Business Economics (2020) 55:202–212
https://doi.org/10.1057/s11369-020-00188-y

NABE
National Association for Business Economics

ORIGINAL ARTICLE

The effects of the COVID pandemic on the federal budget outlook

Alan J. Auerbach[1] · **William Gale**[2]

Published online: 12 October 2020

Abstract
We examine the impact of COVID-19 on the federal budget outlook. We find substantial but temporary effects on spending and revenues, with more moderate but permanent effects on the long-term projections. We project that the debt-to-GDP ratio, currently 98%, will rise to 190% in 2050 under current law, compared to a CBO pre-COVID projection of 180%. Sharply lower interest rates projected for the next dozen years help moderate future debt accumulation. Under a "current policy" projection that allows temporary tax provisions—such as those in the Tax Cut and Jobs Act of 2017—to be made permanent, the debt-to-GDP ratio would rise to 222% by 2050 and would continuing rising thereafter. The long-term projections are sensitive to interest rates. We discuss several aspects of these results, including how the current episode compares to past debt changes, the role of historically low interest rates, and the role of recent Federal Reserve Board policies and actions. Because of the macro-stabilization effects of fiscal tightening, and because low interest rates create "breathing room" for fiscal policy, we do not see the large, short-run debt accumulation resulting from the current pandemic as necessitating any immediate offsetting response. But the long-term projections show that significant fiscal imbalances remain and will eventually require attention.

Keywords COVID · Budget outlook · Fiscal policy

1 Introduction

COVID-19 has created significant changes in almost all aspects of the economy. In this paper, we examine the impact on the federal budget outlook, with five main results. First, we document that the pandemic and the policy responses to it rapidly and substantially raised federal deficits.[1] This increase is temporary, however. Spending and revenues are projected to return to pre-COVID baseline values relatively quickly.

Second, the long-term fiscal outlook through 2050 has deteriorated somewhat. Under the Congressional Budget Office's (CBO 2020f) assumptions for GDP growth and interest rates, we project that the debt-to-GDP ratio, currently 98%, will rise to 190% in 2050 under current law, compared to a pre-COVID baseline projection of 180%. CBO (2020f) obtains a similar projection—195%—using a slightly different set of assumptions about taxes and spending programs.

Third, although the economic downturn and COVID-related legislation raise debt permanently, sharply lower projections of interest rates for the next dozen years help moderate future debt accumulation. Nevertheless, even during the period when interest rates are projected to be low, the projected debt-to-GDP ratio rises due to substantial and rising primary deficits, driven largely by rising outlays on health-related programs and Social Security. As the economy grows and debt accumulates, interest rates are projected to rise and to exceed the nominal GDP growth rate by increasing amounts starting in the early 2040s.

Fourth, under a "current policy" projection that allows temporary tax provisions—such as those in the Tax Cut and Jobs Act of 2017—to be made permanent, the debt-to-GDP ratio would rise to 222% by 2050 and would continuing rising thereafter. Fifth, the long-term projections are sensitive to interest rates. If interest rates remain low (that is, at their

✉ William Gale
WGALE@brookings.edu

Alan J. Auerbach
auerbach@econ.berkeley.edu

[1] University of California, Berkeley, USA

[2] Urban-Brookings Tax Policy Center, Washington, DC, USA

[1] Other countries have had similar responses. The International Monetary Fund (2020) estimated that, as of July, the effects of COVID-related automatic and discretionary policy changes have increased cumulative deficits by 13.6 percent of GDP in advanced countries.

projected level for 2025), rather than rising as in the CBO projections, the debt-to-GDP ratio would equal 157% in 2050 under current policy.

We discuss several aspects of these results—including how the current episode compares to past debt changes, the role of historically low interest rates, and recent Federal Reserve Board policies. Because of the macro-stabilization effects of fiscal tightening, and because low interest rates create "breathing room" for fiscal policy,[2] we do not see the large, short-run debt accumulation resulting from the current pandemic as necessitating any immediate offsetting response. But the long-term projections show that significant fiscal imbalances remain and will eventually require attention.

2 The federal budget outlook

We examine the fiscal outlook over 10- and 30-year horizons. While the shorter horizon conforms to that used by CBO in its standard budget analysis, the longer horizon provides additional insight about underlying budget trends and questions of fiscal sustainability.

2.1 Constructing budget baselines

2.1.1 Ten-year outlook

To provide perspective on both the current budget outlook and how it was affected by the COVID pandemic, we examine three baselines. The "pre-COVID baseline" is based entirely on current law projections that the Congressional Budget Office (CBO 2020a) made in January, pre-dating any consideration of the impact of COVID on the economy.

The "current law" baseline is embodied in the CBO's most recent 10-year budget projections (CBO 2020c). By law and convention, these projections assume that Congress does (almost) nothing to enact new programs or tax changes for the next 10 years.[3] Current law projections serve an important purpose: they show where the government is headed in the absence of almost any action. Another way to proceed, however, is to ask where the government is headed if policy makers continue to make choices as they have in the past. Constructing a baseline along these lines—typically characterized as "current policy"—clearly requires judgment calls to project the consequences of Congress following a "business as usual" approach.

Our current policy projections start with current law projections and make a series of adjustments based on CBO data. These adjustments simply show the effects of what, in our judgment, can be viewed as a continuation of current policies. Given the wide array of provisions enacted in the last year due to the COVID pandemic, judgments about what constitutes current policy are particularly difficult under present circumstances, so we focus narrowly on items that are conventionally included in "current policy" estimates.

Specifically, we assume that, as it has done in the past, Congress makes temporary tax-cut provisions permanent, including the temporary provisions in the 2017 Tax Cuts and Jobs Act.[4] We allow real non-defense discretionary spending to rise with population growth, rather than remaining constant over time, as CBO assumes, because maintaining current services for these programs is likely to require a population adjustment.[5] We assume all CARES Act provisions are implemented and allowed to expire as scheduled and that the President's payroll tax deferral has no effect on any budget outcome.

