

Global Finance Brief

Brandeis International Business School • Rosenberg Institute of Global Finance

How Will We Pay Down the Bush-Obama Debt? Lessons from the Last 60 Years*

George J. Hall, Associate Professor of Economics
Brandeis International Business School
Spring 2010

By the end of 2009, privately-held U.S. Treasury debt stood at 53.0% of the gross domestic product (GDP), double the share from when President George W. Bush took office nine years ago. As illustrated in Figure 1, this ratio is below its peak of 66.2% in 1945. The Congressional Budget Office estimates that it will continue on its upward trajectory and return to World War II percentages by the end of 2012 as a consequence of extraordinarily large primary fiscal deficits and weak GDP growth.¹ This debt surge has awakened concerns that rising government interest payments could eventually unleash inflation, prompt drastic cuts in government spending, or lead to sharp increases in taxes.²

So how will we as a nation cover these interest payments and ultimately pay off this debt? Will we choose to inflate our way out, implicitly defaulting on the government's creditors by paying them negative real returns? Will we be able to grow our way out? Or will we face decades of higher taxes and lower government services? While it is difficult to predict the future, it is instructive to examine how the government has handled large magnitudes of debt relative to GDP before. As we will see, since World War II, the U.S. occasionally inflated away its debt. For the most part, however, the U.S. has grown its way out of debt and paid down its debt by running primary surpluses.³

Can the U.S. repeat its post-war debt payday? Yes, but with some caveats. During the last 60 years the U.S. experienced robust economic growth. There is no reason not to expect this trend to continue for the next 60 years. However, the government faces significant challenges in its ability to raise taxes and limit spending sufficiently to run primary surpluses or to use inflation to erode the returns to its creditors. The rise of entitlement programs such as Medicaid and Medicare has handcuffed the government's ability to control spending compared to the period immediately following the war. Unlike in the late 1940s, a much larger share of the outstanding debt resides in short-term obligations that limit the impact of inflation on owners of nominal debt. Finally, a much larger share of the U.S. debt is held abroad, which means default via inflation has global consequences as well as domestic ones.

The Government Budget Constraint

To understand how the debt-to-GDP ratio evolves from year to year, it is useful to write down the government's *inter-temporal budget constraint*. Mathematically, let B_t denote the real value of government

Rosenberg Institute of Global Finance

The Rosenberg Institute of Global Finance seeks to analyze and anticipate major trends in global financial markets, institutions, and regulations, and to develop the information and ideas required to solve emerging problems. It focuses on the policy implications of economic globalization. The Institute, founded in 2002, is named for Barbara C. Rosenberg '54 and Richard M. Rosenberg.

* This brief summarizes calculations and extends discussion from joint work with Professor Thomas J. Sargent of New York University, "Interest Rate Risk and Other Determinants of Post WWII U.S. Government Debt/GDP Dynamics." This paper is available from <http://people.brandeis.edu/~ghall>. I thank Catherine Mann for helpful comments.

1. See Summary Table 1 on page xii of "The Budget and Economic Outlook: Fiscal Years 2010 to 2020," *Congressional Budget Office*, January 2010. A *primary deficit*, sometimes called a *net of interest deficit*, is government expenditures on goods and services plus transfer payments minus tax revenues. It excludes net interest payments on the debt.

2. See, for example, Edward Andrews' article in the November 22, 2009 *New York Times*, "Payback Time: Wave of Debt Payments Facing U.S. Government," and Michael Kinsley's column in the April 2010 issue of *The Atlantic*, "My Inflation Nightmare: Am I Crazy, or is the Commentariat Ignoring Our Biggest Threat?"

