

## CATASTROPHIC BUDGET FAILURE

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*Continuation of current U.S. fiscal policy will lead to an enormous accumulation of debt with potentially disastrous economic consequences. Exacerbated by the recent economic turmoil and fueled by the willingness of creditors to lend at very low interest rates, there is significant risk that necessary fiscal reform will be put off. In this paper, we consider the causes, mechanisms, and macroeconomic fallout of a catastrophic budget failure — a situation in which markets' perception of the credit worthiness of the U.S. government rapidly deteriorates, leaving it unable to access credit markets at any reasonable rate of interest and generating a high probability of the previously unthinkable: the U.S. government defaulting on its debt obligations.*

**Keywords:** *fiscal policy, debt crisis*

**JEL Codes:** *H60, E62*

### I. INTRODUCTION

Every year, the Congressional Budget Office (CBO) performs a very scary exercise: it calculates the effects of continuing current policy on the national debt, annual deficits, and interest payments. One scenario represents current law, in which most of the tax cuts enacted during the Bush administration expire as scheduled at the end of 2010 and there is no relief from the dreaded alternative minimum tax. This relatively optimistic scenario — called the “extended baseline scenario” — also assumes that health care costs grow slower than they have for the past 50 years. The second scenario — called the “alternative scenario” — assumes the Bush tax cuts are extended, Congress continues to protect the middle class from the AMT, and that health care costs continue their march skyward.

Under both scenarios, debt explodes, although much more slowly in the extended baseline scenario than the alternative. Some analysts have quibbled with some of CBO’s

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assumptions and its forecasts decades ahead are surely wrong (Auerbach and Gale, 2009; Peterson-Pew Commission on Budget Reform, 2009). CBO itself acknowledges that its forecasts even a few years in the future — like those of other prognosticators — are highly uncertain. But few would dispute that, even under optimistic assumptions, continuation of current policies would lead to an enormous accumulation of debt with potentially disastrous consequences for the U.S. economy.

The most important of CBO's assumptions, as it tacitly acknowledges, is that interest rates and economic growth are invariant to debt levels. That is, its projections are simply adding up exercises, not forecasts at all. In part, they do this because building the long-term tax and spending projections into their long-term macroeconomic model causes the model to explode: "Starting in the 2060s, projected deficits become so large and unsustainable that CBO's textbook growth model cannot calculate their effects" (CBO, 2009b, p.18).

This paper presents a preliminary analysis of the macroeconomic effects of the kind of tax and spending trajectories assumed by the CBO. We call these scenarios and the macroeconomic carnage that might result "catastrophic budget failure." We are not predicting that budget catastrophe is our destiny. Many actions and factors could avert this dismal future, but the potential consequences are so severe that we believe it is imperative that policymakers understand them.

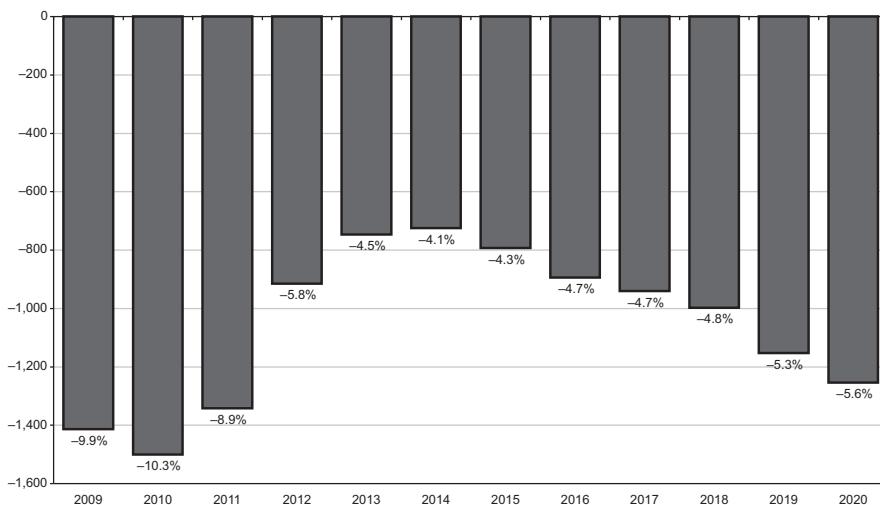
## II. ENORMOUS STRUCTURAL FISCAL IMBALANCES

The United States faces significant fiscal challenges in both the short- and the long-term. The primary short-term challenge stems from the enormous amount of borrowing in the wake of the recent financial market collapse and the most severe economic downturn since the Great Depression. Reduced revenues, support given through the Targeted Asset Relief Program, and the multiple rounds of economic stimulus have resulted in deficits of close to ten percent of GDP in both 2009 and 2010, as shown in Figure 1. The \$3 trillion in net borrowing over this period will leave the federal government with debt of roughly 60 percent of GDP for the first time since the end of World War II.

We believe that borrowing to fend off economic catastrophe is good policy. The real concern is that current economic policies could make annual trillion dollar deficits the norm rather than an infrequent and unpleasant anomaly. President Obama's proposed spending programs and tax cuts would add almost \$10 trillion to the national debt by 2020 based on CBO projections (CBO, 2010). By 2018, annual deficits will exceed \$1 trillion. A closer examination of the data suggests that, if anything, those projections are overly optimistic (Auerbach and Gale, 2009). It should also be noted that, despite the protestations of the newly fiscally responsible political opposition, the debt ballooned under the leadership of President George W. Bush and the Republicans' standard bearer in the 2008 presidential election proposed policies that would have led to even bigger deficits than President Obama's (Burman et al., 2008). Fiscal negligence is a bipartisan problem.

**Figure 1**

CBO Deficit Projections for Obama Budget (\$billions)



Note: Bar labels are expressed as a percentage of GDP.

Source: CBO (March 2010), "An Analysis of the President's Budgetary Proposals for Fiscal Year 2011."

The bad news about the short-term projections is that they are the good news. Every year, the Congressional Budget Office projects current policies forward 75 years and calculates the effects on spending, tax revenues, deficits, and the debt (CBO, 2009b). The Government Accountability Office (GAO) performs similar calculations (GAO, 2009). The projections show an alarming increase in debt. CBO considers two scenarios. The first, called the extended baseline scenario, assumes that the tax law plays out as written and that spending slows considerably. The first assumption would seem uncontroversial, but it actually would represent a major change in policy for both parties. Most of the tax cuts enacted by President Bush are scheduled to expire at the end of 2010, but the Republicans in Congress favor making them all permanent. President Obama has promised to extend all but the tax cuts affecting those with very high incomes and has proposed or enacted a number of other tax cuts that would spend much of the money “saved” by not extending the high-end tax cuts (Office of Management and Budget, 2010).