2.1.2 30-year outlook

Looking only at the next ten years gives an incomplete picture of the fiscal outlook, even with adjustments made to characterize current policy. Projections covering 30 years are generally sufficient to capture most long-term trends. To generate the longer-term projections, we begin with budget and economic figures for 2030 (in the three baselines developed above) and project forward each part of the government budget. Except where noted below, the three baselines are based on similar assumptions after 2030.

First, following CBO (2020f), the nominal growth rate of GDP is set equal to 3.6% for 2031–2040 and 3.5% for 2041–2050. Second, for Medicare and Old-Age, Survivors,

[2] Elmendorf and Sheiner (2017), Blanchard (2019a, b).

[3] But the projections do require that Congress increase or suspend the debt limit as needed to carry out the tax and spending programs in the baseline, that temporary entitlement programs (like SNAP and TANF) are reauthorized on schedule, and that outlays for discretionary spending programs remains constant in real terms over the decade, unless such authority is governed by a specific law. Also, current law projections assume that when the Social Security, Disability, and Medicare (part A) trust funds are exhausted, Congress will (a) authorize full payment of promised benefits and (b) cover any shortfalls with general revenue financed by federal borrowing.

[4] Examples of major expiring provisions in the 2017 tax act include expensing of business investment in qualifying equipment, the individual marginal rate cuts, the increased standard deduction, the repeal of personal exemptions, the increased estate tax exemption, the cap on state and local tax deductions, and the 20 percent deduction for certain pass-through income. Examples of expiring provisions outside of the 2017 tax act include tax credits for biodiesel and alternative fuel mixtures and the deduction for mortgage insurance premiums.

[5] In contrast, defense spending, which largely provides a non-rival public good, plausibly can maintain current services over the relatively short 10-year horizon without a population adjustment.

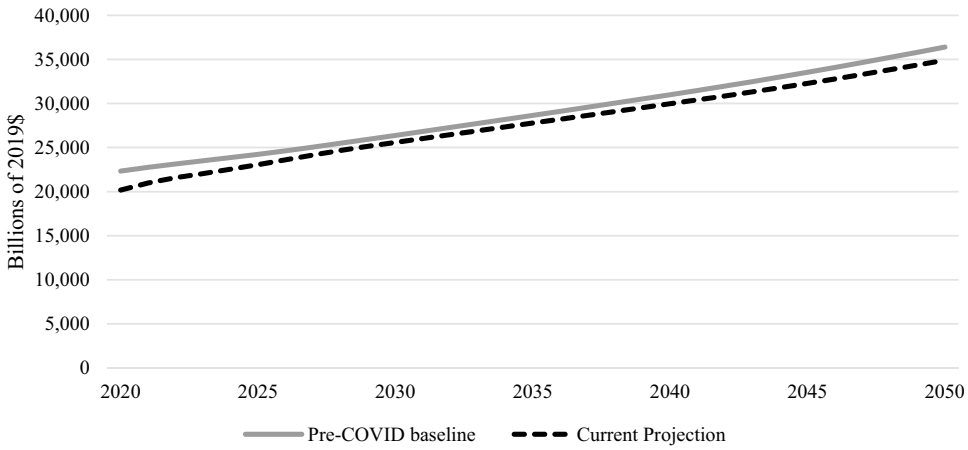

Fig. 1 Real GDP, 2020–2050

and Disability Insurance (OASDI), we project all elements of spending and dedicated revenues (payroll taxes, income taxes on benefits, premiums and contributions from states) using the growth rates as a share of GDP in the intermediate projections in the 2020 Trustees Reports for the period between 2030 and 2050. Third, for Medicaid and the Children's Health Insurance Program (CHIP), we use the most recent long-term CBO (2020f) projections. Fourth, all other non-interest spending—"other" mandatory spending and discretionary spending—is assumed to remain constant as a share of GDP. Fifth, income taxes other than those tied to Social Security and Medicare benefits grow with "bracket creep" according to CBO' most recent long-term projections. Sixth, all other revenues (corporate taxes, excise taxes, etc.) remain constant at their 2030 shares of GDP.

Seventh, "current law" and "current policy" average interest rates on the public debt follow the projections in the latest Long-Term Budget Outlook (CBO 2020f). To estimate net interest payments in years after 2030, we multiply the average interest rate in a given year by the sum of (a) half of the primary deficit in that year and (b) outstanding government debt at the end of the previous year.

In addition to projecting debt and deficits over the 30-year horizon, we also present estimates of the "fiscal gap," an accounting measure that is intended to reflect the long-term budgetary status of the government.[6] The fiscal gap answers the question: if one starts a policy change in a given year to reach a given fiscal target in a given future year, what is the size of the annual, constant-share-of-GDP increase in taxes or reductions in non-interest expenditures (or combination of the two) that would be required, holding projected economic performance unchanged? For example, one might ask what immediate and constant policy change would be needed to obtain some target debt-to-GDP in 2050.[7] Or, one might ask what constant share-of-GDP change would be required, starting with a delay, say in 2025, or to achieve a net interest-to-GDP ratio of 2% by 2050.

2.2 Projections

2.2.1 Economic projections

Figure 1 shows how real GDP projections changed because of COVID. Relative to the pre-COVID baseline, projected real GDP falls significantly early in the decade and is not projected to regain the pre-COVID baseline even by 2030. The growth rate post-2030 fell relative to pre-COVID projections. The weaker economy, slower inflation, and aggressive Federal Reserve policy translated into sharply lower projections of interest rates for about a dozen years (Fig. 2).[8] The average rate falls to 1.1% by mid-decade before rising to its pre-COVID baseline value (2.9%) by 2034 and then rising further to 4.1% by 2050. That is, the projection implies that nominal interest rates will rise above the nominal growth rate around 2042 and will exceed the growth rate by 0.6%age points by 2050. These economic projections help drive the budget outcomes discussed below.

[6] Auerbach (1994). Auerbach et al. (2003) discuss the relationship between the fiscal gap, generational accounting, accrual accounting, and other ways of accounting for government. Note that estimates of the fiscal gap do not in any way imply that level reductions as a share of GDP are the best way to achieve a given fiscal target, rather than, say, level reductions as a share of primary deficits (which in the present circumstance would imply a growing path of primary deficit reductions). The fiscal gap measure just provides one convenient way to think about the magnitude of a fiscal shortfall, given a future fiscal goal.