3. A *primary surplus* is the negative of a primary deficit. See footnote 1.

debt owed the public at the end of year t . This value rises or falls depending on the nominal interest rate i_t , the inflation rate π_t , government spending (excluding interest payments) g_t , and tax revenue τ_t according to:

$$B_t = B_{t-1} + (i_t - \pi_t)B_{t-1} + g_t - \tau_t$$

In words, the value of the debt at the end of this year is equal to the value of the debt at the end of last year plus the real, inflation-adjusted return government creditors received (i.e. $(i_t - \pi_t)B_{t-1}$), plus the deficit (i.e. $g_t - \tau_t$).⁴ By dividing both sides by year t 's real GDP, denoted by Y_t , we can describe the year-to-year evolution of the debt to GDP ratio, as shown in Figure 1, by:

$$\frac{B_t}{Y_t} = \frac{B_{t-1}}{Y_{t-1}} + (i_t - \pi_t - \gamma_t) \frac{B_{t-1}}{Y_{t-1}} + \frac{g_t - \tau_t}{Y_t}$$

where γ_t denotes the growth rate in real GDP from year $t-1$ to year t . Note that if the real rate of return on the debt ($i - \pi$) exceeds the growth rate in GDP (γ), the debt-to-GDP ratio will rise even if the government balances its budget ($g - \tau = 0$).

The Post-World War II Experience

Table 1 displays the decomposition of the change in debt-to-GDP ratio since the start of World War II. In each row, the table reports the starting and ending values of the debt-to-GDP ratio. The remaining columns decompose the change in this ratio into parts due to: i) the nominal, i , and real, $i - \pi$, returns paid to the government's creditors; ii) the inflation rate π ; iii) the growth in real GDP, γ , and; iv) the ratio of the primary deficits to GDP, $(g - \tau)/Y$. Thus this table reveals the following patterns in which the U.S. grew, inflated, and paid its way toward the higher or lower debt-to-GDP ratios plotted in Figure 1.

From 1945 to 1974, the United States reduced its debt-to-GDP ratio from its historical high of 66.2% to just 11.3%. During these three decades, the U.S. reduced this ratio by 54.9 percentage points through a mixture of negative real returns on its bonds (i.e., inflation exceeded the nominal return to the bondholders), primary surpluses (i.e., taxes exceeded spending), and rapidly growing real income.

Inflation played a key role early in this period. Immediately after the war, as the government lifted price controls, prices shot up and imposed real capital losses on long-term bondholders that exceeded 25%. With much of the debt during this period issued with long-term bonds, the average length of maturity of the outstanding debt exceeded seven years (see Figure 1). However over this 30 year period, only 12.5 of the 54.9 percentage point decline (or about 20% of the decline) in the debt-to-GDP ratio came from using inflation to deliver negative returns to bondholders. The remaining 80% was split about equally between growth in GDP and running primary surpluses.

Since the early-1970s, the mix has changed. During the 1970s, the U.S. continued to inflate away part of the debt, but the magnitudes were small – reducing B/Y by only 0.6%. Long term bond

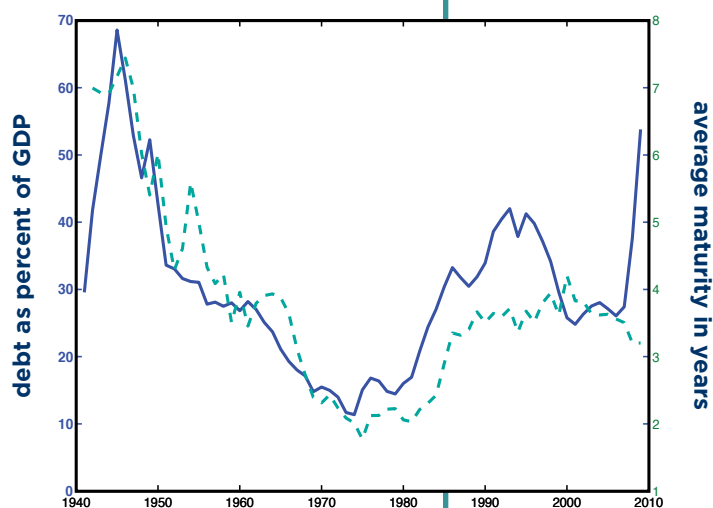


Figure 1: The Ratio of Treasury Debt to GDP and the Average Length of Maturity.

