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Did the United States Really Grow Out of Its World War II Debt?†

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This paper examines the effects of primary budget surpluses, surprise inflation, and pegged interest rates before the Fed-Treasury Accord of 1951 on the US public debt/GDP ratio. We find that with the primary budget balance and without distortions in real interest rates caused by surprise inflation and the pre-Accord peg, debt/GDP would have declined only from 106 percent in 1946 to 74 percent in 1974, not to 23 percent as in actual history. Our findings imply that, over the last 76 years, only a small amount of debt reduction has been achieved through growth rates that exceed undistorted interest rates. (*JEL* E23, E31, E43, E65, H61, H63, N12)

Does a high level of national debt impose a burden on future generations who must pay it off? In recent years, economists such as Blanchard (2019) and Furman and Summers (2020) have suggested that the answer may be no, because $r < g$: The real interest rate on debt is usually below the growth rate of the economy. Under that condition the government can roll over the debt and accumulating interest without raising taxes, and the debt/GDP ratio will fall over time. Because of this possibility, a growing number of economists agree with Blanchard that "public debt may have no fiscal cost." This idea has decreased concern about the high current level of US debt.

Thinking on this issue has been influenced by a salient historical experience: the decline in the US debt/GDP ratio after World War II. Paying for the war increased this ratio from 42 percent in fiscal year 1941 to 106 percent in 1946, but then it started to fall and reached a trough of 23 percent in fiscal year 1974. As Elmendorf and Mankiw (1999) report, "an important factor behind the dramatic drop between 1945 and 1975 is that the growth rate of GDP exceeded the interest rate on government debt for most of that period." Krugman (2012) says that the "debt from World War II was never repaid and just became increasingly irrelevant as the US economy

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grew." This interpretation of history lends credence to the idea that a high level of debt should not cause great concern.[1]

However, other researchers have suggested reasons to question this interpretation. First, as discussed by authors such as Hall and Sargent (2011) and Eichengreen and Esteves (2022), the United States actually paid off part of the World War II debt by running primary surpluses—by levying taxes in excess of current government spending—over much of the period when the debt/GDP ratio was falling. Second, as discussed by authors such as Reinhart and Sbrancia (2015), interest rates were held down relative to economic growth through policies that are not likely to be feasible and/or desirable in the future. These policies included episodes of financial repression, most clearly the Fed's pegging of interest rates at low levels from 1942 to 1951, which was aimed at decreasing the cost of the war. In addition, ex post real interest rates were reduced by unexpected rises in inflation in the aftermath of the war and later in the 1960s and 1970s. Because of these factors, the postwar experience does not necessarily suggest that the US economy naturally grows out of debt.

This paper seeks to explain the path of the debt/GDP ratio since its 1946 peak of 106 percent. We estimate the effects on this path of the government's primary surpluses, the interest rate peg before 1951, and surprise inflation. We then derive a counterfactual path that the debt/GDP ratio would have followed in the absence of these factors. This counterfactual shows how much the ratio was reduced by growth rates in excess of undistorted real interest rates—rates that are not reduced by either a peg or surprise inflation.

We find that this counterfactual scenario differs greatly from actual history. Without primary surpluses and interest rate distortions, the debt/GDP ratio falls only from 106 percent in 1946 to 74 percent in 1974, rather than falling to 23 percent as in reality. Over the three decades after World War II, the natural erosion of debt from economic growth was considerably smaller than is often suggested.

We also extend our counterfactual to the present, with even more negative findings about growing out of debt. The counterfactual debt/GDP ratio starts rising again in 1980, and in 2022 it is 84 percent: The earlier decline in the ratio is partially reversed, leaving it only 22 percentage points below its 1946 level. The rise in the ratio reflects the fact that the economy's growth rate has averaged *less* than the undistorted real interest rate on debt since 1980.

Our method for constructing counterfactual debt paths builds on previous work, but uses a richer set of information to make our quantitative results as accurate as possible. A key step is to measure the fractions of outstanding debt in a given year that were issued in each earlier year—the "reverse maturity structure" of the debt—which we do using granular data on Treasury securities produced by Hall, Payne, and Sargent (2018) before 1960 and by Center For Research in Security

[1] This interpretation appears in many public discussions of debt. For example, the Council on Foreign Relations (McBride, Berman, and Anshu 2023) says: "Over the next thirty years [after World War II], sustained economic growth gradually reduced debt as a percentage of the economy, despite expensive wars in Korea and Vietnam and the establishment of major entitlement programs." Writing in *The Atlantic*, Phillips (2012) says "The United States never really tried to pay down much of the debt it incurred during World War II. Still the debt shrank in significance as the US economy grew."

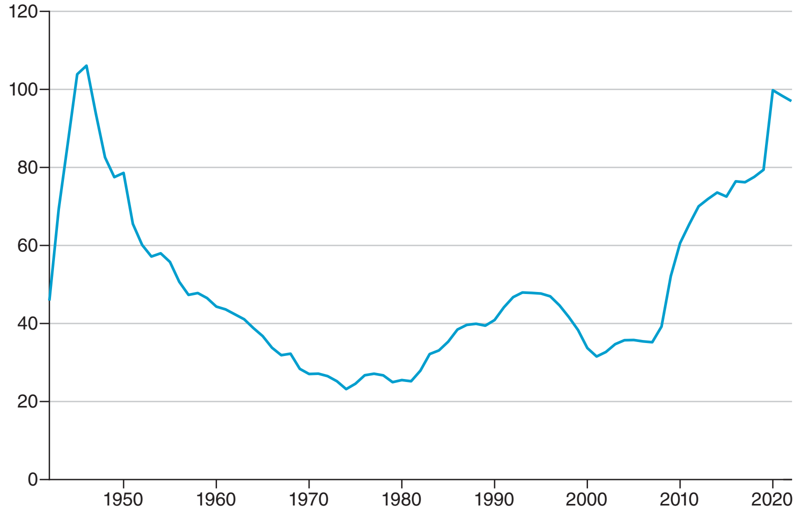

Figure 1. Federal Debt Held by the Public as a Percent of GDP

Note: The line represents the ratio of the federal debt held by the public to GDP.

Source: OMB

Prices (CRSP) thereafter. We also construct a term structure of inflation expectations from surveys of short- and long-term expectations, which allows us to estimate the effects of surprise inflation on the real returns on debt issued in different years. Finally, we estimate the effects of the pre-1952 interest rate peg by comparing the pegged rates on debt of various maturities to market rates during the post-peg period of 1952–1960. Our various calculations require some assumptions about unobserved variables, but our results are not greatly changed by varying these assumptions in reasonable ways.

The next section of this paper provides some historical background on the post-World War II period. We then present our methodology for constructing counterfactual paths of the debt/GDP ratio, describe our data sources, and present our results. We also compare our analysis to Hall and Sargent's (2011) well-known work on the debt/GDP ratio since World War II.

I. Factors Influencing the Debt/GDP Ratio

Figure 1 shows the path of the public debt/GDP ratio in the United States from fiscal year 1941 to fiscal year 2022. We see that this ratio grew rapidly during World War II, rising from 42 percent in 1941 to 106 percent in 1946. It then fell steadily until it reached 23 percent in 1974, an experience commonly attributed to economic growth. Since the trough in 1974, the debt/GDP ratio has risen in most years and it reached 102 percent in 2022.

This section provides some background on three factors, in addition to economic growth, that have influenced the debt/GDP ratio: primary surpluses and deficits, the Fed's interest rate peg from 1942 to 1951, and unexpected inflation. Later sections quantify the effects of these factors.