[7] Implementing the adjustments indicated by the fiscal gap does not stabilize debt after the target year—say 2050; it only adjusts tax and spending trajectories so that the debt hits a target by 2050. Under all the scenarios considered in this paper, the debt-to-GDP ratio would continue rising after hitting the specified target in a specified year.

[8] Figure 2 shows effective interest rates, the ratio of net interest payments in a given year to the sum of (a) half of the primary deficit in that year and (b) debt outstanding at the beginning of the year.

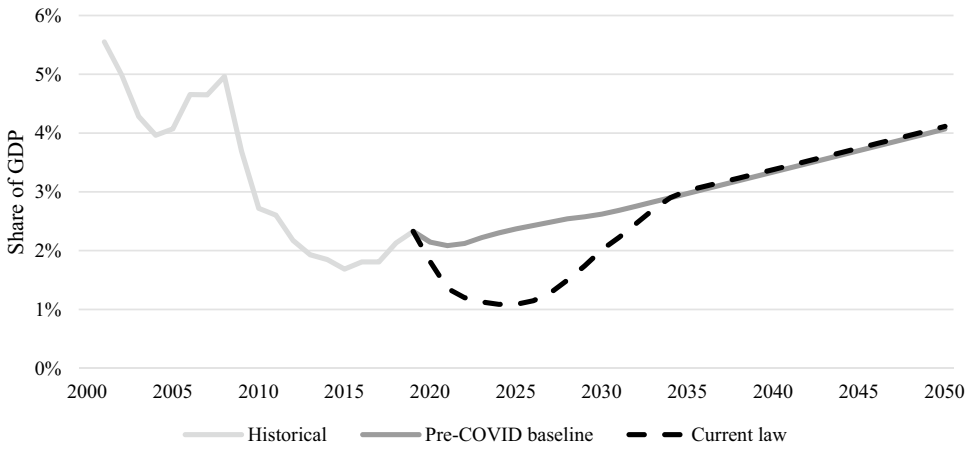

Fig. 2 Effective interest rate, 2000–2050

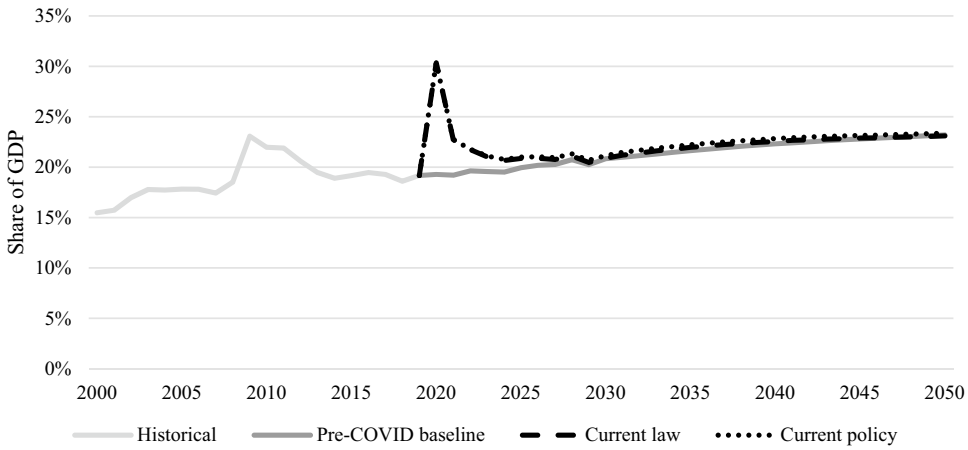

Fig. 3 Non-interest spending, 2000–2050

2.2.2 Effects of COVID: comparing the pre-COVID baseline and current law

Non-interest spending spiked in 2020 (Fig. 3), mostly because of the CARES Act. Spending rose by 11% of GDP relative to the pre-COVID baseline but is projected to fall rapidly in subsequent years and to return to about its pre-COVID baseline projection of 20.8% by 2030. After that, non-interest spending under both the pre-COVID and current law baselines rises by about 2.5% of GDP through 2050. These spending increases are driven mainly by health care (Medicare, Medicaid, CHIPS, and exchange subsidies) and, to a lesser extent, Social Security.

Figure 4 shows that revenues dip slightly in 2020 and 2021 but regain pre-COVID shares of GDP by 2022 and essentially mimic pre-COVID shares thereafter. Of course, with post-COVID GDP lower than under the pre-COVID baseline, the projected level of revenues is still substantially below what had been expected in January. Revenues rise more slowly than non-interest spending, however. Between 2030 and 2050, revenues are projected to rise by less than 1% of GDP, reaching 18.6% of GDP under the both current law and the pre-COVID baselines, with the only changes over time due to bracket creep in the income tax and a slight increase in payroll tax revenues.

As a result of these changes, the primary deficit spikes in 2020—exceeding 14% of GDP—but then falls sharply in the next few years and then hews closely to its projected values under the pre-COVID baseline (Fig. 5). The primary deficit rises gradually from 3.2 (3.1) % of GDP in 2030 to 4.5 (4.6) % of GDP in 2050 under current law (the pre-COVID baseline).

Under the current law projections, interest payments plummet and then explode (Fig. 6). Despite the increase in COVID-related debt, net interest payments fall from about 1.6% of GDP currently to 1.1% in 2024–5 because of the projected decline in interest rates. But as a result of economic growth and rising debt, both of which raise interest rates, interest payments rise to 2.2% in 2030 and continue rising over time, reaching 7.4% of GDP under current law in 2050, slightly higher than the 7.2% of GDP projected under the pre-COVID baseline. Both figures, however, far exceed the peak historical net interest level of 3.2% of GDP in 1991.