Source: Authors' calculations. The solid blue line is the ratio of the market value of privately-held, marketable Treasury debt to GDP. The dashed teal line is the average maturity of this debt in years.

4. Of course, the nominal yield i_t and the real stock of debt B_t in the budget constraint are averages of pertinent objects across terms to maturity and both nominal and Treasury Inflation-Protected Securities (TIPS). To bring out some of the consequences of interest rate risk and the maturity structure of the debt for the evolution of the debt-to-GDP ratio, we need to generalize the government budget constraint to recognize that the government pays different nominal one-period holding period returns to the bonds of different maturities that compose B_t . See the paper cited in the opening footnote for an analysis of this more general case.

Period	start	Debt/GDP (B/Y) end	change	Real Return $i-\pi$	Nominal Return i	Inflation $-\pi$	GDP Growth $-\gamma$	deficit/GDP $(\gamma-\tau)/Y$
1945-1974	66.2	11.3	-54.9	-12.5	21.7	-34.2	-21.6	-20.8
1974-1981	11.3	16.6	5.4	-0.6	7.5	-8.1	-3.3	9.3
1981-1993	16.6	42.0	25.4	24.9	36.5	-11.6	-10.9	11.3
1993-2000	42.0	25.9	-16.2	11.5	16.1	-4.6	-10.0	-17.7
2000-2008	25.9	37.8	11.9	5.7	10.9	-5.2	-4.5	10.7
1945-2008	66.2	37.8	-28.4	28.8	92.6	-63.8	-50.3	-7.1

holders in particular received negative real returns, but there was simply not much debt outstanding. As can be seen in Figure 1 and the second row of Table 1, the debt-to-GDP ratio was less than 20% during this period. Further, federal legislation at the time made it difficult for the Treasury to issue long-term debt, reducing the average maturity of the outstanding debt (see Figure 1) and thus limiting the government's ability to use inflation to impose real capital losses on its creditors as it had done immediately after World War II. Despite the high inflation during this period B/Y continued to grow during the 1970s due to insufficiently rapid real GDP growth and primary deficits.

Since the early 1980s, government creditors have on average been paid positive real returns. In particular, during the early 1980s, when, perhaps unexpectedly, Paul Volcker brought down inflation, government bondholders earned large real returns that outpaced the growth in real GDP, increasing B/Y beyond what would have been realized by the Reagan-era primary deficits themselves. Observers who point to the 1970s as a time during which the U.S. was able to pay negative returns to its creditors through inflation often fail to acknowledge that the subsequent dis-inflation generated large real capital gains for many of those same creditors.

During the Reagan-H. W. Bush years (1981-1992), the debt-to-GDP ratio grew from 16.6 in 1982 to 42.0 in 1993 – an increase of 25.4 percentage points. Almost half of this increase (11.3) came from primary deficits. Despite strong GDP growth, B/Y grew by more than the primary deficits due to large real returns paid to bond holders, particularly long-term bond holders. While long-term bondholders were heavily taxed by inflation after WWII, they did very well when Volcker brought inflation down during the early 1980s.

Of course, the 1990s were a period in which the debt-to-GDP ratio fell from 42% in 1993 to 26% in 2000. This 16 percentage point drop was driven almost solely by years of primary surpluses (-17.7). The contribution of growth in real GDP (-10.0) was offset by real interest payments to bondholders (11.5). In contrast, during George W. Bush's presidency (2001-2008), primary deficits largely fueled growth in indebtedness with B/Y rising 12 percentage points from 26% to 38%. As in the previous decade, real returns to bond holders approximately offset GDP growth.