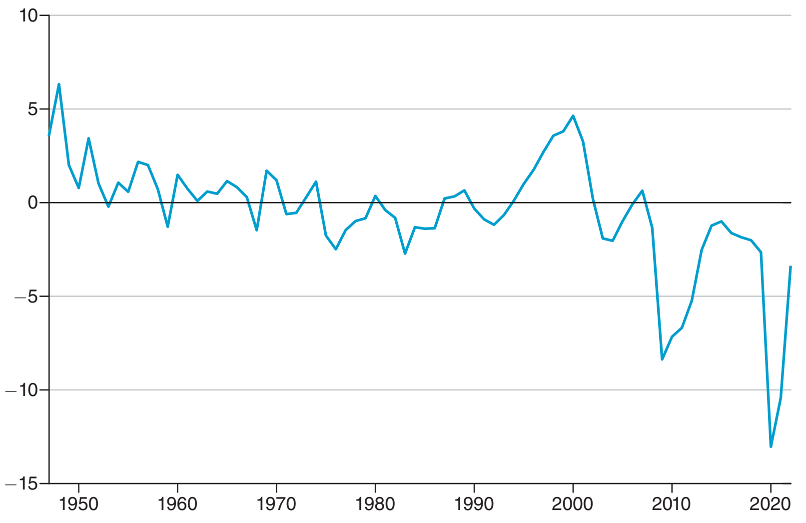

Figure 2. Primary Surplus as a Percent of GDP

Notes: The line represents the ratio of the primary budget surplus to GDP. The primary surplus is computed as the sum of the total fiscal surplus and interest payments on debt held by the public.

Source: OMB, authors' calculations

A. *Primary Surpluses and Deficits*

Figure 2 shows the primary budget surplus as a fraction of GDP from fiscal year 1947, the year after debt/GDP peaked, to the present. We can see that deviations from primary balance contributed to both the fall in the debt/GDP ratio through 1974 and the rise since then.

The sharp fall in government spending after the war produced primary surpluses of 3.6 percent of GDP in 1947 and 6.3 percent in 1948. After that, the surplus remained positive in most years, ranging between 3.4 percent and −1.5 percent of GDP through 1974. This experience reflected a strong political consensus in favor of budgetary restraint in the 1950s and 1960s. During the entire period from 1947 through 1974, the primary surplus averaged 1.1 percent of GDP, helping to reduce the debt/GDP ratio.

After 1974, the pattern reversed and habitual primary deficits contributed to a rising debt/GDP ratio. The primary balance was negative at almost all times except in the late 1990s, and the deficit was especially high around the Great Recession of 2008 and the recent COVID pandemic.

B. *Interest Rates before the Fed-Treasury Accord*

In April 1942, at the request of the Treasury department, the Federal Reserve adopted a policy of pegging interest rates on government bonds at low levels. This policy was intended to contain the cost of financing the war. The Fed capped yields at levels ranging from 0.375 percent for Treasury bills to 2.5 percent for 30-year bonds, maintaining these caps by standing ready to buy any quantity of bonds.

The Fed's policy presumably kept interest rates below the neutral level and made it impossible to adjust rates to control inflation. During World War II, inflation was contained through government price controls. Price controls were eliminated in June 1946, and inflation became unstable: In fiscal years 1947 through 1951, CPI inflation rates ranged from −0.7 percent to 18.3 percent, with an average of 7.1 percent. Fed officials became increasingly unhappy with their inability to control inflation and eventually persuaded the Treasury that the peg should be abandoned, a decision announced by the two agencies in their March 1951 "Accord."[2]

The interest rate peg had a big effect on debt dynamics because it was in effect during the buildup and initial rolling over of the large World War II debt. In addition, a large share of the debt issued with low interest rates had maturities of 10 to 30 years, so the influence on the costs of debt service was felt long after the peg ended in 1951. Both during and after the peg, periods of high inflation produced ex post real interest rates that were deeply negative for many government securities.

The pre-Accord peg is the most clear-cut case of financial repression that held interest rates down in the postwar United States. Reinhart and Sbrancia (2015) cite other types of financial repression, such as caps on banks' interest rates under Regulation Q. We ignore these other policies because we do not know how to quantify their effects on the interest rates on government debt. To the extent they are important, the effects of the pre-Accord peg that we measure are a lower bound on the total effects of financial repression.

C. *Surprise Inflation*

Unexpected inflation reduces the debt/GDP ratio by pushing ex post real interest rates below ex ante real rates. The relevant inflation rate is the growth rate of the GDP deflator. As detailed below, the effect on the debt/GDP ratio in a given period depends on the current level of inflation relative to the level expected at various times in the past when the currently outstanding debt was issued.

Figure 3 shows inflation surprises for fiscal years 1952 through 2022. For each year, the figure compares the actual level of inflation to the level expected one year earlier and (starting in 1962) the level expected ten years earlier, based on several sources of data on inflation expectations (see details below). We see the well-known rise in inflation in the 1960s and 1970s and the fact that inflation persistently exceeded expected inflation during that period—especially the levels expected ten years before, implying a big erosion of real interest rates on long-term securities. These inflation surprises contributed to the decrease in the debt/GDP ratio through 1974 and moderated the first part of the subsequent increase in the late 1970s.

Starting in the 1980s, the story was reversed: As inflation fell following the Volcker regime shift, actual inflation was usually lower than expected inflation. This pattern pushed ex post real interest rates above ex ante rates and contributed to the rising debt/GDP ratio, although we will see that this effect was smaller than that of the earlier surprise inflation, in part because the average maturity of the debt was

[2] See Hetzel and Leach (2001) for a detailed narrative of this episode.

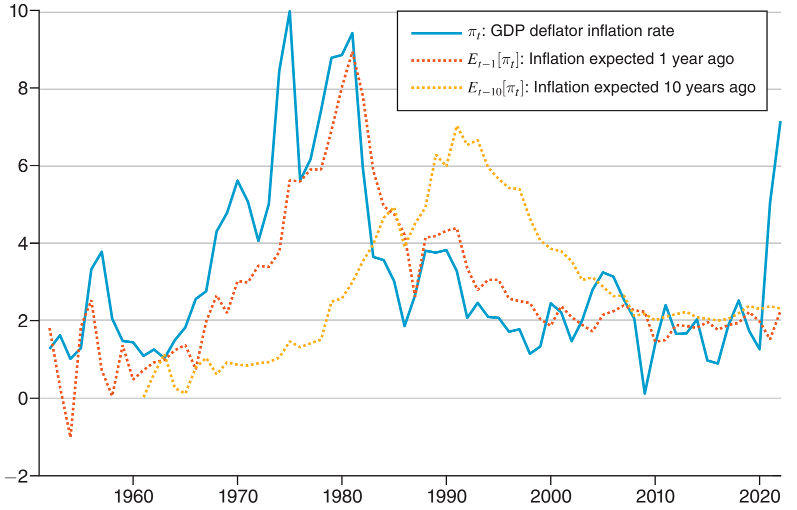

FIGURE 3. ACTUAL AND EXPECTED INFLATION

Note: The lines represent the GDP deflator inflation rate and forecasts made one year and ten years in the past.

Source: Authors' calculations

shorter. The sharp increase in inflation in 2021–2022 meant that unexpected inflation again became a factor reducing the debt/GDP ratio.

II. Constructing Counterfactual Paths of the Debt/GDP Ratio

This section describes how we construct counterfactual paths of the debt/GDP ratio with zero primary surpluses and/or without distortions in real interest rates from the pre-Accord peg and surprise inflation. The differences between these paths capture the different factors driving the actual debt/GDP path. The counterfactual without surpluses or interest rate distortions shows how much the debt/GDP ratio has been reduced through economic growth in excess of undistorted interest rates. We interpret this effect as the natural tendency of the economy to grow out of debt, which is sometimes called the "negative snowball" or "melting" effect (e.g., Krugman 2019; Aizenman and Ito 2020).