The other fiscally optimistic aspect of the CBO’s extended baseline is that it assumes that the periodic “patches” to the individual alternative minimum tax (AMT), which have been extended continually for the past decade, are no longer enacted. The AMT is a very complicated shadow tax system originally intended to levy some tax liability

on aggressive high-income tax shelterers, but through poor design and lack of inflation adjustments, the AMT threatens to swallow the middle class in a web of complexity and higher taxes (Burman, Gale, and Rohaly, 2003). If Congress does not extend the patch, more than 27 million taxpayers — mostly families with relatively modest incomes — will owe AMT in 2010.<sup>1</sup> They will also be very angry, which is why Congress has preferred patching the tax law to fending off millions of irate constituents.

Like the Bush income tax cuts, the Obama budget assumes a permanent patch to the AMT as part of its baseline. For its “alternative baseline,” CBO assumed permanent extension of the Bush tax cuts, a permanently patched AMT, and health care cost growth closer to historical levels. Under that arguably more realistic baseline, the debt explodes. As shown in Figure 2, by 2023, it reaches 100 percent of GDP and, by 2038, 200 percent. But, even under the wildly optimistic extended baseline, the debt climbs to unsustainable levels — albeit more slowly.

In fact, there are other very optimistic features of CBO’s projections. Most notably, CBO assumes that interest rates on government securities remain very low. The average real interest rate actually falls from 4 percent in 2013 to 3 percent in 2024 and remains there throughout the projection period, even though the primary deficit increases steadily from 2013 in the alternative scenario and from 2018 in the extended baseline. CBO’s rosy scenario also assumes sustained economic growth: real GDP recovers after the recession and then grows at roughly trend rates throughout the projection period. The key economic assumption at work here is that higher domestic private savings offsets the effects of higher deficits on national savings, interest rates, and the domestic capital stock.<sup>2</sup>

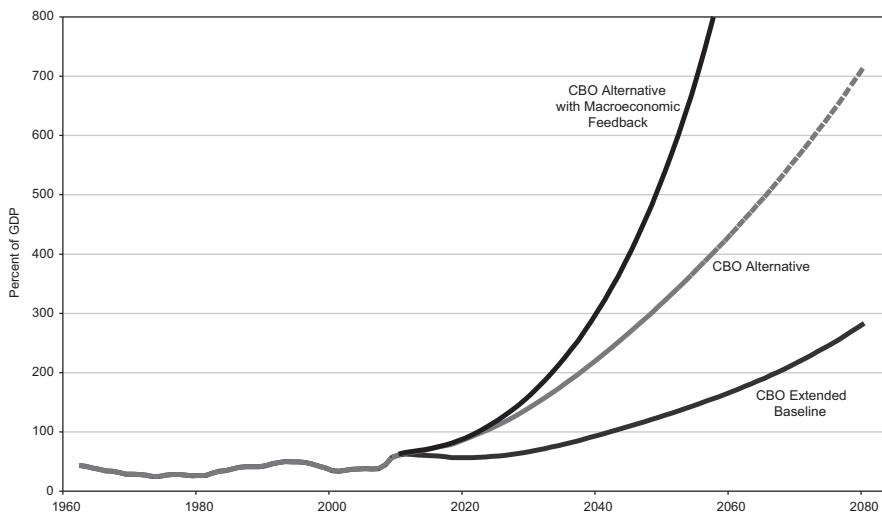
Gale and Orszag (2004) investigate the relationship between budget deficits (and the level of debt) on national savings and interest rates. They find that national savings is highly correlated with government savings, indicating that households are not Ricardian and that private savings offsets only a small fraction of increased government borrowing. They find that interest rates increase by between 40 and 70 basis points for every one percentage point increase in the primary deficit as a percentage of GDP. Following the methodology of Gale and Orszag, we incorporate the macroeconomic effects of increased government borrowing into the CBO projections for a range of plausible assumptions regarding the responsiveness of both private domestic and foreign savings.<sup>3</sup> As shown in Figure 2, building such a response into the CBO projections produces an even more dismal path for the debt.

<sup>1</sup> See Tax Policy Center Table T09-0384, which is located at <http://www.taxpolicycenter.org/numbers/displaytab.cfm?DocID=2459>.

<sup>2</sup> CBO acknowledges that such an assumption is invalid, but required in their long-term forecast to ensure a stable macroeconomic base upon which their projections of entitlement programs depend.

<sup>3</sup> Note that this is forecasting far outside of sample. The United States has never accumulated debts in the range projected by the CBO. As discussed below, the interest rate response is likely to be much, much larger if debt accumulates as projected. Additional details about these calculations can be found in the appendix to Burman et al. (forthcoming).

**Figure 2**  
Projections of Debt Held by the Public, 1962–2080



Source: CBO (2009b) and authors' calculations.

In our view, this is far from the most dreadful scenario. If interest rates were to respond to growing debt, there would be pressure on policymakers to take steps to reduce the deficit. That happened in the early 1980s. Ronald Reagan campaigned promising tax cuts and he delivered — pushing through the largest tax cut in history in 1981. What is sometimes forgotten, though, is that he was later convinced that the tax cutting had gone too far when Wall Street complained that the deficits were pushing up interest rates and stifling investment. President Reagan responded by supporting a large tax increase. He eloquently made the case for a tax increase:

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The single most important question facing us tonight is: Do we reduce deficits and interest rates by raising revenue from those who are not now paying their fair share — or do we accept bigger budget deficits, higher interest rates and higher unemployment ... We're within sight of a safe port of economic recovery. Do we make port or go aground on the shoals of selfishness, partisanship and just plain bullheadedness?<sup>4</sup>

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<sup>4</sup> Ronald Reagan, "Televised Speech On Tax Policy" (as reported by the New York Times), August 17, 1982.

While higher interest rates would be damaging to the economy in the short run, especially if they came before the economy had fully recovered from the financial market meltdown, they would have the salutary effect of restraining deficits because policymakers would see a cost to continued political pandering.

A far worse situation would be for interest rates to stay low while we accumulate unprecedented amounts of debt only to respond very suddenly when financial markets or foreign lenders decide that the United States is no longer a good credit risk. That could produce a catastrophic financial meltdown, similar to the one triggered by the bursting of the housing market bubble, but with one important difference. If the crisis is caused by a surfeit of government debt, the government will not be able to borrow to deal with its effects. This would be a catastrophic budget failure.

### **III. CATASTROPHIC BUDGET FAILURE DEFINED**

The key players in catastrophic budget failure are the public, policymakers, and lenders. The public cares about public services, taxes, and deficits. Policymakers want to get reelected so they try to satisfy the public's demand for more public service and lower taxes, limited only by the public's expressed concern about deficits. Lenders supply funds to the federal government (and other borrowers). Domestic lenders maximize profits whereas foreign lenders' objective function might be more complex because the debt sustains our trade imbalance.