Figure 7 shows the unified deficit, combining the effects of primary deficits and interest payments. The deficit in 2020 reaches 16% of GDP—more than 11% of GDP larger than

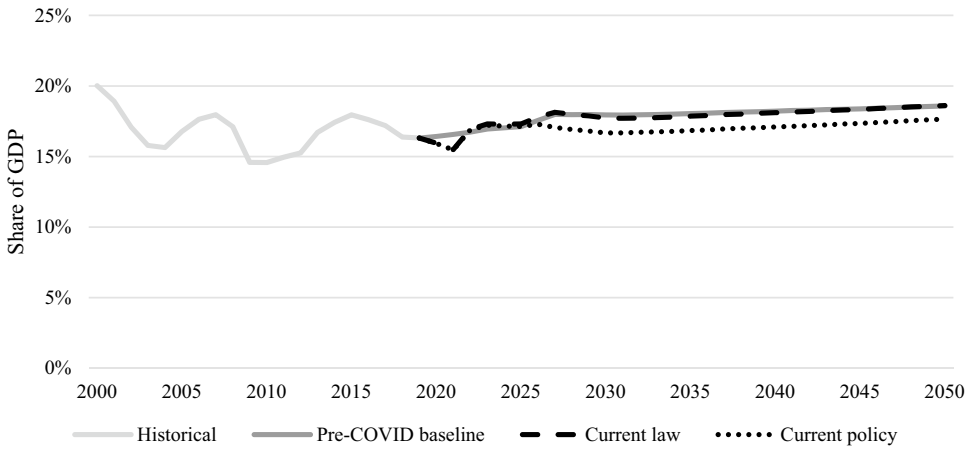

Fig. 4 Revenue, 2000–2050

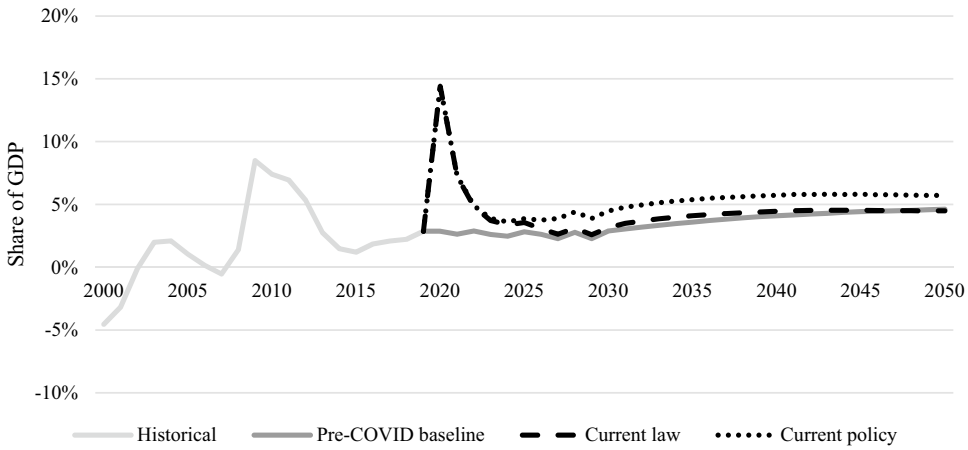

Fig. 5 Primary deficit, 2000–2050

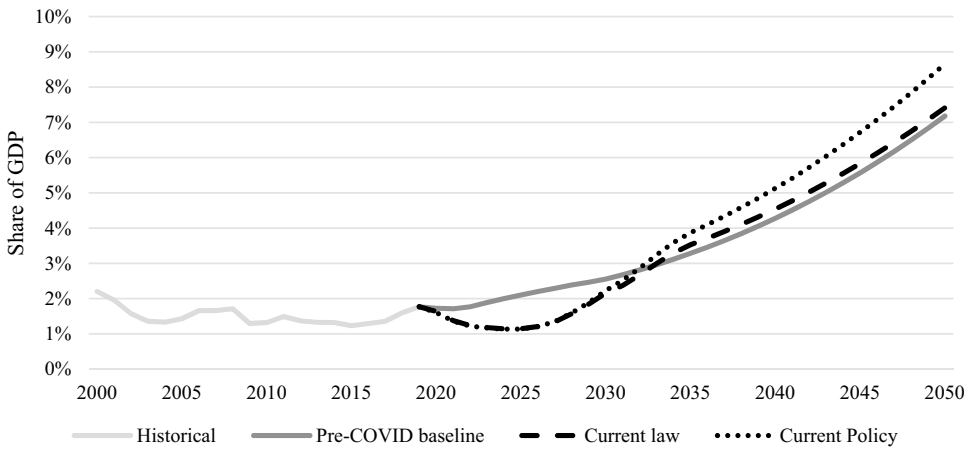

Fig. 6 Net interest, 2000–2050

was predicted in the pre-COVID baseline, and much higher than even the peak deficit in the Great Recession—about 10% of GDP. The effect is temporary, however. Projected deficits decline sharply after 2020 and return to their pre-COVID projected share of GDP by 2024. At that point, relative to the pre-COVID baseline, the projections imply that non-interest spending will be about 1% of GDP higher, net interest payments will be about 1% of GDP lower, and revenue will raise the same share of GDP. By the end of the decade, the deficit is projected to be 5.3% of GDP under current law.

The projected 2020–2030 unified deficit rises from $14.2 trillion in the pre-COVID baseline to $16.3 trillion under current law. Excluding net interest, legislative changes add $2.6 trillion to the projected deficit—more than the entire increase in deficits. The effects of macroeconomic changes