A. *Overview*

We start with a standard equation describing the evolution of the nominal stock of debt:

$$D_t = (1 + i_t)\, D_{t-1} - P_t, \tag{1}$$

where D_t is the par value of the debt in period t, i_t is the average interest rate on the debt, and P_t is the primary surplus.[3] From period $t-1$ to t, the debt grows at rate i_t as it is rolled over, and primary surpluses reduce the debt (while primary deficits increase it). In our empirical work, a period is a fiscal year, and debt is measured at the end of the year. The interest rate is measured as total interest payments in fiscal year t divided by D_{t-1}.

In all simulations we start with the debt at its actual level at the end of fiscal year 1946 and derive its path after that for alternative assumptions about primary surpluses and interest rates. We then derive the path of the debt/GDP ratio, assuming in all cases that the path of nominal GDP is the same as in actual history.

It is straightforward to construct a counterfactual with no primary surpluses: We simply set $P_t = 0$ for all t in equation (1).

Adjusting for the pre-Accord peg and inflation surprises is more complex. In our counterfactual exercise, we replace the actual nominal interest rates i_t with the rates that would have prevailed under two conditions. The first, which is relevant for debt issued before 1952, is that the ex ante real interest rate is the one that would have prevailed in the absence of the peg, if the Federal Reserve were operating normally (presumably setting rates to stabilize output and inflation). We estimate these undistorted interest rates from ex ante real rates observed after the peg period, as detailed below.

The second condition is that the ex post real interest rate is always equal to the ex ante real rate. We implement this assumption by adding the unexpected component of inflation (measured using surveys of expectations) to actual nominal interest rates. This adjustment yields the nominal rates that would have prevailed given ex ante real rates if financial market participants had known the future path of inflation. We can also interpret our counterfactual interest rates as those that would have been observed if all debt were indexed to inflation.[4]

Our simulations of debt/GDP ratios assume that both undistorted real interest rates and real GDP are the same in our counterfactual scenarios as in actual history. Conventional macroeconomics implies that the higher debt levels in the counterfactuals would increase real rates and reduce real GDP by crowding out capital, and both of these effects would magnify the increases in the debt/GDP ratio relative to actual history. In light of these omitted effects, the debt/GDP paths we derive can be interpreted as lower bounds on the paths implied by our counterfactual assumptions.[5]

[3] We consider the par value of the debt because it is a focus of policy discussions. Hall and Sargent (2011) analyze a version of equation (1) that applies to the market value of debt. Taking that approach would complicate our analysis without making a material difference for our results, because the paths of the par and market values of the debt are very close to each other over long periods (see Figure A1 in the Supplemental Appendix).

[4] Andreolli and Rey (2023) conduct a similar counterfactual exercise for Euro Area countries for the period since 1999.

[5] This overview of our analysis ignores one detail: Equation (1) describing the evolution of debt does not hold exactly in the data. There is a residual reflecting factors that affect debt besides interest payments and primary surpluses, the most important of which is changes in the cash balances held by the Treasury department. In all our simulations, we hold the residuals in equation (1) constant at their historical levels. The nature of these residuals and their effects on the debt are discussed further in the SupplementalAppendix.

B. *Counterfactual Interest Rates and the Reverse Maturity Structure*

We need to calculate the average interest rates on debt in our counterfactual with no real rate distortions, which we denote by $\hat{i}_t$. In doing so, a critical nuance is that the debt outstanding in a given fiscal year is a mix of securities issued in different past years. We call the mix of years when the current debt was issued the "reverse maturity structure" of the debt (as opposed to the regular maturity structure, which is the mix of future years when the current debt will mature). The reverse maturity structure matters because the outstanding debt may include some securities issued during the pre-Accord peg and some issued later, and because inflation expectations differed at the various times securities were issued.

To see the role of the reverse maturity structure, we introduce some notation. The stock of debt outstanding at the end of fiscal year $t-1$ is a sum of debt issued during $t-1$ and earlier years:

$$D_{t-1} = \sum_{\tau=t-M}^{t-1} D_{t-1}^{\tau}, \tag{2}$$

where D_{t-1}^{τ} is the debt outstanding at the end of year $t-1$ that was issued during year τ, and $t-M$ is the earliest year when part of the debt was issued. We denote the fraction of outstanding debt at $t-1$ that was issued at τ by w_{t-1}^{τ}:

$$w_{t-1}^{\tau} \equiv D_{t-1}^{\tau}/D_{t-1}. \tag{3}$$

The weights w_{t-1}^{τ} capture the reverse maturity structure of the debt.

We let i_t^{τ} equal the actual average interest rate paid at t on the part of the debt issued at τ. The overall average rate i_t is an average of the i_t^{τ}'s weighted by the shares of total debt to which they apply:

$$i_t = \sum_{\tau=t-M}^{t-1} w_{t-1}^{\tau} i_t^{\tau}. \tag{4}$$

In any counterfactual, the overall average interest rate $\hat{i}_t$ will depend on how we adjust the weights and interest rates in equation (4). In our main simulations, we assume for simplicity that the w_{t-1}^{τ}'s in each year are the same as in actual history. That is, we assume that the increase in aggregate debt in our counterfactuals does not affect the reverse maturity structure of the debt. The Supplemental Appendix (Section A4) takes a different approach: We assume that the reverse maturity structure evolves based on the amount of additional debt issued each year, given plausible assumptions about the maturity structure of this additional debt. We do not focus on this version of our analysis because, while arguably more precise than the one presented here, it is much more complicated and does not make a material difference for our results.

In counterfactuals with undistorted interest rates, we adjust each i_t^{τ} to eliminate the effects of the peg and surprise inflation and denote the result by $\hat{i}_t^{\tau}$. Let x_t^{τ} be the adjustment $\hat{i}_t^\tau - i_t^\tau$. Given fixed weights w_{t-1}^τ, the counterfactual aggregate interest rate $\hat{i}_t$ can be written as

$$(5) \qquad \hat{i}_t = \sum_{\tau=t-M}^{t-1} w_{t-1}^\tau \left(i_t^\tau + x_t^\tau\right) = i_t + \underbrace{\sum_{\tau=t-M}^{t-1} w_{t-1}^\tau x_t^\tau}_{\equiv x_t}.$$

The path of $\hat{i}_t$ can be derived from the actual aggregate interest rates i_t, the weights w_{t-1}^τ, and the adjustments x_t^τ.

C. *The Adjustments to Interest Rates*

An adjustment x_t^τ applies to the interest rate paid on debt issued at τ, so it depends on whether the date τ is before, during, or after the peg. The expressions for x_t^τ are

$$(6) \qquad x_t^\tau = \begin{cases} 0 & \text{for } \tau \leq 1942 \\ r_t^{\star\tau} - \left(i_t^\tau - \pi_t\right) & \text{for } 1943 \leq \tau \leq 1951 \\ \pi_t - \mathbb{E}_\tau\left[\pi_t\right] & \text{for } \tau \geq 1952 \end{cases},$$

where $r_t^{\star\tau}$ is the undistorted real interest rate on the outstanding debt at t that was issued at τ, and $\mathbb{E}_\tau\left[\pi_t\right]$ is the expectation at τ of the inflation rate at t.

Let us review these adjustments in reverse chronological order. For $\tau \geq 1952$, x_t^τ is an adjustment to an interest rate paid at t on debt that was issued after the Fed-Treasury Accord. In this case we assume that the ex ante real interest rate is the undistorted rate and adjust the ex post rate to eliminate the effect of unexpected inflation. The relevant inflation surprise is the difference between the actual inflation rate in year t and the expectation of that rate at τ. The next section describes how we derive estimates of this expectation from surveys.[6]

The second line is the adjustment to interest rates in year t on debt issued during the peg period, which we date from fiscal year 1943 through fiscal year 1951.[7] This adjustment is the difference between the ex post real interest rate and the undistorted real rate (which no longer equals the actual ex ante rate). The ex post real rate is the average nominal interest rate on the outstanding debt that was issued at τ minus the inflation rate at t. The undistorted real interest rates $r_t^{\star\tau}$ are not observed, so we must make educated guesses about their levels. As detailed in the next section, we do so using ex ante real rates in the years after the peg.