#### **A. Policymakers' Dilemma**

The basic problem is that policymakers want to make people happy and win elections, which means higher spending and lower taxes. As long as interest rates stay low and the public does not express a strong aversion to deficits, there is little cost to political pandering. These principal-agent problems between politicians and the public are analogous to the incentive incompatibilities between corporate executives and their shareholders. Corporate CEOs are rewarded financially for boosting short-term profits, even if they harm the company over the long-term. Political leaders perceive that their reelection depends on short-term results, even if the short-term expedients may be disastrous over the long term.

Indeed, policymakers may sincerely want to tackle the deficit, but their political advisors will tell them that now is not the time to take unpopular steps for the public good: "Mr. President, if you raise taxes or cut popular programs, you and your party will be defeated in the polls and the bad guys will take over. The bad guys do not share your priorities and they do not care about the deficit. Therefore, you cannot effectively deal with the deficit; all you can do is undermine your agenda."<sup>5</sup> Translation; political constraints make it impossible to deal with the deficit, so don't even try.

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<sup>5</sup> Alesina and Drazen (1991) present a formal treatment of delayed stabilization resulting from differing preferences among policymakers.

The problem resembles the classic prisoners' dilemma: two miscreants are apprehended for a crime and interrogated separately. If they both keep their mouths shut, they will be freed for lack of evidence. Their interrogators, however, tell each that the other has confessed, and if they don't confess too, they will face ten years in jail. If they cooperate, they will get off with only three years. If the criminals follow a minimax strategy — avoiding the maximum loss — they will both confess to avoid the possibility of 10 years in jail. The consequence is that both prisoners end up facing three more years in jail than they would if they cooperated.

The policymakers' dilemma is that they might want to cooperate to deal with the deficit, but they feel they have to pander to protect themselves from the risk that their political opponents will promise deficit-financed tax cuts or spending programs and defeat them in the polls. Both parties seem to have learned that the winning strategy is to play Santa Claus — simply give away goodies at every opportunity — which precludes Scrooge-like fiscal discipline.<sup>6</sup> The solution to this conundrum, as in the prisoners' dilemma, would be a binding bipartisan agreement to deal with the deficit, which could inoculate both parties from the political damage arising from proposing unpopular fiscal measures. The problem with this scenario is the increasing polarization and partisanship of the two parties makes such an agreement unlikely.

## B. Lenders' Myopia and Ulterior Motives

Failure by policymakers might be less problematic if financial markets were sending signals to policymakers that the borrowing was unsustainable. Higher interest rates would raise the actual and perceived cost of deficit financing, which would alter the political calculus in favor of fiscal restraint. However, as shown in Figure 3, at the same time that the debt was burgeoning in the last decade, interest rates were plummeting.

It is possible that interest rates would have been lower over the same time period absent government borrowing or that the Fed was keeping rates artificially low, as some have claimed. But the fact is that financial markets have not been clearly signaling that U.S. fiscal policy is on an unsustainable path.

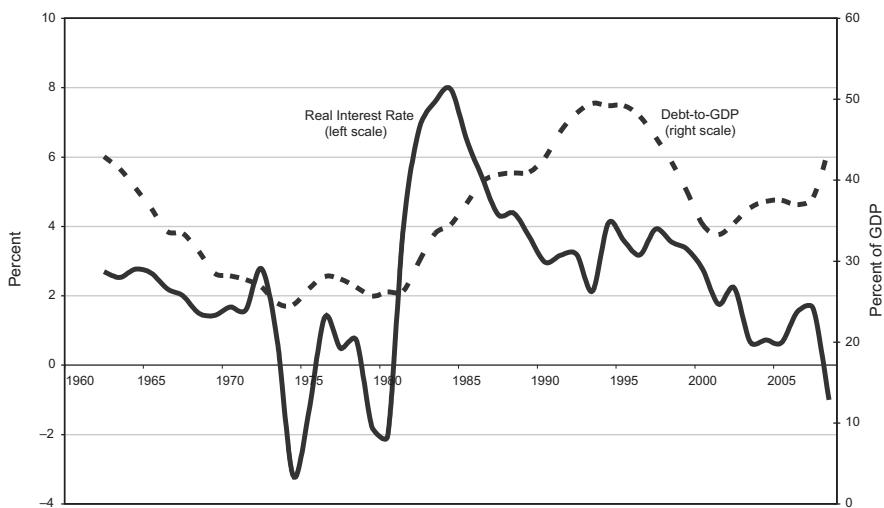
One could take solace in this fact and conclude that there is no real problem, however there is a legitimate concern that markets might not appropriately price the risk inherent in continued Treasury borrowing. Keep in mind that the same geniuses who thought they could make money selling mortgages to people with no reliable source of income and no down payment also trade government bonds. "Liar loans" were profitable as long as house prices kept growing at double-digit rates, prodded on by extremely low interest rates. That worked for a while.

The analogy in the government bond market is that the U.S. government can easily pay its debt service as long as interest rates stay low and the economy continues to grow.

<sup>6</sup> Jude Wanniski (1976) actually advised Republicans to jettison their doctrine of fiscal discipline, arguing that it hurt the party in the polls and prevented them from enacting beneficial supply-side tax cuts.

**Figure 3**

Debt versus Real Interest Rate on Five-Year Treasury Note, 1962–2008



Source: CBO (2009b), Federal Reserve Board H15, and U.S. Bureau of Labor Statistics.

Right now, even though debt is at a post-war record, interest on the debt only amounts to about 1.2 percent of GDP because interest rates are so low.

There are a number of models of debt crises in which multiple equilibria exist. In one equilibrium, interest rates are low and default is avoided. In the other, investors perceive a risk of default, which produces a self-fulfilling debt crisis, as discussed in, for example, Cole and Kehoe (2000), Calvo (1988), and Alesina, Prati, and Tabellini (1989). Romer (2005) develops a very simple model where investors require an interest rate that compensates them for the risk of default. When the risk of default is low, interest rates are low. In this model, a random shock to interest rates increases the government's debt service cost, which increases the risk of default, requiring a higher interest rate still. Under certain circumstances, this can produce a dynamic where lenders are not willing to lend at any interest rate and default is assured. That is, there is a tipping point beyond which interest rates explode and default is certain.