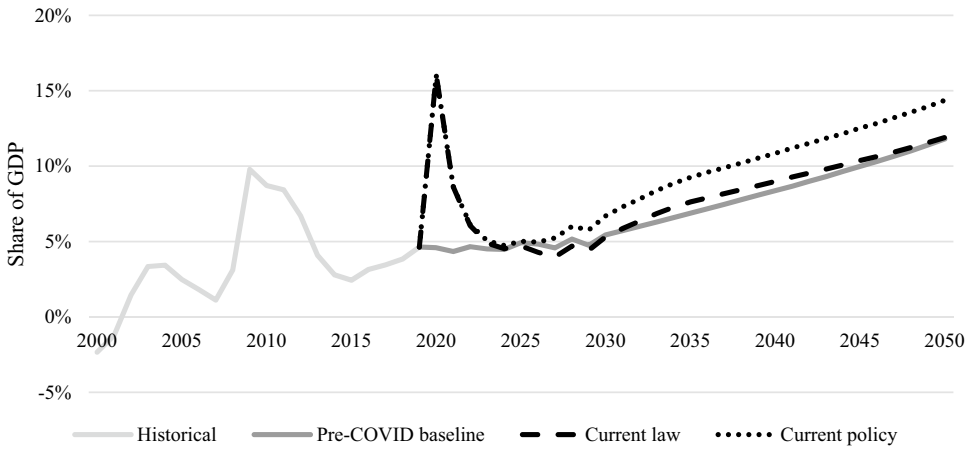

Fig. 7 Unified deficit, 2000–2050

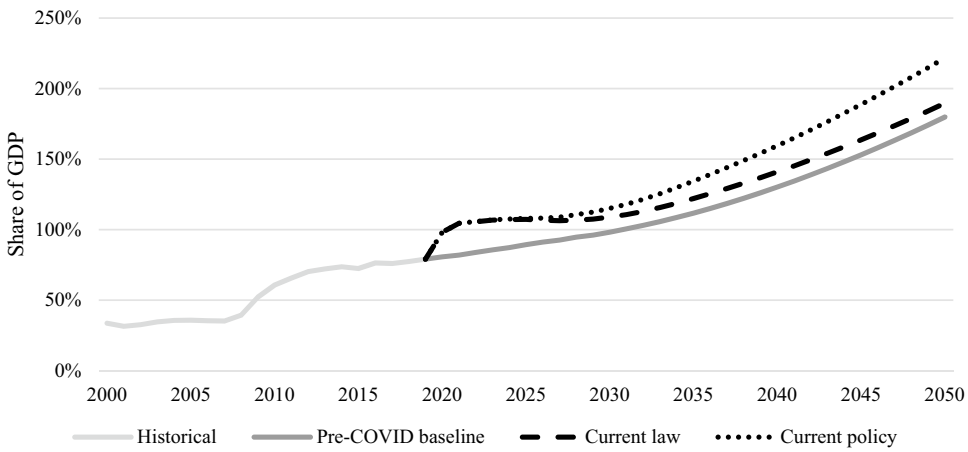

Fig. 8 Public debt, 2000–2050

add another $1.3 trillion, and other changes account for $0.4 trillion more. Despite these increases in spending and reductions in revenue, net interest payments are projected to decline by $2.2 trillion because of sharply lower projected interest rates.

After 2030, the unified deficit continues to rise under both the pre-COVID baseline and the current law scenario. By 2050, the unified deficit reaches almost 12% of GDP under both current law and the pre-COVID baseline.

Figure 8 shows the impact of COVID on the public debt. Before the pandemic, the US already had historically high debt as a share of GDP—the highest since just after the end of World War II. Under the pre-COVID baseline, the stock of outstanding public debt would have been 81% of GDP at the end of fiscal 2020 and 82% by the end of fiscal 2021. Now, analogous current law projections are 98% and 104%, respectively. Projected debt rises gradually for the rest of the decade, reaching 109% of GDP in 2030 under current law, compared to 98% under the pre-COVID baseline.

After 2030, rates of debt accumulation pick up, because of rising primary deficits and rising interest payments. By 2050, the debt rises to 190% of GDP under current law compared to 180% in the pre-COVID baseline. Essentially, the higher deficits incurred in 2020 and 2021 are carried forward on a long-term basis but since interest rates are lower than growth rates on average over the 2020–2050 period, the effect relative to GDP is slightly dissipated.[9]

[9] Our current law baseline differs slightly from CBO (2020f). CBO uses its own estimates for Social Security and Medicare, whereas we use estimates from the Trustees of those programs (scaled for GDP). We allow other mandatory spending and discretionary spending to remain constant shares of GDP from 2030 to 2050. CBO has them declining somewhat. Nevertheless, both our projections and CBO's generate primary deficits of 4.5 percent of GDP in 2050. We use interest rate estimates embedded in CBO (2020f) projections. (Although the projected interest rates reported in CBO (2020f, page 47) are larger than those reported above, the difference is due to different definitions. CBO reports effective interest rates as the ratio of net interest payments in a given year to debt at the end of the previous year. We report effective interest rates as the ratio of net interest payments in a given year to the sum of (a) half of the primary deficit in that year and (b) the debt at the end of the previous year. Finally, CBO generates a debt-to-GDP ratio of 195 percent in 2050, compared to our estimate of 190 percent under current law. CBO (2020f) compares its budget outlook to its 2019 Long-Term Budget Outlook (CBO 2019), which projects a 2049 debt-to-GDP ratio of 144 percent. We compare our current law baseline to CBO's January 2020 baseline – the most recent prior to the pandemic which projects a 2050 debt-to-GDP ratio of 180 percent.

Table 1 Fiscal gap (% GDP)

Target	Current law			Current policy		
	Begin 2021	Begin 2025	Begin 2030	Begin 2021	Begin 2025	Begin 2030
Debt = current	3.19	3.54	4.24	4.23	4.74	5.73
NI = 3.2	3.79	4.21	5.06	4.81	5.40	6.55

2.2.3 Current law versus current policy

While comparing the pre-COVID baseline to current law shows the impact of the pandemic, comparing current law to current policy shows the impact of certain "business as usual" changes that Congress tends to make. These differences occur during the first 10 years, given our process for generating projections, but they have ramifications for longer-term outcomes. Making the temporary provisions of the Tax Cuts and Jobs Act permanent, along with modest adjustments to spending, would raise the 2050 debt-to-GDP ratio to 222% compared to 190% under current law. By 2050, revenues would be at 17.7% of GDP, compared to 18.6% under current law; the primary deficit would rise to 5.7% of GDP and interest payments would rise to 8.7% of GDP, compared to 4.5 and 7.4%, respectively, under current law.

2.2.4 The fiscal gap

Turning to the fiscal gap, Table 1 shows that, under current law projections, obtaining a debt-to-GDP ratio in 2050 equal its 2020 level of 99% would (ignoring any macroeconomic feedback effects) require permanent tax increases or non-interest spending cuts totaling 3.2% of GDP starting in 2021. This would be the equivalent to a about a 34% increase in income tax revenues, a 15% increase in all tax revenues, or a 14% reduction in average non-interest spending. Because projected interest rates are so low in the next few years, the cost of delaying fiscal consolidation is, at least initially, small. If policy makers wait till 2025 or 2030 to pursue a 2050 policy goal, the required changes would be larger, because the debt must be brought down in fewer years.