[6] Some readers have suggested that the Fed's quantitative easing policy after 2008 caused interest rate distortions. We view this policy as an effort to move rates toward their equilibrium levels in the presence of the zero bound on the policy rate, not as a distortion of rates. In any case, if we adjust interest rates to eliminate the effects of QE, the levels of debt/GDP in our counterfactuals become larger after 2008, which strengthens our conclusions. See the Supplemental Appendix (Section A5) for details.

[7] The peg was adopted in April 1942 and ended in March 1951. Our dating of the peg period as fiscal years 1943–1951, which run from July 1942 through June 1951, is an approximation that is necessary because our data are available by fiscal year.

Finally, the first line of equation (6) indicates that we do not make any adjustment to the interest rates on debt issued before the start of the peg. These interest rates are relevant because part of that debt was still outstanding in 1946, when we start our simulations. In principle we should adjust interest rates set before the peg for surprise inflation, but we lack data on inflation expectations before 1943. As a robustness check, the Supplemental Appendix considers interest rate adjustments based on a range of reasonable conjectures about pre-1943 expectations. These adjustments modestly increase the amount of debt reduction that we attribute to surprise inflation, because the high inflation of the late 1940s and early 1950s was probably not expected before 1943.

D. *Two Complications*

The derivation of equation (6) ignores two details about the types of securities issued by the US Treasury. Here we briefly describe these details and how we address them. The Supplemental Appendix presents a modification of equation (6) that accounts for these issues, and we use that equation in our simulations.

Treasury Bills.—A substantial fraction of the debt consists of Treasury bills with maturities of less than a year, most commonly 90 days. This poses a problem because equation (6) assumes that all debt outstanding at the end of year $t - 1$ is eroded by surprise inflation over year t, but most of the outstanding Treasury bills will be rolled over during the year at interest rates that adjust to inflation news. To be conservative in assessing the effects of surprise inflation, we assume it has no effect on the real returns on Treasury bills and modify equation (6) accordingly.[8]

Inflation Indexed Debt.—Starting in 1997, part of the debt consists of Treasury Inflation-Protected Securities, whose nominal interest rates adjust to ensure that ex post real interest rates equal ex ante rates. Inflation surprises do not erode the value of these securities, so we adjust equation (6) accordingly.

III. Data and Measurement

This section describes our data sources and the measurement of the variables in our counterfactual simulations. These variables include a number of fiscal variables, inflation expectations at various horizons, and undistorted real interest rates during the peg period. We give an overview of our approach and leave a number of details to the Supplemental Appendix.

[8] Some long-term bonds also mature within year t, so their returns are not eroded by the full inflation surprise over t. This fact implies some overstatement of the effects of inflation surprises in equation (6), but this bias is counterbalanced by one in the other direction: Securities are issued throughout each year, and we measure expected inflation at the end of the year, which probably understates inflation surprises relative to expectations when securities were issued. We doubt that these factors are important, but future research could address them with higher-frequency data.

A. *Timing*

The unit of time in our analysis is a fiscal year, because much of our data are reported by fiscal year. In the early part of our sample, fiscal year t runs from July of calendar year $t-1$ through the following June. Starting with fiscal year 1977, the timing shifts and fiscal years run from October of calendar year $t-1$ through the following September. This shift creates a "transitional quarter" (the third quarter of calendar year 1976) that is treated separately in the government's fiscal accounts and which requires some modifications of our procedures around that time (see Supplemental Appendix).

B. *Fiscal Variables*

We use fiscal data from the Office of Management and Budget (OMB) Historical Database, the Hall, Payne, and Sargent (2018) database on government securities, the CRSP Monthly US Treasury Database, and the Treasury Bulletin.

Aggregate Debt.—Our measure of D_t, the total debt in fiscal year t, is the level of debt held by the public at the end of the year, from the OMB historical database. Debt held by the public includes debt held by the private sector and the Federal Reserve, but excludes intragovernmental holdings such as debt held by the Social Security Trust Fund. This variable is the most common measure of public debt in the literature.

To measure debt/GDP ratios, we use the series for nominal GDP by fiscal year from the OMB database. As discussed above, our simulations hold the path of GDP constant when we consider counterfactual paths of debt.

The Reverse Maturity Structure.—We construct the reverse maturity structure of the debt from the Hall, Payne, and Sargent (2018) database for the period from 1942 through 1960, and from the CRSP Monthly US Treasury Database for 1961 through 2022. For every month, these databases provide an accounting of almost every issue of a Treasury security that is currently outstanding, including its quantity and issue date. We use data for the final month of each fiscal year to construct D_t^τ, the amount of debt outstanding at the end of year t that was issued in year τ. Dividing the quantities D_t^τ by the total debt D_t yields the weights w_t^τ that define the reverse maturity structure.

The Supplemental Appendix provides details of this procedure, including approximations needed because of missing information in the Hall, Payne, and Sargent (2018) and CRSP datasets. Perhaps the most significant issue is that the post-1960 data from CRSP do not include nonmarketable debt such as savings bonds. We assume that the reverse maturity structure of nonmarketable debt remains constant after 1960.

Figure 4 summarizes the evolution of the reverse maturity structure by showing the fractions of outstanding debt with maturities in various ranges. Over the first part of our sample, during the pre-Accord peg, the share of debt with reverse maturities above five years rose due to debt issued more than five years earlier to finance World

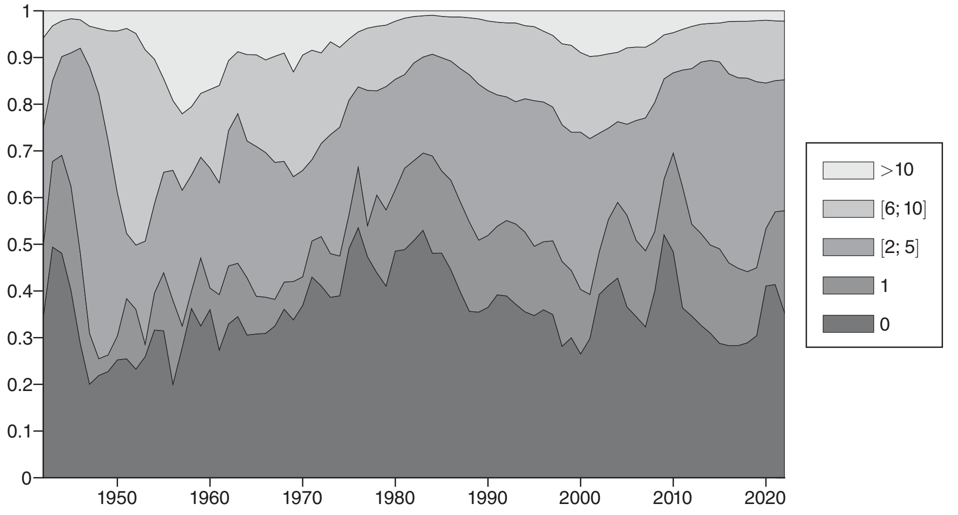

FIGURE 4. REVERSE MATURITY STRUCTURE OF PUBLIC DEBT

Notes: This chart shows the reverse maturity structure of outstanding debt held by the public. The different shades represent the share of the debt at the end of the fiscal year which was issued in the same year, the previous year, 2 to 5 years earlier, 6 to 10 years earlier, and more than 10 years earlier. Lighter shades indicate longer reverse maturities.

Source: Authors' calculations

War II. This longer-term debt share peaked at 48 percent in 1951 and then fell, and from 1975 through 2022 it fluctuated between 10 and 25 percent. The average reverse maturity of all outstanding debt fell from 4.4 years in 1951 to 2.2 years in 2022.

Aggregate Interest Rates.—Following previous researchers, we define the aggregate interest rate on debt in fiscal year t, i_t, as total interest payments during the year divided by total debt outstanding at the end of year $t-1$. This definition is the one for which the accounting identity in equation (1) holds. For consistency with our measure of D_t, which excludes intragovernmental holdings of Treasury debt, total interest payments exclude payments to government entities.