Over the entire post-war period from 1945 to 2008, the debt-to-GDP ratio fell from 66% to 38%. During these 63 years, nominal returns to government creditors exceeded inflation. While the government has at times inflated away its debt, on average, government creditors were paid positive returns. These returns pushed up the debt-to-GDP ratio 28.8 percentage points. The government ran primary surpluses for 43 of these 63 years. By this accounting one quarter (i.e., $7.1/28.4$) of the drop in indebtedness is due the government simply paying off the debt. But by far and away the largest component of the post war debt paydown is economic growth. How did we pay off our World War II debt? The short answer is we grew out of it.

Table 1. Contributions to Changes in the Debt-to-GDP Ratio

Source: Authors' calculations. The change in B/Y is decomposed into the sum of three components: the real return on the debt, GDP growth, and the deficit-to-GDP ratio. The real return contribution is further decomposed into contributions from the nominal return and inflation. The difference between the sum of the components and the change in B/Y since 1993 are the contributions from TIPS.

Going Forward

So what about the next half century? Will we be able to pay down our debt as we did in the three decades following World War II? There are causes for both optimism and concern.

As we have seen, economic growth is key. This provides a reason for optimism. Over any 20-year period in the last century real GDP in the United States has grown on average about 3.3% per year. There is no reason the U.S. should expect anything less in the next century. Nevertheless, policies that encourage productivity growth are essential; we cannot afford another 1970s-era productivity slowdown.

Economic growth will be even more important since in other ways the situation today is very different from the one immediately after the World War II. Most importantly, World War II was a temporary event. At the conclusion of the war, the U.S. was able to stop running large deficits, cut government spending, and start running surpluses. Today's budget deficits are largely driven by two wars whose end dates are far from certain and entitlement programs that require ever-increasing payments.⁵ It is difficult to envision Congress and the President mustering the political will required to undertake an agenda of higher taxes and lower spending. Having said this, during the highly polarized political environment of the 1990s, the Clinton administration and the Republican-controlled Congress did run primary surpluses from 1994 to 2001, which brought the debt level down substantially.

Unlike the late-1940s, inflation is not a solution. Today a much larger share of the U.S. debt is held in short-term securities. Immediately after World War II the average maturity of the outstanding portfolio of Treasury debt was seven years. Currently it is about half that with an increasing share due within one year.⁶ Any attempt to nail long-term bondholders with real capital losses through inflation will be tempered by quickly rising short-term rates. Furthermore, the experience of the early 1980s reminds us that while rising inflation is bad for long-term bondholders, falling inflation is good for them. Even if the government can engineer a brief burst of inflation, eventually this inflation must be brought down.

Finally, today much of the U.S. Treasury debt is held abroad. Up until the late 1960s foreigners accounted for less than 5% of the total public holdings. Currently foreigners, primarily foreign central banks, own nearly half the quantity of outstanding debt. China and Japan each hold roughly 10% of the privately-held Treasury securities.⁷ Fiscal decisions that trade off the interests of taxpayers with those of government bondholders are no longer purely domestic issues. They now have global implications. Delivering low returns to bondholders via inflation could exacerbate tensions with our financial partners and risk the dollar's dominant role in the world economy.

For additional copies or more information about the Rosenberg Institute of Global Finance contact:

International Business School
Brandeis University
415 South Street – Mail Stop O32
Waltham, MA
781-736-2178
ibsceneters@brandeis.edu
www.brandeis.edu/global/rosenberg

5. The three primary entitlement programs, Social Security, Medicare, and Medicaid, currently account for 40.5% of federal government outlays. Payments to these three programs are expected to increase to 51% of total outlays by 2020. (See Table 3-1 on page 48 of CBO *op. cit.*) Further, Social Security is *de jure* indexed to inflation while Medicare and Medicaid are *de facto* indexed, making it difficult for inflation to erode the government's obligations to recipients of these programs.

6. See Figure 1. In 2005, 33% of the marketable debt was scheduled to mature within one year. By December 2009 this share had risen to over 37%. See Table FD-5 of the *Treasury Bulletin*, March 2010.

7. See Table 1-6 on page 19 of CBO *op. cit.*