Policy makers could choose a net-interest-to-GDP target instead of a debt target. To hold 2050 interest payments at 3.2% of GDP—the historical maximum for this ratio, obtained in 1991—would require policy changes equal to about 3.8% of GDP starting in 2021.

Under current policy, all the shortfalls are larger. Obtaining the current debt-to-GDP ratio would require policy changes equal to 4.2% of GDP starting in 2021. Holding net interest payments to their historical maximum share of GDP would require policy changes of 4.8 percent of GDP.

2.2.5 Sensitivity analysis

How future economic and budget outcomes evolve depends crucially on how the virus and the economy change over time. There is significant uncertainty about the course of the virus, which creates uncertainty about the path of the economy. But, even for a known course of the virus and known pattern of social distancing behavior, there is considerable uncertainty about the course of the economy.[10] This uncertainty stems from (1) the unique nature of the pandemic as a recession-causing event, (2) the sheer depth of the drop in GDP and employment experienced in the spring of 2020, and (3) the massive reallocation of workers, jobs, and economic activity across sectors of the economy that will be required in the wake of the pandemic. In fact, the economy has recovered faster than many expected. CBO's July projections implying that the economy will not recover to close to its the pre-pandemic projected GDP level until the end of the decade are now viewed by some as overly pessimistic in terms of the speed of recovery.

But after the Great Recession, CBO (and many other forecasters) expected the economy to recover to close to its pre-recession path, which, in the end, did not happen. As a result of prolonged slower growth, CBO eventually significantly lowered its projections for potential GDP.[11] CBO's current GDP projection is that real GDP will be 1.1% lower in 2030 than prior to the pandemic. If the economy's gap from the pre-COVID path is larger than projected, the fiscal outlook will likely be worse, with the obvious caveat that if interest rates fall enough, the overall fiscal position could be improved. However, projected rates are already very low already, so there is a limit on how much lower they can fall. To address the possibility that the economy may not recover as close to the pre-COVID path, we use CBO's interactive workbook to apply the agency's rules of thumb

[10] CBO assumes that social distancing peaked in April 2020 and will diminish to two-thirds of the peak level later in 2020 and continue to fall through 2021 regardless of any resurgence in transmission (Congressional Budget Office 2020b).

[11] In its January 2009 budget outlook, CBO (https://www.cbo.gov/sites/default/files/111th-congress-2009-2010/reports/01-07-outlook.pdf) noted that its projection of potential output in 2018 had been revised downward by 1 percentage point. In 2014, (https://www.cbo.gov/publication/45150), CBO wrote that its projection of 2017 potential GDP had fallen by more than 7 percent since 2007.

for the impact of alternative economic scenarios on budget projections and find that if the annual productivity growth rates were lower than projected by 0.5 percentage points for each of the next 10 years, the debt-to-GDP ratio would rise by an additional 12 percentage points by 2030.[12] CBO (2020f) shows that if the annual growth rate of total factor productivity is 0.5 percentage points lower than projected, debt will rise to 239% of GDP in 2050 under current law, compared to the 195% figure in its baseline.

Given the importance of net interest payments for the long-term budget outlook, we also consider a low-interest rate scenario. Figure 2 shows that projected rates reach a minimum in 2025, and then rise more or less steadily through 2050. In our alternative scenario, we assume that interest rates stay constant at their 2025 levels through 2050. Under this specification, the 2050 debt-to-GDP ratio reaches 134% under current law and 157% under current policy. CBO (2020f) shows that if interest rates are 1 percentage point higher (lower) than predicted over the next 30 years, the debt-to-GDP ratio will be higher (lower) by 69 (46)% of GDP by 2050 under current law.

2.2.6 Social security, disability, and medicare trust funds

All the estimates above—both current law and current policy—assume that future shortfalls in the Social Security, Disability, and Medicare (Part A—hospital insurance) trust funds are financed by government borrowing.[13] However, under existing law, benefit payments may only be made from the trust funds (which receive dedicated sources of revenue, the main source being payroll taxes). In practice, lawmakers have generally maintained the notion that Social Security and a portion of Medicare benefits net of premiums should be funded by dedicated taxes rather than general revenues. The April 2020 Trustees reports, based on projections that predate the impact of the COVID-19 pandemic, showed that in the absence of policy changes, Social Security and Medicare would need to cut benefits by 21 and 10%, respectively, or raise taxes considerably, when their trust funds were projected to be exhausted in 2035 and 2026, respectively.[14]

There are many possible interactions between the COVID pandemic and the Social Security trust fund. For example, lower current wages and high current unemployment imply lower payroll tax revenues until the economy recovers but also lower future benefits for the cohort that is turning 60 this year, because of the way benefits are calculated.[15] This quirk is clearly unintended and will likely be addressed by Congress in the near future. In addition, more older Americans may retire this year, having been laid off in the current downturn. Furthermore, if the pandemic makes work more dangerous for older Americans, labor force participation of older workers may be suppressed for some time. And the expansive pandemic unemployment insurance is likely to reduce disability claims this year but could raise them next year as the unemployment rate is projected to remain high.

As to the Medicare trust funds, the potential impacts are much greater than during a normal downturn or even the Great Recession, because health care expenditures are a central factor as the pandemic plays out. Covering the cost of treating covered COVID-19 patients increases Medicare spending, but the sharp drop in elective procedures, at least temporarily, works in the opposite direction.

An additional implication of COVID on the trust funds has to do with the change in projected interest rates. Lower interest rates raise the present value of future spending obligations, like those for Social Security and Medicare. In the past, policy makers have chosen to pre-fund a certain share of these obligations. With lower interest rates, any level of pre-funding will be more difficult to achieve: that is, pre-funding will require higher taxes or lower spending than it did under higher interest rates. Policy makers will have to choose between imposing higher burdens to reach a given level of pre-funding or pre-funding these programs to a lesser extent than in the past considering the less favorable payoff from doing so.[16]

We estimate the effects on the 2050 debt-to-GDP ratio of funding Social Security, Disability Insurance, and Medicare part A on a pay-as-you-go basis—that is, with some combination of tax increases or spending cuts when the trust funds are exhausted. If Medicare Part A is funded, the 2050 debt-to-GDP ratio would fall by 11 percentage points. If Social Security and Disability are funded when the respective trust funds are exhausted, the 2050 debt-to-GDP ratio would fall by 22 percentage points.[17] These estimates, though, only partially incorporate the effects of the COVID pandemic on the trust funds. For 2020–2030 data, we employ CBO

[12] Congressional Budget Office (2020d).