Our data on interest payments come from the OMB Historical Data. Starting in 1962, we derive the appropriate series by subtracting intragovernmental payments from gross interest payments. Before 1962, we lack data on intragovernmental payments. The OMB reports "net interest," but this series subtracts not only intragovernmental payments but also interest received by the government (e.g., through credit programs such as student loans), which is not appropriate. In the Supplemental Appendix, we examine the relation between the net interest series and our desired series for interest payments on the debt, and find that the latter is approximately 10 percent higher in years when we can measure both. Therefore, before 1962 we measure total interest payments by multiplying net interest by 1.1. Other reasonable approaches yield similar results.

The Primary Balance.—The primary balance is also calculated from OMB data. It is computed as the sum of the total fiscal surplus (which is usually negative) and total interest payments, with total interest calculated as described above.

C. *Inflation and Inflation Expectations*

Here we describe our measurement of actual and expected inflation, which determine the inflation surprises that enter our calculations. We use data on one-year and ten-year inflation expectations to estimate the entire term structure of expectations.

The Inflation Rate.—When studying the debt/GDP ratio, the relevant price index is the GDP deflator. We measure the inflation rate in fiscal year t, π_t, as the growth rate of the deflator (not seasonally adjusted) from the fourth quarter of year $t-1$ to the fourth quarter of t. (The Supplemental Appendix describes complications around the Transitional Quarter in 1976.)

One-Year Expectations.—We let $\mathbb{E}_t[\pi_{t+1}]$ denote the expectation at the end of year t of the inflation rate in $t+1$. We measure this expectation using two different surveys for two parts of our sample.

Starting with fiscal year $t = 1970$, we use forecasts reported in the Survey of Professional Forecasters in the last quarter of the fiscal year (either the second or third quarter of the calendar year). We use the median forecast of the GDP deflator growth rate over the following four quarters, that is, over fiscal year $t+1$.

For fiscal years before 1970, we lack data on expectations of the GDP deflator, so we create a proxy. We start with expectations of the CPI from the semiannual Federal Reserve Bank of Philadelphia (2025) Livingston Survey of business economists. We use forecasts published in June—before 1970, the last month of the fiscal year—of the CPI in the following June. We derive an expected CPI inflation rate over the coming fiscal year from the forecast of the CPI level.

To derive expected inflation in the GDP deflator, we assume that the expectation error $\pi_{t+1} - \mathbb{E}_t[\pi_{t+1}]$ is the same for inflation measured by the deflator and inflation measured by the CPI. This assumption is close to true during periods when we have survey expectations of both variables (see Supplemental Appendix). With our assumption we can measure the expectation of GDP deflator inflation $\mathbb{E}_t[\pi_{t+1}]$ as actual deflator inflation π_{t+1} minus the expectation error for the CPI.

Ten-Year Expectations.—Our analysis also uses an expectation of the average inflation rate over the next ten years, which we denote by $\mathbb{E}_t[\pi^{10}]$. For fiscal years back to $t = 1968$, we measure this variable with a series for expected ten-year inflation from the Fed's dataset for its FRB/US Model. (We use the observations for the last quarter of each fiscal year.) These data are expectations of inflation in the PCE deflator, but the paths of the PCE and GDP deflators are usually close (see Supplemental Appendix). The Fed produces its series by combining forecasts from the Survey of Professional Forecasters and Consensus Economics with econometric estimates of expected inflation when survey measures are not available.

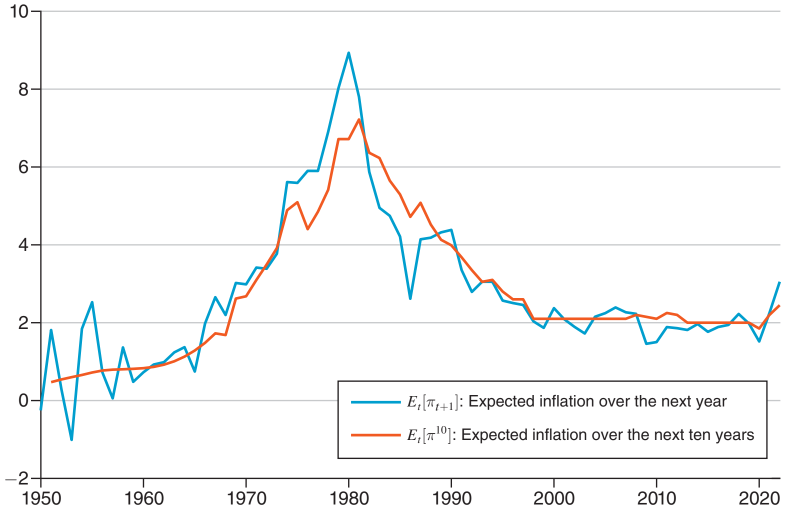

FIGURE 5. SHORT- AND LONG-TERM INFLATION EXPECTATIONS

Note: The lines represent the GDP deflator inflation forecasts for the next year and the next ten years.

Source: Livingston Survey, Survey of Professional Forecasters, Federal Reserve FRB/US Model, authors' calculations

We have not found data on ten-year expected inflation before 1968, and our calculations require these expectations back to 1952. We construct estimates of the missing data using our series for one-year expectations $\mathbb{E}_t[\pi_{t+1}]$. Specifically, for the period from 1968 to 1997, we find that the level of ten-year expectations is well explained statistically by the level and change in a smoothed version of one-year expectations. We use this estimated relation to construct fitted values for long-term expectations before 1968. See the Supplemental Appendix for details.

Figure 5 shows our final series for one-year inflation expectations $\mathbb{E}_t[\pi_{t+1}]$ and ten-year expectations $\mathbb{E}_t[\pi^{10}]$. Note that these forward-looking expectations differ from the series shown above in Figure 3, which are expectations of current inflation in past years.

The Term Structure of Inflation Expectations.—To adjust interest rates in our counterfactuals, we need expectations of inflation at all horizons. We derive estimates of these expectations by making assumptions about the shape of the term structure of expected inflation. Specifically, we assume that the term structure $\mathbb{E}_t[\pi_{t+1}]$, $\mathbb{E}_t[\pi_{t+2}]$, … is linear from $t+1$ through $t+5$ and then perfectly flat. Along with our series for $\mathbb{E}_t[\pi_{t+1}]$ and $\mathbb{E}_t[\pi^{10}]$ (which is the average of $\mathbb{E}_t[\pi_{t+x}]$ from $x = 1$ to $x = 10$), our shape assumptions determine the entire term structure. Once again, the Supplemental Appendix discusses the details of our procedure, its rationale, and robustness to other reasonable assumptions.

Figure 6 shows the term structure of expected inflation for each year in our sample. In some years the entire term structure is flat, but long-term expectations lag behind short-term expectations when the latter are trending up or down (which occurs when actual inflation trends up or down).

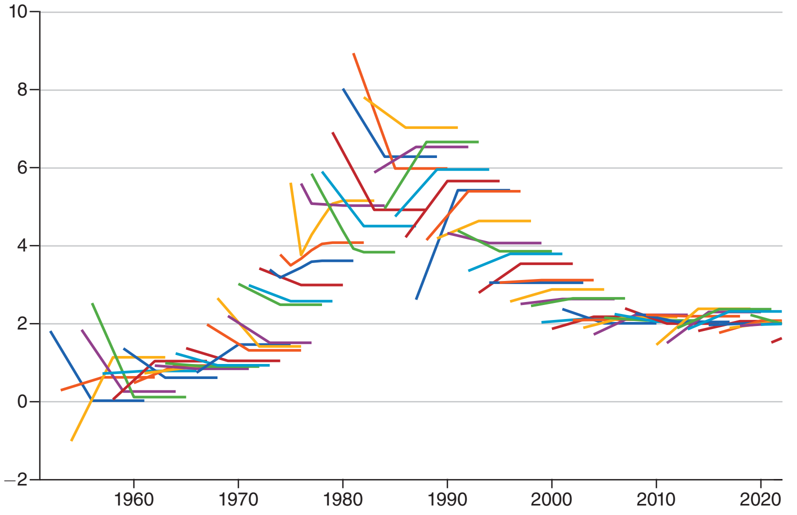

FIGURE 6. TERM STRUCTURE OF INFLATION EXPECTATIONS

Notes: Each line indicates expectations in the year previous to the beginning of the line of inflation in the following ten years. For example, the line beginning at 1952 indicates inflation expectations formed in 1951 for inflation in 1952, …, 1961.