Other models can produce similar bubble phenomena. In herd models, investors have imperfect information and attempt to infer information from observing other market actors. If the first movers in the market act erroneously (for example, by underestimating the default risk of financial assets), other participants follow their lead. This leads

to a bubble. When additional information proves the early movers wrong, the herd exits the market.<sup>7</sup>

Another possibility that could create bubble-like behavior is if the worldwide market for government securities has a winner-take-all aspect. The safest asset, currently U.S. government securities, can secure an almost limitless supply of cheap capital, while the next most safe asset trades at a substantial risk premium. Volatility in world markets, even if it makes Treasury bonds less safe, raises the risk premium even more — increasing the flow of capital to the United States and further depressing interest rates. This would explain why Treasury yields plummeted even as the U.S. financial sector was teetering on the brink of collapse and the economy was heading into a deep recession, and it would be consistent with the further decline in U.S. interest rates when Greece and other Euro-zone countries experienced debt crises.

This has been convenient in the short-term because it enabled a huge amount of Treasury borrowing to fund economic recovery programs at minuscule interest rates, but it raises the threat of an explosion in interest rates in the future. Suppose that U.S. finances continue to deteriorate and that the European Union works out its policy coordination and monitoring problems. At some point (presumably in the distant future), investors could decide that the European Union, which is twice the size of the U.S. economy, is a better investment and Treasury interest rates could increase very suddenly. That shock could produce a tangible risk of default, which would spark an explosion in interest rates as in the bubble models described above.

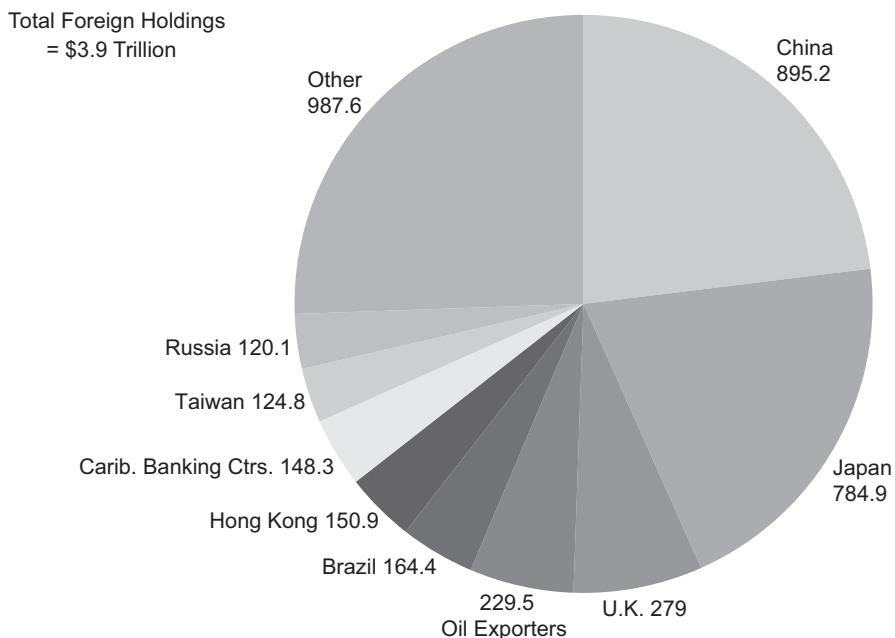
A further complication is that some investors in U.S. bonds have multiple reasons for holding U.S. debt, only one of which is a desire to earn a suitable rate of return. Figure 4 shows that foreign lenders held about half of U.S. government debt in March 2010. The money they sent us fueled demand for their exports, propping up their own economies. If they had cut off the flow of capital, the dollar would have weakened, which would have reduced demand for their products, possibly pushing their own economies into a recession. Over the long run, there is a one-to-one relationship between capital inflows into a country and its net imports. Thus, lending from overseas may be an explicit or implicit policy to boost demand for exports. This might continue even if the foreign lenders perceived an increased risk of default from the United States. And the perception that the Chinese or oil countries are willing to meet all of the United States' capital needs may provide an implicit guarantee that reassures other lenders, even if they harbor doubts about the long-term fiscal prospects of the United States.

The problem with this scenario is that foreign lenders' ability and willingness to lend to the United States is not limitless. If the United States' debt really did grow

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<sup>7</sup> Banerjee (1992) presents the seminal model of this type and Chari and Kehoe (2003) present a more robust version. There is also the possibility of "rational bubbles," in which participants recognize that prices are too high given fundamentals, but nevertheless remain in the market confident that they will be able to exit before the herd. This provides a candidate explanation for the sustained demand for longer-term Treasury securities.

**Figure 4**  
Major Foreign Holders of U.S. Debt (\$Billion), March 2010



Source: U.S. Treasury (March 2010), "Major Foreign Holders of Treasury Securities," <http://www.ustreas.gov/tic/mfh.txt>

to two or three times GDP, our borrowing would strain the resources of even OPEC and China. China, despite dramatic economic growth, is still a very poor country. If it follows the pattern of other developing nations, it will start spending more of its income domestically (and stop spending so much to bolster the consumption of the richest nation on earth). Foreign lenders would have to be concerned that an abrupt stop to the flow of capital to the United States could trigger a worldwide recession, but at some point, they might well decide that a debt crisis in the United States is unavoidable and rationally conclude that it would be better to do it sooner rather than later.

Perhaps the most distressing possibility is that a foreign lender might decide that it is in its strategic interest to provoke an economic crisis in the United States. As the U.S. debt and our dependence on foreign lenders grow, the possibility of a strategic withdrawal of capital grows too.

## IV. ANATOMY OF A DEBT CRISIS

### A. Timing

In their timely survey of debt crises through the ages, Reinhart and Rogoff (2009) show that there is no magic threshold beyond which a debt crisis is guaranteed. It depends on the nation, the time, and numerous intangible factors. Theoretical models of debt crises invariably include a “sunspot” or random component. Nearly one-fifth of countries that defaulted or required debt restructuring had external debt (held by foreigners) of less than 40 percent of GNP, and more than half of countries experiencing debt crises had debt levels below 60 percent of GNP. Thus, 60 percent might be viewed as a rough barometer of high risk for budget failure.<sup>8</sup> However, nearly one sixth of countries did not reach a crisis point until their debt level had exceeded 100 percent of GNP.

