator the government will pay me as an incentive reward. They won’t send me a check but they will give me a tax deduction or a tax credit, and there are many, many such tax expenditures that add literally billions of dollars each year to the fiscal deficit and I think Congress should be reviewing these items and asking which ones we really cannot afford in our current fiscal situation. But, the big tax expenditures are of course the major deductions and exclusions. The mortgage interest deduction, the deduction for state and local taxes, the deduction for charitable contributions, and the exclusion of employer paid health insurance—the largest of all the tax expenditures—and the exclusion for municipal bond interests.
Some analysts would also include in tax expenditures a variety of pro-saving features of the tax law like IRA’s and the lower tax rates on capital gains. I wouldn’t do that. I think these should be retained for the long run advantage of increasing the saving rate and increasing economic growth, and technically when I think about this with my public finance hat on I think about tax expenditures against the standard of a consumption tax rather than a pure income tax. And against that standard you don’t want to call those things tax expenditures. But I realize any attempt to eliminate any of these major tax expenditures would generate fierce political opposition. Tax payers would rightly complain: Why are they going to limit my mortgage deduction when other major deductions are not being limited? So, what I favor is allowing individuals to retain all deductions and the two major exclusions that I mentioned, municipal bond interest and employer paid health insurance, but to put an overall cap on the extent to which individuals can reduce their tax liability in this way. So, the cap is not explicitly on the size of the deductions and exclusions but it’s on the savings, the tax reduction that individuals get.

More specifically, while I’ve done computer simulations of a variety of these I have focused on a cap equal to 2% of the taxpayer’s adjusted gross income on the scale of the tax reduction, the tax savings that individuals can get from tax expenditures. So, I emphasize that I’m talking about capping the tax savings not capping the deductions and exclusions. So, if an individual is in a 25% marginal tax bracket, a 2% cap would correspond to limits of deductions and exclusions of about 8% of their adjusted gross income.

My preference would be to exclude the charitable deduction from this because I think the charitable deduction is different from say my mortgage deduction. My mortgage deduction is something that benefits me, the interest payments that I make benefit me, but my charitable contributions benefit the institutions—the museum, university, hospitals—to which I’m writing that check. So, if it were up to me, I would not include the charitable contributions under that cap; I would exclude that from the cap.

I would also modify the treatment of employer paid health insurance, saying that the first $8000 of employer paid health insurance would not be part of the cap. But, if you make those two modifications, but, otherwise, include all of the deductions, a cap equal to 2% of adjusted gross income would produce a lot of revenue. It would produce at 2013 level single-year revenue about 140 billion dollars, nearly 1% of GDP, and over 10 years as the economy grows and including the interest savings that result it would produce a little more than 2 trillion dollars. So, that represents, in terms of the debt level at the end of the decade, about 2 trillion dollars of reduced debt — about 8% of GDP in 2023. It would also reduce the annual deficit in 2023 by roughly 300 billion dollars.

I can feel pretty confident about the 140 billion dollars, anything beyond that is a back of the envelop projection. Unfortunately, that’s still not enough deficit and debt reduction. But, if my Republican friends will accept this as a way of reducing government spending, then I would think that the revenue that’s being created — 2 trillion dollars’ worth of revenue over the decade — would, I hope, open the door for Democrats to accept some entitlement reductions. And there are many ways to slow the growth of social security and the health programs. But, just to give you a sense of magnitude, if you slow the growth of those programs, social security and the health programs, by 1% a year so they’re going to continue to grow at a pretty hefty rate, but, if you take it down by 1% a year over the next decade, that would reduce the deficit in 2023 by about $300 billion in that year and it would continue to reduce by larger amounts in future years.

So that combination (the 2% cap on tax expenditures, the 1% reduction in the growth rates of social security and the health programs) would put the deficit over GDP and the debt ratio on a sustainable path.
If those structural policies can be put in place, the combination of capping tax expenditures and slowing the growth of the entitlements would produce some $600 billion dollars or more than 2% of GDP, and that would have, in my judgment, one other very important advantage: it would allow short run stimulus policies in the form of increased infrastructure spending and lower marginal tax rates. I think under our current budget situation it’s hard to justify either of those, but I think if we had long term structural policies in place, which were going to put the debt to GDP ratio on a declining path, it would be much easier to justify appropriately something to stimulate the economy in the short run. Well, of course, there is no guarantee that this combination is going to be politically acceptable but I certainly think it’s worth trying. Thank you.

Zanny Minton Beddoes:
It sounds very simple when you lay it out and so elegant. But, how do you get the political support to do this, and since you’re making this argument quite publically now, do you have any sense that there is any buy-in for it?

Martin Feldstein:
There is some. When I talked to some members of Congress, some members of the Senate on the Republican side, and I explained how many of the things that are in the tax code are really in the nature of spending, they say, “yeah, that’s right, that’s going to be hard to explain that at home but I think I can handle that.” So, if enough of them move in that direction so that we can get Republican’s saying “let’s cut…let’s not raise tax rates, but let’s cut tax expenditures in a significant way,” then I think we’re halfway there. And then somebody else will have to convince my Democratic friends that with all that revenue increase being agreed to by the Republicans it ought to be possible to take on some modifications, some slow down, something like that 1% reduction in the growth rate of the entitlement programs.
"U.S. Fiscal Problems and Potential Solutions"

Presentation to the 2013 U.S. Monetary Policy Forum
Conducted by the University of Chicago Booth School of Business

By Alice M. Rivlin, Senior Fellow at Brookings, Visiting Professor at the Public Policy Institute of Georgetown University, and the Director of Engelberg Center for Health Care Reform

Zanny Minton Beddoes (moderator):
Maybe the person to do that is sitting next to you. Alice, the floor is yours.