Source: Livingston Survey, Survey of Professional Forecasters, Federal Reserve FRB/US Model, authors' calculations

D. *The Peg Period*

For debt issued during the peg period before 1952, our interest rate adjustments require series for i_t^τ, the actual nominal interest rates on the debt, and for $r_t^{\star\tau}$, the undistorted real interest rates. We derive these variables as follows.

Actual Interest Rates under the Peg.—For each issue of a Treasury security, the Hall, Payne, and Sargent (2018) database reports the issue date, quantity, maturity, and usually the coupon rate, which is the relevant interest rate. When the coupon rate is missing, we use the interest rates by maturity under the peg reported by Friedman and Schwartz (1963).

We construct i_t^τ, the average interest rate on the outstanding securities at t that were issued at τ, by averaging across the interest rates on the individual securities.

Counterfactual Real Rates.—We do not have direct evidence on the ex ante real interest rates that would have prevailed on securities issued during the pre-Accord period if the Fed had not pegged rates. As a baseline measure, we simply assume that the rate for any security of a given maturity (at issuance) would have been equal to the average of the ex ante real rates on securities with that maturity issued over the decade after the peg ended, from fiscal years 1952 through 1961. The counterfactual real rate $r_t^{\star\tau}$ is the average of the assumed rates on securities of different maturities weighted by the term structure of securities issued at τ and outstanding at t. The Supplemental Appendix considers alternative assumptions that produce higher or lower rates and finds that our results are fairly robust across reasonable cases.

To calculate ex ante real rates by maturity for 1952–1961, we use data on nominal interest rates on debt issued during that period from the Global Financial Database. (The interest rate data in Hall, Payne, and Sargent (2018) do not cover the period.) We obtain ex ante real rates using the term structure of inflation expectations, derived as described above. We average the ex ante real rates at each maturity over all securities issued over 1952–1961.

The resulting term structure of undistorted real interest rates includes 1.7 percent at the one-year horizon, 2.2 percent at five years, 2.5 percent at ten years, and 2.7 percent at thirty years.

IV. Results

Here we present our central results, which are simulations of the path of the debt/GDP ratio. All simulations begin in 1946 with the ratio at its actual level of 106 percent. We compare the actual path of debt/GDP after 1946 to three counterfactual scenarios. In one, the "primary balance scenario," we set the primary surplus to zero in all years (but leave interest rates unchanged at their historical levels). In another, the "adjusted interest rate scenario," we apply the adjustments x_t^T to eliminate the effects of both surprise inflation and the pre-Accord peg (but leave primary surpluses at their historical levels). Finally, in a "combined scenario" we assume primary balance and also adjust interest rates. The path of debt/GDP in the combined scenario is determined by $r^* - g$, the difference between the undistorted real interest rate and the growth rate of output.

Figure 7 presents the alternative paths of debt/GDP. In interpreting these results, we divide the period since 1946 into two parts: 1946–1974, the period when the actual debt/GDP ratio declined to its trough of 23 percent; and 1975–2022, when the ratio rose to 97 percent. For each counterfactual, Table 1 reports the total changes in debt/GDP over the two periods, which we examine in turn.

A. *The Postwar Erosion of Debt, 1946–1974*

The actual debt/GDP ratio declined steeply during the 1946–1974 period. Our counterfactual ratios also decline, but more slowly. As a result, while the actual debt/GDP ratio reached 23 percent in 1974, the counterfactual ratios in 1974 are substantially higher: 40 percent in the primary balance scenario, 51 percent in the adjusted rate scenario, and 74 percent in the combined scenario.

To appreciate these results, recall that the actual debt/GDP ratio fell by 83 percentage points from 1946 to 1974 (from 106 to 23 percent). In the combined scenario, the ratio falls by only 32 points (from 106 to 74 percent). Therefore, of the actual 83-point fall, 51 points are explained by the combination of primary surpluses and interest rate distortions. By comparing the different counterfactuals, we can divide this 51 points into 17 points explained by primary surpluses alone, 28 points explained by interest rate distortions alone, and 6 points from the interaction of the two factors. The interaction arises because adjusting the primary balance raises the level of debt, and higher debt magnifies the effects of adjusting interest rates.

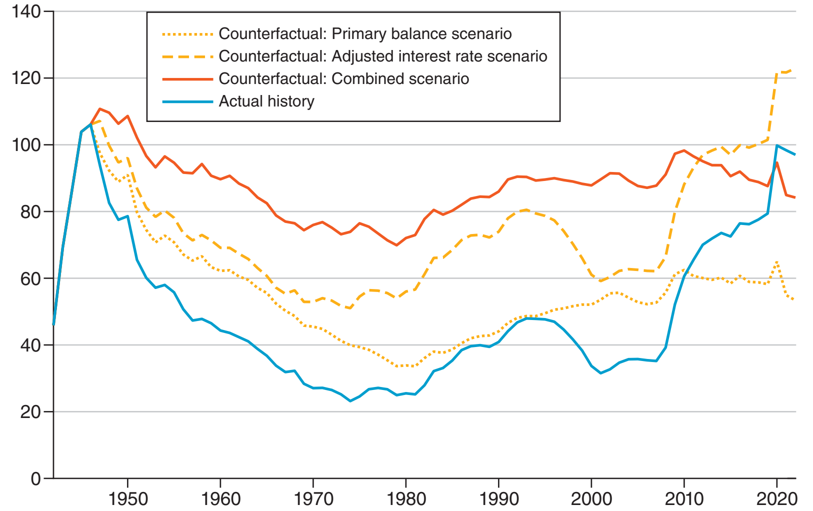

Figure 7. Debt/GDP Paths—Counterfactual Scenarios

Note: The lines represent the path of the debt-GDP ratio in actual history and our different counterfactual scenarios.

Source: Authors' calculations

The adjusted interest rate scenario eliminates distortions from both surprise inflation and the suppression of ex ante real rates under the peg. It would be interesting to separate the effects of these two distortions, but that would be difficult because it requires measures of expected inflation during the peg period from 1942 to 1951. There are no data on long-term inflation expectations before 1951 or short-term expectations before 1947 (the start of the Livingston survey), and it is difficult even to make educated guesses. (What was long-term expected inflation in the middle of World War II and its price controls?)

In Figure 8 we examine more closely the interest rate distortions that helped to reduce the debt/GDP ratio. The figure shows the series for x_t, the adjustment of the aggregate interest rate in our counterfactuals, for the period 1947–1974. We see large adjustments at the start of the period—13 percentage points in 1947 and 8 points in 1951—when surges in inflation with pegged nominal interest rates produced deeply negative real rates. Because of these episodes, the actual debt/GDP ratio in 1951 had already diverged by more than 20 percentage points from its level in our rate-adjusted scenario. After that, the x_t adjustment is mostly small until the late 1960s, when unexpected inflation starts pushing it up. The adjustment is over 4 percentage points in 1974. It then stays high through the rest of the 1970s, somewhat dampening the rise in the debt/GDP ratio that we discuss next.