[13] CBO (2020e) provides new projections for the major federal trust funds.

[14] Board of Trustees of the Old-Age Survivors Insurance and Federal Disability Insurance Trust Funds (2020), and Boards of Trustees of the Federal Hospital Insurance and Federal Supplemental Medical Insurance Trust Funds (2020).

[15] Biggs (2020).

[16] When the Social Security or Medicare trust fund runs an annual surplus, the excess funds are invested in bonds at the Treasury. The interest rate that the Treasury Department pays to these programs depends on recent average yields on federal debt. As a result, lower interest rates reduce the returns that the trust funds receive and thus make it more costly to achieve a given level of pre-funding. (In a similar fashion, low rates of return make it more difficult for pension funds to finance future obligations.).

[17] Committee for a Responsible Federal Budget (2017) obtains similar effects.

projections, which have been updated for COVID. For subsequent years' data, the estimates are based on growth rates of revenue and spending from the latest Social Security and Medicare Trustees Reports, which have not yet been updated in response to the pandemic.

2.3 Perspectives and interpretations

The sharp changes in the economy brought about by COVID and the associated policy responses raise several interesting issues for fiscal policy. First, the debt-to-GDP ratio is projected to rise by 25 percentage points between 2019 and 2021 and could rise by more if there is new legislation or a weaker-than-expected recovery. This increase is sizable but is not out of line with other debt build-ups over the past century. For instance, the coupling of World War I with the 1918 flu pandemic led to a debt-to-GDP increase of 30 percentage points over 3 years. World War II raised the debt-to-GDP ratio by 64 percentage points over 6 years. The Great Recession boosted the debt-to-GDP ratio by about 31 percentage points over 4 years.

Second, the previous peak in the debt-to-GDP ratio—106%—occurred just after World War II, following which the debt-to-GDP ratio gradually dwindled to 28% over the ensuing 35 years, an outcome that contains both good and bad news for the current long-term fiscal shortfall.[18] Between 1945 and 1980, interest rates on government debt were often below the economic growth rate, which helped to reduce the debt-to-GDP ratio. Likewise, although economic growth is projected to be lower than during the earlier post-war period, so are interest rates, which as discussed above are projected to remain below growth rates for the next 30 years, providing the same help in reducing the debt-GDP ratio over time.

However, the federal government maintained balanced primary budgets on average over the 1945–1980 period. In contrast, we project sizable and growing primary deficits as a share of GDP even after the pandemic and its economic aftermath subside. These primary deficits are sufficiently large to cause debt to grow inexorably relative to GDP despite lower interest rates, and there is nothing in the forecast to suggest that this growth will slow even after 2050.

Approaching a balanced primary budget through reductions in spending would be much more challenging now than in the earlier post-war period, because of differences in demographics and budget composition. In 1945 and the years that followed, defense spending was an important part of the federal budget, expenditures on Social Security were small, and Medicare and Medicaid did not exist. In fiscal year 2019, the last pre-pandemic fiscal year, federal spending on defense was just 3.2% of GDP, while spending on the three major entitlement programs accounted for 10.5% of GDP and over half of non-interest federal spending. Moreover, spending on the entitlement programs is projected to grow faster than GDP over the next three decades, due to population aging and health care cost growth. At the same time, with greater inequality than during the period ending in 1980, there is stronger support for increased spending on social services. One may also conjecture that demand will increase for health insurance coverage, a stronger social safety net, and more redistribution, given the differential impact of both COVID illness itself and the associated economic burdens. In short, the upward pressure on federal spending is much stronger now than in the past.

Reducing the primary deficit through tax increases may prove difficult politically, but there is room to maneuver. As a share of GDP, federal revenues equaled 16% in 2020. If TCJA and other temporary provisions are extended in the usual manner, and revenues are projected to total just 17.0% over the 2020–2050 period. In the fifty years prior to 2020, revenues averaged 17.4% of GDP and reached a high of 20.8% in 2000.

Third, a key factor in the fiscal picture is the path of interest rates. The reduction in projected interest rates unambiguously improves the federal government's overall fiscal stance—because it is a net borrower. We can certainly borrow more and consume more with low interest rates and not hurt future generations (who can in turn borrow more from later generations). But the optimality of this pattern may fall apart if interest rates subsequently rise, resulting in higher interest rates on higher levels of debt,[19] particularly if this rise in interest rates is not accompanied by a sufficiently large increase in the rate of productivity growth.[20]

The path of interest rates will also depend in part on monetary policy. But the relevance of the Fed to the fiscal picture goes well beyond its role in the determination of interest rates. The Fed has sharply expanded its balance sheet since the onset of the pandemic, acquiring large quantities of the new government debt being issued.[21] In addition, through facilities created under its emergency lending authority, it has taken on the debts of companies and state and local governments. Some have argued that these facilities, which were utilized in response to the financial crisis and expanded in scope in the current situation, signify a growing role of the Fed in conducting fiscal policy (e.g. Plosser 2012; Warsh

[18] Gale (2019a, b).

[19] Ballet al. (1998).

[20] If the increase in interest rates is in response to higher productivity, the effect on debt sustainability is unclear (Sheiner 2018).

[21] Data in CBO (2020c, table 2) imply that Fed holdings of public debt will rise by about 70 percent of the increase in public debt from 2019 to 2021.

2020). Alternatively, however, the facilities can be viewed as an extension of the Fed's traditional lender of last resort role which reflect the relative shift in financial activity since the Fed's creation away from bank loans toward securities traded in capital markets (Labonte 2020). Moreover, the facilities can only address temporary interruptions to liquidity via loans. Addressing solvency issues, which requires fiscal spending authority, has been left to Congress and the Administration (Powell 2020).