Similarly, Figure 5 shows there is a great deal of heterogeneity in debt levels among developed nations.<sup>9</sup> While the United States had a debt equal to about 40 percent of GDP in 2008, nine nations had debt-to-GDP ratios of 60 percent or more. Japan’s debt exceeded 160 percent of GDP, although that country also holds enormous reserves of foreign currency. Belgium and Italy both had debt levels over 80 percent of GDP

**Table 1**  
Distribution of Defaults or Restructurings by Debt Level,  
Middle-Income Countries, 1970–2008

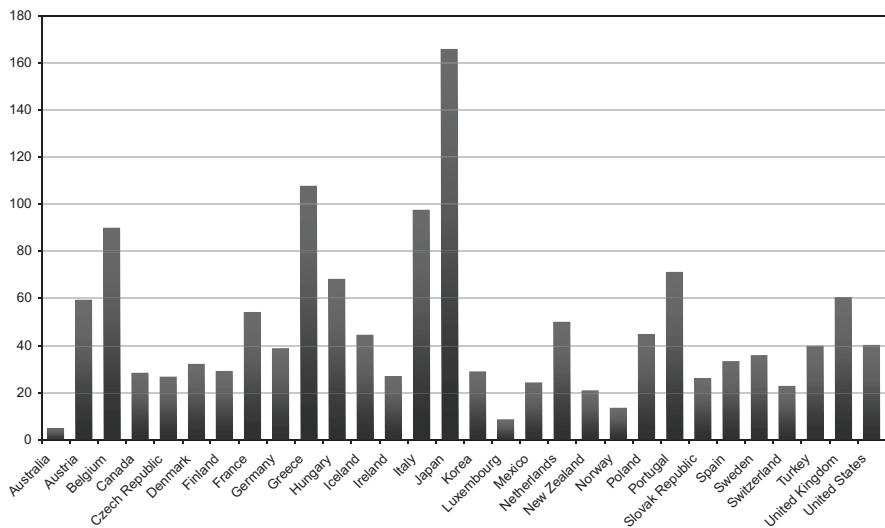
External Debt/GNP at end of first year of default or restructuring	Percent of total defaults or restructurings
< 40	19.4
41–60	32.3
61–80	16.1
81–100	16.1
> 100	16.1

Source: Reinhart and Rogoff (2009), p. 24.

<sup>8</sup> Interestingly, the European Union requires its members to have debt (both external and domestically held) below 60 percent of GDP, although enforcement is problematic. The Peterson-Pew panel recommended that the United States get its debt level down to 60 percent of GDP by 2018 before taking steps to reduce it further over the long term. The Reinhart-Rogoff data provide a basis for the seemingly arbitrary threshold.

<sup>9</sup> Figure 5 shows total debt — held by foreign and domestic lenders — and thus is not strictly comparable to the data in Table 1.

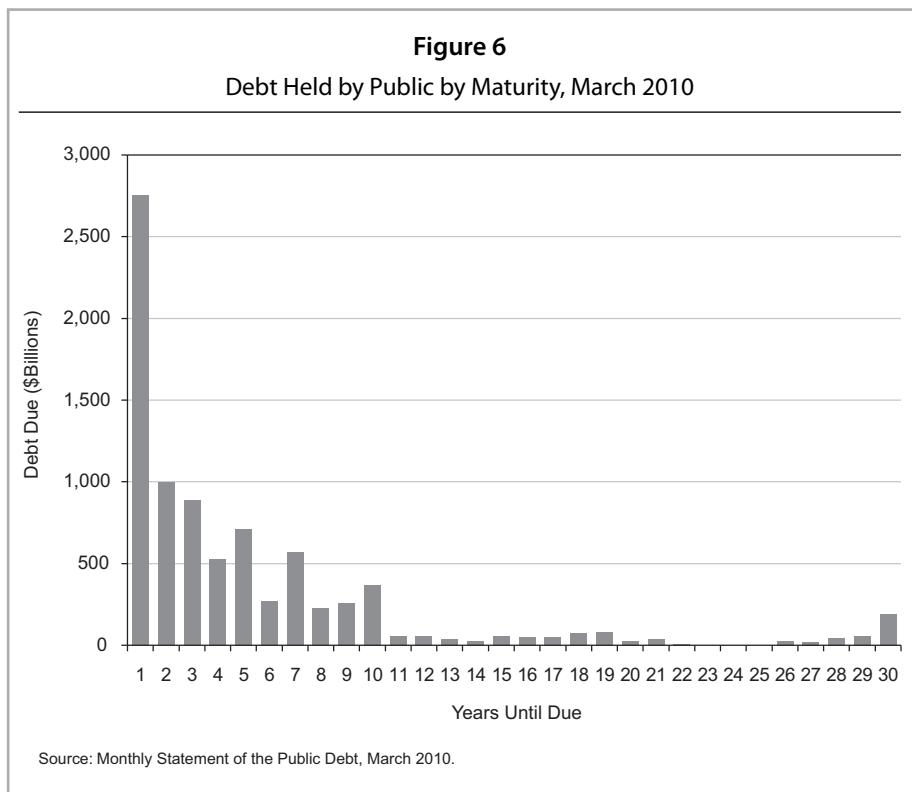
**Figure 5**  
Debt as Percent of GDP in OECD Countries, 2008



Source: OECD Stat.Extracts, [http://stats.oecd.org/Index.aspx?DataSetCode=GOV\\_DEBT](http://stats.oecd.org/Index.aspx?DataSetCode=GOV_DEBT)

and neither experienced a debt crisis. Greece did not experience its crisis until its debt reached 125 percent of GDP (although it hid the degree of its fiscal problems for quite a while). Given that the United States has much lower taxes and spending levels than those European countries, this suggests that, unless something dramatically changes in world financial markets, we may be able to accumulate considerably more debt before a crisis occurs.

That may seem reassuring, but it is in fact very bad news. To see why, suppose lenders deemed us a poor credit risk now. In March 2010, Figure 6 shows that over \$2.5 trillion of debt had a maturity of one year or less. That is, about 30 percent of our debt will need to be rolled over in the next year. If that debt could not be rolled over, the government would have to raise taxes and cut spending enough to eliminate the primary deficit, cover interest on the rest of the outstanding debt, and pay off \$2.8 trillion in bonds coming due within a year. The weak state of the economy would clearly make such draconian fiscal tightening impossible, but even if the economy were healthy, this would create enormous challenges. The debt coming due in year one is more than twice individual income tax receipts in a good year. Raising income taxes could not close the gap. Unprecedented spending cuts along with a new source of tax revenue, such as a value-added tax (VAT), would be necessary. Since these measures would take time to



implement (several years in the case of a VAT), the Federal Reserve would be forced to abandon its inflation targets and create money to purchase the bonds, at least on an interim basis. The economic dislocation created by extremely contractionary fiscal policy and extremely inflationary monetary policy would be disastrous, as discussed below.

But, as bad as it would be, the debt-to-GDP ratio in 2009 was *only* about 50 percent. If the crisis did not come until debt reached 150 percent of GDP, the economic dislocations would be tripled. The longer it takes for the crisis to occur, the worse it will be.