B. *The Debt Buildup, 1975–2022*

As shown in Figure 7, the actual debt/GDP ratio started to rise in 1975 and continued to rise except for a dip in the late 1990s. In 2022 it stood at 97 percent, not far from its level in 1946. The biggest factor behind the increase was a shift from

Table 1—Debt/GDP Ratio (%)–Actual and Counterfactuals

		Counterfactuals		
Year	Actual	Primary balance	Adjusted interest rate	Combined
1946	106.1	106.1	106.1	106.1
1974	23.2	39.9	51.0	73.9
2022	97.0	53.3	122.9	84.2

Note: The table shows the values of the debt/GDP ratio in actual history and our counterfactuals in 1946, 1974, and 2022.

Source: OMB, authors' calculations

primary surpluses to primary deficits. Persistent deficits emerged as a result of tax cuts at several points, most notably the Reagan tax cuts of the early 1980s, and the deficit ballooned in the wake of the 2008 financial crisis and the 2020 pandemic.

For our purposes, the most important part of Figure 7 is the combined counterfactual with primary balance and undistorted real interest rates. In this scenario the debt/GDP ratio falls from its 1974 level of 74 percent to 70 percent in 1979, but then starts to rise. In 2022 the debt/GDP ratio is 84 percent.

Recall that the evolution of debt/GDP in the combined counterfactual depends on $r^{\star} - g$, the difference between the undistorted real interest rate and the growth rate. The increase in debt/GDP from 1979 to 2022 reflects the fact that on average $r^{\star} > g$ during that period, a reversal of $r^{\star} < g$ over 1947–1979. This shift resulted from both a rise in the average $r^{\star}$, from 2.3 percent over 1947–1979 to 2.8 percent over 1980–2022, and a fall in the average g, from 3.5 percent to 2.6 percent.

All in all, our findings cast doubt on the common narrative that the United States "grew its way" out of its World War II debt. Over the 76 years from 1946 to 2022, economic growth without primary surpluses or interest-rate distortions would have reduced the debt/GDP ratio by only 22 percentage points, from 106 percent to 84 percent. This experience suggests that we should not count on a major contribution from economic growth to resolving the problem of a high debt level.

A nuance of our results is that the post-1979 rise in the debt/GDP ratio is even larger in the primary-balance counterfactual, which maintains real interest rates at their actual ex post levels, than in the combined counterfactual (19 percentage points, from 34 percent to 53 percent, compared to 14 points). This result reflects the fact that inflation surprises since 1979 have been negative on average, so they have increased ex post real rates and debt/GDP. The rise in debt/GDP in the primary-balance counterfactual indicates that the actual real interest rate r has exceeded the growth rate g since 1979.

This finding might appear inconsistent with the analysis in Blanchard's 2019 Presidential Address. In arguing that debt dynamics may be benign, Blanchard reports that r has been less than g over almost all of the post–World War II era, including the period since 1979. Our findings differ from Blanchard's because of two differences in the measurement of interest rates. First, we use the government's interest payments on outstanding debt, while Blanchard uses market yields on debt, which have been lower than the rates paid by the government because interest rates

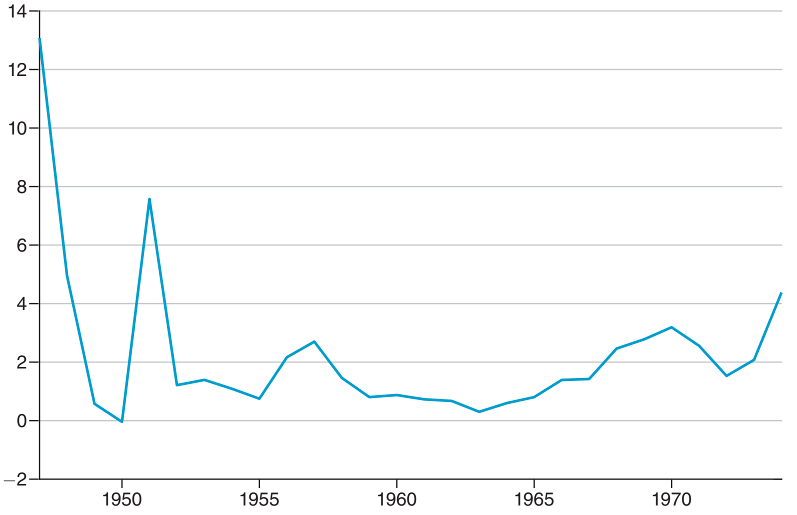

Figure 8. Aggregate Interest Rate Adjustments, 1947–1974

Note: The line represents x_t, the difference between the aggregate interest rate in our adjusted rate scenario and the actual interest rate.

Source: Authors' calculations

have trended downward. Second, we use pre-tax interest rates, and Blanchard uses after-tax rates. The Supplemental Appendix details these differences and argues that our measurement of interest rates is appropriate for our purposes.

V. Comparison to Hall and Sargent (2011)

Hall and Sargent's (2011) well-known paper also explores the factors behind changes in the debt-GDP ratio since World War II. There are two main differences between their analysis and ours. The first, which we want to stress, is that they estimate the role of $r - g$ but do not ask how that difference is influenced by the interest-rate distortions that we consider. The second is a more subtle distinction between our counterfactual debt paths and Hall and Sargent's decomposition of actual debt changes. To make these points clear, we first present an analysis that is similar to Hall and Sargent's and then compare it to our approach.

A. *Hall and Sargent's Decomposition*

Here we perform an exercise in the spirit of Hall and Sargent. (See also the Eichengreen, El-Ganainy, Esteves, and Mitchener (2021) study of international data.) We analyze the change in debt from 1946 to 1974, when the debt/GDP ratio fell to its trough of 23 percent. Starting with the debt dynamics equation (1), we divide all variables by nominal GDP in year t, Y_t, which yields

$$d_t = \frac{1 + i_t}{1 + z_t} d_{t-1} - p_t, \tag{7}$$

Table 2—Contributions to Change in Debt/GDP Ratio (%), 1946–1974

Panel A

	Contribution of:	
Δ(Debt/GDP)	$r-g$	surpluses
-82.9	-48.1	-29.6

Panel B

	Contribution of:		
Δ(Debt/GDP)	r^*-g	$r-r^*$	surpluses
-82.9	-11.7	-36.3	-29.6

Notes: Table 2, panel A shows the contributions to the change in Debt/GDP of $r-g$ (term a in equation (9)) and primary surpluses (term b). Table 2, panel B divides the contribution of $r-g$ into contributions of r^*-g (term a_1 in equation (10)) and the interest rate distortion $r-r^*$ (term a_2). The terms in Table 2 sum to 78 percentage points, which is less than the total decrease in Debt/GDP of 83 points. This difference reflects the residual in the debt dynamics equation, which we discuss in footnote 5, and which contributes 5 percentage points to the drop in Debt/GDP.

Source: Authors' calculations

where $d_t = \frac{D_t}{Y_t}$, $p_t = \frac{P_t}{Y_t}$, and z_t is the growth rate of nominal GDP. Rearranging this equation yields the change in the debt/GDP ratio over one period:

$$d_t - d_{t-1} = \frac{i_t - z_t}{1+z_t} d_{t-1} - p_t. \tag{8}$$

Finally, cumulating over time yields the total change in debt/GDP over 1946–1974:

$$d_{1974} - d_{1946} = \underbrace{\sum_{t=1947}^{1974} \frac{i_t - z_t}{1+z_t} d_{t-1}}_{(a)} - \underbrace{\sum_{t=1947}^{1974} p_t}_{(b)}. \tag{9}$$

Equation (9) is a simplified version of Hall and Sargent's equation (11). Note that $i-z$ (the nominal interest rate minus the nominal growth rate) is the same as $r-g$ (the real interest rate minus the real growth rate). Hall and Sargent interpret the two terms on the right side of equation (9) as the contributions of $r-g$ (term a) and primary surpluses (term b) to the decline in debt/GDP to its 1974 trough.