Nonetheless, the previously sharp lines between monetary policy, fiscal policy, and debt management policy have arguably blurred somewhat in recent years (Greenwood et al. 2014). With the Federal Reserve's adoption of paying interest on reserves held by banks, bank balance sheets have become functionally similar to Treasury bills.[22] And there may be concerns over the extent to which the Treasury can use changes in the federal debt's maturity structure as a debt management tool while the Fed is pursuing its own policies to influence the term structure of interest rates. Finally, as the Fed's tool kit has expanded in recent years, so too may the pressure to use those tools to implement fiscal or debt management objectives (e.g. Plosser 2012; Warsh 2020).

3 Conclusion

The COVID-19 pandemic has had the biggest effect on the economy, at least in the short run, of any downturn since the Great Depression. The policies undertaken to deal with the crisis will have important implications for the length of the recession and the strength of the recovery. The pandemic will also affect the conduct of fiscal policy once the crisis is past, given the projection of rising debt, the long-lasting effects on the economy, and the effects of the crisis on U.S. political imperatives.

Acknowledgements The authors thank Grace Enda and Claire Haldeman for outstanding research assistance. Gale thanks Arnold Ventures for generous research support. The views expressed here are solely those of the authors and should not be attributed to any other person or any organization. This article is based on a paper presented at the Brookings Papers on Economic Activity, on September 24, 2020.

References

Auerbach, Alan J. 1994, "The U.S. Fiscal Problem: Where We Are, How We Got Here, and Where We're Going." In *NBER Macroeconomics Annual* (Stanley Fischer and Julio Rotemberg, eds.). Cambridge, MA: National Bureau of Economic Research.

Auerbach, Alan J., William G. Gale, and Peter R. Orszag. 2003. Reassessing the Fiscal Gap: Why Tax-Deferred Saving Will Not Solve the Problem. *Tax Notes* 100: 567–584.

Ball, Laurence, Douglas W. Elmendorf, and N. Gregory Mankiw. 1998. The Deficit Gamble. *Journal of Money, Credit and Banking* 30 (40): 699–720.

Blanchard, Olivier. 2019a. *Public Debt: Fiscal and Welfare Costs in a Time of Low Interest Rates. Working Paper 19–2*, Peterson Institute for International Economics: Washington, DC.

Blanchard, Olivier. 2019b. Public Debt and Low Interest Rates. *American Economic Review* 109 (4): 1197–1229.

Biggs, Andrew G. 2020. *Coronavirus Recession Could Cut Social Security Benefits for Near-Retirees*. Philadelphia: University of Pennsylvania Pension Research Council.

Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. 2008. *The 2008 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds*. Washington, DC: Center for Medicare and Medicaid Services.

Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds. 2020. *The 2020 Annual Report of the Boards of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*. Washington, DC: Social Security Administration.

Committee for a Responsible Federal Budget. 2017. *Trustgo: To fix the Debt, Start by Making the Trust Funds Solvent*. April 3.

Congressional Budget Office. 2020a. Long-term budget projections [Data file]. Retrieved from https://www.cbo.gov/system/files/2020-01/51119-2020-01-ltbo.xlsx.

Congressional Budget Office. 2020b. *An Update to the Budget and Economic Outlook: 2020 to 2030*. Washington, DC.: U.S. Congressional Budget Office (July).

Congressional Budget Office. 2020c. *An Update to the Budget and Economic Outlook: 2020 to 2030.* Washington, DC.: U.S. Congressional Budget Office (September_.

Congressional Budget Office. 2020d. *Workbook for How Changes in Economic Conditions Might Affect the Federal Budget.* Washington, DC.: U.S. Congressional Budget Office (February).

Congressional Budget Office. 2020e. *The Outlook for Major Federal Trust Funds: 2020 to 2030.* Washington, DC.: U.S. Congressional Budget Office (September).

Congressional Budget Office. 2020f. *The 2020 Long-term Budget Outlook*. Washington, DC.: U.S. Congressional Budget Office (September).

Elmendorf, Douglas W., and Louise M. Sheiner. 2017. Federal Budget Policy with an Aging Population and Persistently Low Interest Rates. *Journal of Economic Perspectives* 31 (3): 175–194.

Gale, William. 2019a. *Fiscal Therapy: Curing America's Debt Addiction and Investing in the Future*. Oxford: Oxford University Press.

Gale, William. 2019b. Fiscal Policy with High Debt and Low Interest Rates. In *Maintaining the Strength of American Capitalism*, (Melissa S. Kearney and Amy Ganz, eds.) Washington, DC.: Aspen Economic Strategy Group.

Greenwood, Robin, Samuel G. Hanson, Joshua S. Rudolph, and Lawrence H. Summers. 2014. *Government Debt Management at the Zero Lower Bound*. Hutchins Center Working Paper. September 30, 2014.

International Monetary Fund. 2020. *World Economic Outlook Update: June 2020.*

Labonte, Marc. 2020. *The Federal Reserve's Response to COVID-19: Policy Issues*, Congressional Research Service, June 12, 2020.

Powell, Jerome. 2020. Current Economic Issues. Speech at the Peterson Institute for International Economics, Washington D.C., May 13, 2020.

[22] Several international central banks also have the authority to pay interest on reserves.

Plosser, Charles. 2012. Fiscal Policy and Monetary Policy: Restoring the Boundaries. *2012 Annual Report*, Federal Reserve Bank of Philadelphia.

Sheiner, Louise. 2018. *Effects of Low Productivity Growth on Fiscal Sustainability in the United States.* PIIE Working Paper 18–9. Peterson Institute for International Economics: Washington, DC.

Warsh, Kevin. 2020. The Fed Puts Its Independence on the Line. *Wall Street Journal*, September 7.

Alan J. Auerbach is the Robert D. Burch Professor of Economics and Law at the University of California, Berkeley, Director of the Robert D. Burch Center for Tax Policy and Public Finance, and Research Associate, National Bureau of Economic Research.

William Gale is the Arjay and Frances Fearing Miller Chair in Federal Economic Policy at the Brookings Institution and Codirector of the Urban-Brookings Tax Policy Center.