## B. What Happens When the Bubble Bursts?

Catastrophic budget failure amounts to the bursting of a bubble in the market for U.S. government securities. Interest rates would increase dramatically when investors decide that U.S. bonds are no longer a safe asset. As discussed in Section III.B, one possibility is that Treasury rates rapidly rise as investors update their beliefs about the future solvency of the U.S. government or their beliefs about what other investors believe about the future solvency of the U.S. government, causing Treasury bond prices

to drop and yields to soar. The U.S. dollar would fall precipitously as investors rush out of U.S. bonds and into the bonds of whichever country or region is deemed a safe haven at that moment, or, if the crisis is global, into commodities such as gold or silver.

In this comparatively rosy scenario, the U.S. government might still be able to borrow on international capital markets but it would pay an extremely large risk premium to do so. There would be no *de facto* or *de jure* default but the suddenness and magnitude of the increased borrowing costs for the government would have major macroeconomic repercussions. In fact, if the government did not respond with a credible plan for increased revenues and reduced outlays, the increased borrowing cost itself could lead investors to raise their estimate of the likelihood of a future default by the government. This could cause an upward spiral of interest rates and eventually a sudden stop in all international lending to the United States.

The more dramatic scenario involves an immediate freezing of the U.S. Treasury market altogether and an inability of the U.S. government to roll over debt that is coming due in order to make interest payments on other existing government debt or to fund government activities. In this case, no one is willing to lend to the U.S. government at any interest rate. Essentially, the Treasury holds a debt auction and no one shows up.<sup>10</sup>

Under this scenario, the government would need to buy itself some time in order to devise policies to get creditors to lend again. One option would be to default on the debt by temporarily suspending interest and principal payments on outstanding bonds.<sup>11</sup> Another possibility is a negotiated debt restructuring, by either converting short-term debt to longer-term debt or imposing “haircuts” by issuing new bonds to replace the existing ones that have a face value less than 100 percent of the original issue. As part of any rescheduling and restructuring plan, creditor countries and domestic lenders would demand certain fiscal policy actions be taken in the United States; taxes would need to rise dramatically and spending would need to be cut. Creditors would walk a fine line, however, as a dramatic fiscal contraction could hurt both United States and world growth to such an extent that even the restructured debt could not be paid back and the ground instead would be laid for future defaults.<sup>12</sup>

Another option would be a *de facto* default through printing money. In practice, this would likely involve the Federal Reserve buying up the new Treasury debt that other investors were unwilling to purchase. In exchange, the Treasury would receive funds from the Fed with which to pay interest on other existing debt and to fund government activities. In the absence of sufficient tax revenue or funding from abroad, the federal government would rely on seigniorage revenue to fund its activities.

<sup>10</sup> Alternatively, the United States might cancel the auction when it learns through futures prices and possibly even public announcements from creditor countries that it would likely have no buyers for its next debt issue.

<sup>11</sup> Along with the suspension of debt payments, the salaries of federal government workers would either go unpaid, or would be paid with IOUs that could be redeemed at a future date.

<sup>12</sup> Reinhart and Rogoff (2009) show that serial default has been common historically.

Note that the United States has no reliable way of avoiding a debt crisis as long as it accumulates more debt. The United States may be completely committed to repaying its creditors, but there is no way for creditors to know that with certainty. According to Reinhart and Rogoff (2009), sovereign defaults, unlike personal and corporate bankruptcies, often occur before nations are destitute. It is simply a cost-benefit calculus: the costs of default, which include at least temporary lack of access to foreign capital, possible international sanctions, and a confiscation of wealth from bondholders are deemed to be lower than the cost of paying off the debt.

If investors decide that a default is likely, it can become a self-fulfilling expectation, even if the United States had no intention of ever reneging on its responsibilities. Without the ability to roll over mature debt, the nation could at least temporarily become insolvent.

## V. MACROECONOMIC EFFECTS OF A DEBT CRISIS

Regardless of the nature and timing of the crisis moment, the U.S. government will have to act quickly and will lack any desirable options. In addition to higher interest rates, the solution would necessarily involve massive fiscal adjustment.<sup>13</sup> What would the likely macroeconomic consequences of a dramatic and severe debt crisis be?

### A. Effects on Output and Growth

Qualitatively, a standard short-run Keynesian-type macroeconomic model would predict that a dramatic increase in the risk premium would mean that the U.S. government, and domestic firms and households, would no longer be able to borrow at the “world” interest rate that was previously available to them.<sup>14</sup> The increased borrowing cost for domestic firms would reduce the expected profitability from investment and therefore reduce aggregate investment spending. Households would also face higher borrowing costs and would reduce consumption spending as well. Both of these would act as a further drag on aggregate demand at the same time that the government was forced to raise taxes and cut spending. In theory, the depreciation of the U.S. dollar should help exporters as the relative price of U.S. goods would fall on international markets. This would help to offset the drop in aggregate demand caused by domestic forces. A complicating factor is that if the economic downturn in the United States were to spread to other countries — a highly likely scenario given the large role of the United

<sup>13</sup> The magnitude of the adjustment would be strongly influenced by the timing of the crisis moment. In fact, if corrective policies were adopted early enough that either the size of outstanding debt was “modest” or most of the adjustment could take the form of credible commitments to reduce future government deficits, the macroeconomic effects could be manageable. Alesina and Perotti (1995) present evidence of expansionary fiscal contractions.

<sup>14</sup> Jones (2009) provides a standard textbook treatment of the introduction of a risk premium into a short-run Keynesian model. His discussion is in the context of the current financial crisis.

States in the world economy and the number of countries that would be vulnerable to a future default by the United States through their holdings of Treasury securities — there could be a worldwide drop-off in demand for U.S. exports despite their lower price in foreign currencies.

Existing estimates of the effects of increased interest rates and fiscal contractions are difficult to apply to a situation like this. In modern times, no country as economically dominant as the United States has suffered such a series of macroeconomic setbacks at the magnitudes that would likely occur under this scenario. In addition, macroeconomic models vary widely in their predictions for the effects of fiscal policy on real variables such as output and unemployment.

In its recent analysis of the macroeconomic effects of the 2009 stimulus legislation, the Congressional Budget Office produced a range of estimates by relying on several different types of analysis: output from macroeconometric forecasting models, general equilibrium macro models, and direct extrapolation of historical data (CBO, 2009a).

Macroeconometric models are typically large-scale models that predict the economy's potential level of output based on estimated stocks of capital and labor combined with a production technology. In addition, they model the different components of aggregate demand based on historical data and theoretical assumptions about the determinants of the components of aggregate demand such as consumption and investment. These models typically allow for a role for aggregate demand in the determination of output in the short-run and therefore tend to produce the largest multipliers for fiscal policy changes.