We report the two terms in equation (9) in Table 2, panel A. The contributions of $r-g$ and primary surpluses to the fall in the debt-GDP ratio (D/Y) are -48 percentage points and -30 percentage points, respectively. These numbers are roughly consistent with Hall and Sargent's results for the period 1945–1974, despite some differences in the details of calculations. (Hall and Sargent report contributions of -48 points from $r-g$ and -35 points from primary surpluses.)[9]

[9] Minor differences between Hall and Sargent's calculations and ours include slightly different time periods (calendar years 1945–1974 versus fiscal years 1946–1974) and Hall and Sargent's focus on the market value of debt rather than the par value. Hall and Sargent also decompose the $r-g$ term in equation (9) into contributions

B. *Accounting for Interest-Rate Distortions*

Using the earlier analysis in this paper, we can go a step beyond equation (9) and divide $r - g$ into two parts: $r^* - g$ and $-x$, where r^* is again the undistorted real interest rate and $-x = r - r^*$ is the distortion from surprise inflation and the pre-Accord peg. (Recall that $+x$ is the adjustment to interest rates that eliminates the distortion). We can decompose the decline in D/Y into contributions from these two terms and from primary surpluses:

$$(10) \qquad d_{1974} - d_{1946} = \underbrace{\underbrace{\sum_{t=1947}^{1974} \frac{r_t^* - g_t}{1 + z_t} d_{t-1}}_{(a_1)} - \underbrace{\sum_{t=1947}^{1974} \frac{x_t}{1 + z_t} d_{t-1}}_{(a_2)}}_{\equiv (a)} - \underbrace{\sum_{t=1947}^{1974} p_t}_{(b)}.$$

Table 2, panel B shows the three terms in equation (10). The new result is that, of the 48 percentage point contribution of $r - g$ to debt reduction (term a), only 12 points are attributed to $r^* - g$ (term a_1). The other 36 points reflect distortions in interest rates (term a_2). Put differently, for the period 1946–1974, about three-quarters of the fall in the debt/GDP ratio traditionally attributed to $r - g$ comes from real rate distortions. These results confirm our earlier conclusion that debt/GDP would have fallen much less without the distortions and primary surpluses.[10]

C. *Comparison to Counterfactual Histories*

The decompositions of debt changes in both equation (9) and equation (10) differ from this paper's counterfactual histories in subtle but quantitatively significant ways. To illustrate this point, consider the question of how much of the fall in debt/GDP over 1946–1974 to attribute to primary surpluses. In Hall and Sargent (2011) and equations (9) and (10), the answer is given by term (b), the sum of surpluses, which is 30 percentage points. The alternative that we develop above is the difference between the fall in debt/GDP in actual history and in the primary balance scenario, which is considerably lower at 17 points. Why this difference?

To answer this question, start again with equation (7), which shows the evolution over time of the actual debt/GDP ratio d_t. The evolution of debt/GDP in the primary balance scenario is given by (7) with two modifications: The surplus p_t is set to zero in all years, and the actual values of debt d_t are replaced by the values in the primary balance scenario, which we denote $\hat{d}_t$. This modified version of (7) leads to

$$(11) \qquad \hat{d}_{1974} - d_{1946} = \sum_{t=1947}^{1974} \frac{i_t - z_t}{1 + z_t} \hat{d}_{t-1},$$

from i, π, and g (without distinguishing between expected and surprise π). They find that the g component reduced D/Y by 32 percentage points, which they interpret as "a lot." We follow more recent work in focusing on $r - g$ rather than g by itself.

[10] The terms in Table 2 sum to 78 percentage points, which is less than the total decrease in D/Y over 1946–1974 (83 percentage points). This difference reflects the residual in the debt dynamics equation, which accounts for 5 percentage points and which we discuss in footnote 5 and the Supplemental Appendix.

which gives the counterfactual fall in debt/GDP through 1974. (Note that the initial level d_{1946} is the same in the counterfactual and actual history.) Combining equations (9) and (11), the difference between 1974 debt/GDP in the counterfactual and actual history is

$$(12) \qquad \hat{d}_{1974} - d_{1974} = \sum_{t=1947}^{1974} \frac{i_t - z_t}{1 + z_t}\left(\hat{d}_{t-1} - d_{t-1}\right) + \sum_{t=1947}^{1974} p_t.$$

We see that this expression includes the sum of surpluses, but there is also another sum. The terms in this sum are negative in most years because $\hat{d}_t > d_t$ (debt/GDP is higher in the counterfactual than in actual history) and $i_t - z_t = r_t - g_t$ is negative for most years in 1947–1974. Mathematically, this explains why $\hat{d}_{1974} - d_{1974}$ (17 percentage points) is less than the sum of surpluses (30 points).

The economics behind equation (11) involve the erosion of debt resulting from $r < g$. The higher levels of debt in the primary balance counterfactual magnify this effect, which moderates the rise in debt. That is, the elimination of primary surpluses in the counterfactual creates additional debt, but part of this debt is eroded by $r < g$, so the total increase in debt is less than the sum of surpluses that are eliminated.

For similar reasons, the contribution of interest rate distortions x_t as measured in equation (10) is different from the effects of distortions as measured by our counterfactuals. We conclude that, while the decompositions in (9) and (10) are useful for comparing our results to other work, the counterfactuals in Figure 7 and Table 1 are more informative in showing how debt/GDP would have evolved in alternative scenarios.

VI. Conclusions

This paper studies the factors behind the behavior of the US debt/GDP ratio since 1946, both the large decline in the ratio from 1946 to 1974 and the large increase since then. We examine the roles of primary surpluses and deficits; distortions of real interest rates from surprise inflation and from pegged nominal rates before the 1951 Fed-Treasury Accord; and the difference between the undistorted real interest rate and the growth rate of output ($r^\star - g$).

For the period up to 1974, we find that the fall in the debt/GDP ratio is explained mostly by primary surpluses and interest-rate distortions. Absent those factors, with the path of the ratio determined entirely by $r^\star - g$, the ratio of 106 percent in 1946 would have fallen only to 74 percent in 1974 rather than the actual trough of 23 percent.

For the debt increase since 1974, the most important factor is large primary deficits. Another factor, however, is a switch in the sign of $r^\star - g$: On average the undistorted real interest rate has exceeded the growth rate. As a result, with primary balance and undistorted interest rates, the debt/GDP ratio would have grown from 74 percent in 1974 to 84 percent in 2022, not too far from its 1946 level.

At the end of fiscal year 2022, the actual debt/GDP ratio had risen to 97 percent, close to its peak of 106 percent in 1946. What are the prospects for debt going forward? Can we hope for a steep fall in the debt/GDP ratio like the one after World War II?

It is unlikely that debt/GDP will be reduced significantly by the kinds of interest-rate distortions that reduced the ratio after 1946. Presumably, US policymakers are not considering the kind of interest-rate peg (with price controls to contain the inflationary effects) that was imposed during World War II. And despite the recent surge in inflation, the Federal Reserve appears committed to pushing inflation back down and keeping it low, which would preclude debt erosion through surprise inflation. Additionally, any inflation surprises that occur will have smaller effects than they did in the past because the average maturity of the debt is shorter (Aizenman and Marion 2011; Hilscher, Raviv, and Reis 2022).

In theory debt could be reduced rapidly through primary surpluses, but that appears unlikely. Under current policy, the Congressional Budget Office predicts large primary *deficits* over the next three decades, and political leaders are not proposing the kind of fiscal adjustment that could change this outcome.

Will economic growth help resolve the debt problem? On average since World War II, a negative $r^{\star} - g$ has contributed to debt reduction, but this effect has been weak: It has reduced debt/GDP by only 22 percentage points over 76 years. This history suggests that, if future primary surpluses were zero, the debt would not explode but it would also not fall by much in the next few decades. And with the primary deficits that are forecasted, we are likely to see debt/GDP climb to higher and higher levels.[11]

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