Alice M. Rivlin:
I would buy Marty’s plan in a minute. And if he and I were in charge I think we could all go home — we’d have the deficit under control. I particularly, actually, like his belief, which I share, that if we had our budget on a sustainable track for the long run future, that we could then concentrate on job creating and long run growth creating — things that we need to do in the near term. I don’t understand why Paul Krugman, who is actually quite a smart man, doesn’t understand that. And I don’t understand why the President of the United States doesn’t understand that.

I think the effort to get the long run under control is essential to any hope of faster growth in the near term. And what we do need for a sustainable budget is both higher growth and structural changes in the budget that guarantee that it does not grow automatically, that the debt does not grow automatically faster than the GDP.

After World War II, as was noted this morning, we had a very high debt to GDP ratio — over 100%. And what we did over time, a long time, was grow the economy quite fast and restrain the expenditures. There was no upward pressure of entitlements pushing expenditures up.

We did the same thing in the 90’s: the economy was growing very well; we held the spending growth tight. We weren’t up against the demographics that are coming at us now, but we did achieve a surplus at the end of that decade.

Current policy is just wrong on both counts. It is too severe in the near term — too much austerity. The sequester is very bad policy from any point of view. It’s dumb, stupid, whatever technical term you want to use here. What we should not be doing from a macro point of view is additional austerity.

Remember, the federal budget is restrictive in the near term. Yeah, we have big deficits and big deficits are stimulating the economy. No way the deficit’s coming down and that restrains the economy. The Fed is doing accommodative monetary policy in the face of a federal government and state governments that are imposing considerable drag on growth.

This sequester is bad macro policy right now. And it’s bad policy for two other reasons: it does nothing to change the structural problem — the long run problem, the spending growth has been eliminated in the discretionary spending area — is on a downward track. That’s not what we need to run the government effectively. We really don’t need fewer air traffic controllers and fewer rangers in our National Parks. We need to focus on what’s causing the structural growth in the debt in the out years, and then find program by program cuts.
So, the sequester is a disaster and we shouldn’t have it. Instead the president and the leadership of Congress should get back to the bargaining table and craft some version, and I don’t think the exact details matter very much, but some version of the so-called “grand bargain,” that we put forward in two commission reports that I served on (why is a woman of my age doomed to serve on two commissions on the budget? But, here I am) and we said the same thing. And that’s what Marty’s been saying as well: the problem is that the entitlements and, especially, health care costs multiplied by the demographics are causing spending to rise faster than the GDP can grow. The growth of health care entitlements faster than GDP will continue as far as the eye can see unless policy changes. Tax revenues won’t go up that much. Whatever we do to the tax code, and I’d be happy to do what Marty wants to do, revenues will grow about as fast as the economy grows. The “grand bargain” idea was embodied in Simpson–Bowles and Domenici–Rivlin, which we did at the Bi–partisan Policy Center. The essential idea was, tackle both entitlement reform and tax reform in ways that will give us slower growth of entitlement spending, especially for health care, and faster growth of revenues from a more pro–growth tax code.

One ray of hope is that in the near term do we have significant inefficiencies and waste in our health care system that can be squeezed out. As I read Republican and Democratic health care gurus they’re all about in the same place. What they are saying is we’ve got to restrain health care spending generally and Medicare can take the lead in this so that it doesn’t grow much faster than the GDP, whether much faster is GDP plus 1% or plus a ½%, you’ve got to keep it from growing much faster than the GDP.

So how do you do that? Well, everybody is focusing on the distortions from the fee–for–service reimbursement of providers, which lead to more services, but does nothing to get efficiency and reward better health care. So how do you change that? There are two ways you can go at this, the one embodied in the Affordable Care Act which says, “Do a whole lot of experiments with different ways of reimbursing health providers and put the successful ones in play through regulations in Medicare.” The other is a more free market idea: allow seniors to choose among integrated capitated health plans – that is health plans that will agree to take care of you for a year whatever happens to you — and let them compete in an organized marketplace. In the second model, called premium support, the government would subsidize the premium. The subsidy would start at the current cost of Medicare, but the increase would be limited to control future growth.

When Pete Domenici and I put together our plan, we said, “Why not both?” Let’s try the regulatory route through traditional Medicare, but let’s also give seniors a choice on an exchange — Paul Ryan moved to that position in his plan with Democratic Senator Ron Wyden. A less drastic approach would be to get the competition through reforming Medicare Advantage. Medicare Advantage, which already covers a quarter of Medicare recipients, allows beneficiaries to choose among private plans, but could be better designed to foster competition.

We also have to get Social Security back on a firm foundation, and we have to reform the tax code. Both were featured in Simpson–Bowles and Domenici–Rivlin. Regarding aggressive tax reform, start by blowing up the system, put back only a few of the deductions — in fact, no deductions — convert deductions to credits and then you can lower the rates a lot. I still think that’s the best way to go, but the high–end rate reductions that were part of the fiscal cliff deal on New Year’s Day have set us back — it’s going to be harder to get rate reductions. So Marty’s plan looks like a good second best. If we can couple it with entitlement reform we will be on a path to keeping our future debt from continuing to grow faster than the economy.
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