Another class of models — general equilibrium (GE) models — is built up from optimizing behavior of rational, perfectly informed individuals and firms. Individuals in these models are typically forward-looking and base their decisions of how much to work, consume, and save on their expectations of current and future income, interest rates, government tax and spending policies, and other economic variables. GE models typically produce estimates of fiscal policy multipliers that are significantly lower than those produced by more Keynesian-type macroeconometric models.

CBO's conclusions based on these models and on historical experiences were that direct changes to government spending would have a multiplier in the range of 1.0–2.5. This means that a \$1 increase in government spending could be expected to increase real GDP by somewhere between \$1 and \$2.5 over the next several quarters. Tax changes would have a multiplier between –0.5 and –1.7. The tax changes examined by CBO were temporary in nature, however, and aimed primarily at lower-and middle-income households. Permanent tax changes would likely have a larger impact.<sup>15</sup>

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<sup>15</sup> The permanent income hypothesis holds that consumers base spending decisions on their expected lifetime income and that temporary changes in income have little effect on current consumption decisions. Recent empirical evidence confirms that consumers saved a significant fraction of temporary stimulus payments (Shapiro and Slemrod, 2009).

Extrapolating based on these estimates, if the crisis forced the U.S. government to close a budget gap of, for example, 10 percent of GDP, the resulting fall in output might approach 25 percent — a decline not seen since the Great Depression.

Romer and Romer (forthcoming) use a different approach to estimate fiscal policy multipliers, specifically the tax multiplier. They sift through the historical narrative record to derive the size, timing, and purported justification for each major postwar tax change in the United States. This allows them to separate out tax changes that occur in response to economic conditions and those that occur for exogenous reasons. Using the observations where tax changes occur for exogenous reasons allows the Romers to overcome the omitted variable bias inherent in simple regressions of output against measures of changes in taxes. Their approach yields a large tax multiplier, close to 3 in absolute value. Taken at face value, this means that the negative impact on output could be even larger than the CBO analysis suggests. The Romers make several points about their results. The first is that their results do not say anything about whether the tax multiplier is larger than the government spending multiplier despite the fact that their tax multiplier estimate is much larger than other estimates. The government spending multiplier estimates could suffer from the same omitted variable bias that they describe for tax changes. Second, although their estimates are significant, they are imprecise and the confidence interval for the multiplier is quite large. Finally, the Romers find some weak evidence that tax changes that are undertaken for the purpose of reducing the budget deficit have a smaller negative impact on output than changes taken for other reasons, such as to stimulate long-run growth.

For an historical perspective, Reinhart and Rogoff (2009) construct an extensive dataset on financial crises — external and domestic defaults, banking crises, and combinations of the two — across countries through the last two centuries. They find that real GDP falls an average of 1.4 percent in the year before an external default and 1.2 percent in the year of default. Countries experiencing severe banking crises saw their real GDP drop by an average of 9.3 percent and the average time from peak to trough was two years. For countries that experienced severe financial crises, it took an average of 4.4 years for real GDP to reach pre-crisis levels and public debt increased by an average of 86 percent. But it is not clear how relevant these experiences would be to the United States.

Over the longer term, a standard neoclassical model would predict that reduced investment, caused by either lack of access to international capital markets or an elevated risk premium, would depress capital accumulation and lead to a lower level of growth and future living standards. If government cutbacks extend to research and development, as is likely since the government would reduce spending on all but the most essential goods and services, technological progress and thus total factor productivity growth could also fall. In endogenous growth models, a reduction in innovation feeds back to further retard economic growth, compounding the damage, as discussed by Romer (1990) and Jones (2003). Reinhart and Rogoff (2010) estimated that heavily indebted countries (debt-to-GDP ratios over 90 percent) grow

by an average of 1.3 percent per year less than otherwise similar countries with less debt.<sup>16</sup>

## B. Effect on Inflation

As both economic theory and history indicate, the result of (or perceived threat of) using seigniorage to fund government activities is inflation and if taken to an extreme, hyperinflation. Inflation can have the benefit of reducing the real value of any outstanding debt, however that benefit is limited if debt is concentrated in short maturities. In many other countries, particularly emerging economies, there is a sharp distinction between the nature of external and domestic debt, as pointed out by Reinhart and Rogoff (2009). External debt is typically denominated in foreign currency whereas domestic debt, generally held by domestic residents, is denominated in domestic currency. Thus inflation would erode the real value of domestic debt but not external debt. Accordingly, historical inflation rates surrounding external defaults are much lower than those experienced during a domestic default. Reinhart and Rogoff find that the average inflation rate during the year of an external crisis is 33 percent with inflation averaging 32 percent during the three years following the crisis. The equivalent figures for domestic defaults are 171 percent and 120 percent. From beginning to end of crisis, Reinhart and Rogoff estimate that prices increased 9,000 percent, on average. Put differently, a pre-crisis dollar was worth 1.1 cents three years after the debt crisis. For the United States, debt held by both domestic and foreign entities is denominated in dollars. Thus inflation in the United States would dramatically deflate the value of both external and domestic debt resulting in an effective default on the vast majority of the debt.

While printing money “works” in the limited sense of paying off creditors with cash, the cost to the United States and world economies of the resulting inflation or hyperinflation should not be underestimated. All holders of dollar denominated assets, including all U.S. financial institutions, would experience a huge decline in wealth. Effectively, the average level of inflation calculated by Reinhart and Rogoff would amount to a 99 percent tax on all existing wealth (and a huge windfall to debtors). Financial institutions would suffer much greater losses than in the 2008 financial meltdown, and the insolvent federal government would be powerless to help them. The “wealth effect” of devaluing asset holdings would dramatically cut domestic consumption, compounding the contractionary effect of the government’s tax increases and spending cuts. Because many contracts are set in nominal dollars (without an adjustment for inflation) many

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<sup>16</sup> The authors did not find a significant effect on GDP at lower debt levels. The estimated correlations do not necessarily imply a causal link. Countries experiencing unusually slow growth may accumulate debt because of a diminished tax base and increased demand for public services. Or it may be that countries that are prone to fiscally irresponsible policies are also susceptible to other policy choices that impair economic growth. However, higher interest rates arising from burgeoning debt would depress economic output by lowering productivity, although the effect would tend to grow steadily with the debt-to-GDP level rather than jump precipitously at a threshold rate. Nonetheless, the Reinhart-Rogoff estimates may illustrate an average level of response of output to debt that is broadly consistent with their dataset.

businesses would suffer huge losses and many would fail. And because dollars would be devaluing so quickly, households and firms would take steps to minimize the holding of cash. In the extreme, barter might become preferable, but barter is inefficient.

And, while inflation effectively devalues outstanding debt, its immediate effect is to increase deficits because many government programs are explicitly or implicitly indexed for inflation (Auerbach and Gale, 2009). Social Security benefits are indexed and would explode along with price levels (although the devalued Social Security trust fund would quickly be exhausted, requiring huge reductions in real benefit levels barring Congressional action). Medicare and Medicaid costs would also tend to grow with the price level. Meanwhile, tax revenues, which are indexed for inflation, would tend to lag because wages and capital incomes would likely fail to keep pace with inflation for many years. And, to the extent that further inflation is expected in the future, nominal interest rates would explode, causing the debt to accelerate dramatically.

Printing money without some negotiation with foreign creditors, and certainly without concomitant actions to reduce the budgetary imbalance, would thus not be a long-run solution. It is highly unlikely that the United States would regain access to international capital markets if it were to simply walk away from its external debts or if it continued to technically meet its debt payment requirements using dramatically devalued dollars. A more realistic scenario would be to print money as a temporary stopgap until the United States could agree with its creditors on a restructuring of its debt. However, there would be enormous pressure on policymakers to continue providing essential services and at least a fraction of the Social Security and Medicare that were promised to seniors. As a result, inflation would be almost inevitable since the government could not provide those services and pay off its creditors without income from seigniorage.

The final piece in this macroeconomic tragedy is that the failure of the U.S. Treasury market would almost certainly set off a severe global financial crisis. Banks and other lending institutions that hold U.S. Treasuries would see their balance sheets rapidly deteriorate. This would lead to widespread asset devaluation and a deleveraging and liquidity crisis similar to — although more severe than — the one the world experienced in 2008.

The bottom line is this: catastrophic budget failure would produce a worldwide recession or depression and likely provoke a massive financial market meltdown. Government would have to raise taxes to unprecedented levels while slashing spending to the bone, simply to pay off its creditors. Neither liberals nor conservatives would be able to take any solace in that outcome. There would be a serious risk of inflation or hyperinflation, with the attendant large economic costs. It could easily take the nation a generation or longer to recover from the disaster.

## **VI. AVOIDING CATASTROPHIC BUDGET FAILURE**

The good news is that the risk of catastrophic budget failure is probably still years away. The United States debt exceeded 100 percent of GDP at the end of World War II, and the nation was able to pay it down fairly quickly. To be sure, there was an enormous peace dividend to ease the way and most of the debt was held domestically. Even so,

the sudden reduction in government spending led to a significant economic recession, but the results were not disastrous. While the United States lacks a comparable peace dividend now, we are much, much richer than we were in 1945. Paying down the debt in an orderly fashion is feasible.

The question is what would precipitate a change in policy. One option is presidential leadership. President Obama and his senior advisors are clearly concerned about the long-term budget situation. The president could signal an interest in working with Republicans to craft a bipartisan budget process that would control deficits. Jens Henriksson (2007), who served several ministers of finance in Sweden as that country dealt with a debt crisis, advises that liberals could signal commitment by offering to cut spending, and that conservatives could do likewise by offering to support tax increases.<sup>17</sup> For example, the president could offer to cut spending by a dollar for every dollar that taxes increase. It is not clear that this approach would be successful because it would be extremely unpopular with the base of each political party, but something like it has to happen.

In fact, the president has sent mixed messages about fiscal discipline. While his budget would produce almost \$10 trillion in deficits over the decade, it also supported the creation of a bipartisan deficit commission. Legislation to enact such a commission failed to pass Congress because of opposition from liberals who feared its effect on cherished programs and conservatives concerned that the panel's recommendations would include more taxes. Instead the president created a commission by executive order with members appointed by legislative leaders from both parties. However, since all of the Republican members appear inalterably opposed to any tax increases, the scope for compromise seems limited, and many analysts believe the panel is doomed to failure.

Another possibility is that budget deficits become salient to voters. This might happen when the debt-to-GDP ratio crosses the threshold for admission to the European Union or it might happen when debt exceeds 100 percent of GDP — the level last seen at the end of World War II. Or the insolvency of the Medicare trust fund, currently projected to occur in 2017, might force a reexamination of spending on medical care for seniors and the revenues that fund it. If Medicare's finances were brought into balance, the long-term budget situation would brighten considerably (although excess spending growth in Medicaid and Social Security's actuarial imbalance would still swell the debt over time, albeit more slowly).

Alternatively, the public may become aware of ways in which growing debt is constraining behavior in undesirable ways. For example, the *New York Times* reported that the president soft-pedaled on human rights during a visit to China because of concerns about alienating a major lender: "The result: unlike his immediate predecessors, who publicly pushed and prodded China to follow the Western model and become more open politically and economically, Mr. Obama will be spending less time exhorting Beijing

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<sup>17</sup> Henriksson (2007) also suggests that the leader promise to resign if budget targets are not met. Given the highly polarized political environment in the United States, that threat might not evoke the desired response.

and more time reassuring it.”<sup>18</sup> Or citizens may begin to understand the connection between government deficits and anemic private saving and the balance of trade deficit. If voters thought that the budget deficit increased the risk of their job moving to China, they might become more concerned about it.

Finally, the press might step up reporting on the consequences of catastrophic budget failure. McCombs and Shaw (1972) report that public opinion does not move until the mass media report an issue as news. The only problems are (1) a large and growing debt ceases to become news unless there is a related crisis (which might come too late), and (2) it is not clear who is setting the agenda in an era of bloggers and custom-tailored news.

## VII. CONCLUSION

Continuation of current patterns of taxing and spending would cause U.S. debt levels to reach unprecedented levels. The CBO (2009b) calculates that debt would reach 100 percent of GDP by 2023 and 200 percent of GDP by 2038. As bleak as those projections are, they do not reflect likely macroeconomic feedback effects. Including the effects of rising debt on interest rates and economic growth, the debt-to-GDP ratio will increase even faster.

We fear, however, that a far worse scenario may be in our future. It is possible that interest rates will not respond significantly to rising debt levels for many years — because of a bubble in financial markets or because foreign lenders have an incentive to fuel our imports by enabling our large budget deficits. This cannot go on forever and when the bubble bursts, the consequences for the United States would be a severe recession or depression with a significant probability of hyperinflation. Since the United States is so large relative to the world economy, catastrophic budget failure would likely create economic carnage around the world, which could feed back to deepen and lengthen our own economic decline.

Unfortunately, given current knowledge, it is impossible to predict when or even if such a budget crisis could occur or exactly how it would play out. However, the possible consequences are so severe that avoiding it should be a high priority. The solution is relatively straightforward: cut spending, especially for entitlements, and raise revenues to stabilize and eventually reduce debt as a share of the economy.

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<sup>18</sup> See Cooper, Wines and Sanger (2009).

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