

Effects of COVID-19 on Federal, State, and Local Government Budgets

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I. Introduction

The COVID-19 pandemic and the associated policy responses have had a significant impact on government budgets. Federal spending has skyrocketed. State and local governments, almost all of which face some form of annual balanced budget rule, confront fiscal shocks on both the revenue and spending sides that threaten to make the recession deeper and slow the recovery. This paper examines the impact of COVID on the fiscal status of the federal government and the states.²

Section II provides new projections of 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, but only on a temporary basis. Spending and revenue 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 percent, will rise to 190 percent in 2050 under current law, compared to a pre-COVID baseline projection of 180 percent. CBO (2020f) obtains a similar projection—195 percent—using a slightly different set of assumptions.

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 expected to be low, the projected debt-to-GDP ratio rises steadily due to substantial and rising primary

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² Other countries are facing similar fiscal issues. 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.

deficits, driven largely by rising outlays on health-related programs and Social Security. As the economy grows and debt accumulates, the average interest rate on government debt is 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 percent by 2050 and would continue rising thereafter. Fifth, the long-term projections are sensitive to interest rates. If interest rates remain very low (that is, at their projected level for 2025), rather than rising as in the CBO projections, the debt-to-GDP ratio would equal 157 percent 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,³ 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.

Section III discusses the effects on state and local governments. We examine several recent estimates of the effects of the pandemic on state and local budgets—some of which find relatively modest effects and others which find effects that dwarf those experienced during the Great Recession. We note that the very unusual nature of the current recession means that relying on the historical relationships between the state of the economy and state and local tax revenues may produce misleading results. We instead attempt to calculate the impact on state and local government using a “bottom-up” approach that accounts for the geographic variation in the distribution of unemployment and consumption declines, the fact that low-wage workers have been particularly hard hit this recession, and the fact that the stock market has held up.

Our findings suggest that this pandemic is indeed having very unusual effects on state and local revenues. We estimate far smaller income tax losses than would have been expected on the basis of historical experience, which we attribute to the fact that employment losses have

³ Elmendorf and Sheiner (2017), Blanchard (2019a, 2019b)

been unusually concentrated on low-wage workers, the unprecedented increases and expansions of unemployment insurance benefits and business loans, which will shore up taxable income in 2020, and the fact that the stock market has held up so far, unlike most of the prior economic downturns. On the other hand, our estimates of the losses in sales and other taxes and fees are much larger than one would have expected—the decline in use of transportation services alone seems likely to depress revenues by over \$45 billion this year. In aggregate, we estimate that state and local own source revenues, excluding fees to public hospitals and institution of higher education—which we view as somewhat distinct— will decline \$155 billion in 2020, \$167 billion in 2021, and \$145 billion in 2022. Including lower fees to hospitals and higher ed would bring these totals to \$188 billion, \$189 billion, and \$167 billion.

We then turn to a discussion of federal aid to states and localities. We estimate that the legislation enacted last spring provides about \$212 billion in aid, excluding aid to public hospitals and higher ed, and \$250 billion including that aid. *While this appears to be larger than the total revenue declines expected this year, that doesn't mean that the aid has been sufficient to preclude tough budget choices and poor macroeconomic outcomes.* First, should the economy remain below its pre-COVID baseline for many years, as the CBO projections suggest, these governments will face significant shortfalls in coming years. Knowing that, they are likely to restrain spending somewhat this year, and make additional cuts in coming years. Second, the pandemic itself has likely increased the demands on state and local governments—for public health spending, virtual schooling, elderly, etc. Simply maintaining pre-COVID levels of spending may not be enough to assure that necessary services aren't cut. Finally, our analysis shows that smaller states got much more generous aid relative to their losses, and that states like New York and California will likely be facing budget shortfalls in the current year even without consideration of the spending demands brought on by COVID-19. Section IV provides concluding remarks.

We note at the outset that the CBO economic projection is more pessimistic than that of many other forecasters. Activity has already rebounded far more quickly than CBO had anticipated in July – e.g. the unemployment rate ended the third quarter at 7.9 percent whereas the CBO had projected it to be 10.5 percent in the fourth quarter. Moreover, the CBO has the economy operating below potential for almost a decade, while other forecasters have a much quicker rebound. As we base our calculations on CBO's economic projection, our federal and state and

local projections are likely somewhat more pessimist than would be implied by alternative economic forecasts.⁴ Alternatively, CBO’s economic outlook may prove more accurate when viewed over a longer time period.

II. 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.

A. Constructing Budget Baselines

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 projection (CBO 2020c). These projections—by law and convention—assume that Congress does (almost) nothing in the way of new programs or tax changes for the next 10 years.⁵ 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 like 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

⁴ A second set of estimates using a more optimistic economic projection, as our discussant suggested, would clearly have been a useful addition but we unfortunately were not able to include it given the time and space allotted.

⁵ 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.

enacted in the last year due to the COVID pandemic, judgments about what constitutes current policy are particularly difficult under present circumstances, so we take a conservative approach and 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.⁶ 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. 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.⁷ 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. 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 percent for 2031-40 and 3.5 percent for 2041-2050. Second, for Medicare and Old-Age, Survivors, and Disability Insurance (OASDI), we project all elements of spending and dedicated revenues

⁶ Examples of major expiring provisions in the 2017 tax act include “100 percent bonus depreciation” (expensing of business investment in qualifying equipment), the marginal individual 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.

⁷ The 10-year current-law projections for discretionary spending are uncertain because the law does not specify appropriations over the whole period. Thus, one might argue that not all non-defense discretionary spending requires a population adjustment, implying that our projections are too high. On the other hand, defense spending depends not just on maintaining current services but also responding to the actions of our political adversaries, and so our projections may be too low. There is no way to know for sure, so we follow rules-of-thumb that are both plausible and easy to understand.

(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’s 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.⁸

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.⁹ The fiscal gap answers the question: if one starts a policy

⁸ Alternative projections of policy over a 30-year period naturally differ for a variety of reasons. In particular, the assumptions underlying our 30-year projections differ in several ways from those made by CBO (2020f) but the aggregate effects of their projections and ours are similar. CBO uses its own estimates for Social Security and Medicare, which project longer life spans and thus higher spending than the estimates we use, which come from the Trustees of those programs (scaled for differences in GDP projections). We allow other mandatory spending and discretionary spending to remain constant shares of GDP from 2030 to 2050. CBO has them declining somewhat. Despite these differences, 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 long-term baseline—which was the most recent projection prior to the pandemic, and which projects a 2050 debt-to-GDP ratio of 180 percent.

⁹ Auerbach (1994). Online Appendix 1 describes the construction of the fiscal gap and how interest rates affect it. 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.

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 2050.¹⁰ 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 percent by 2050.

B. Projections

1. Economic Projections

Relative to the pre-COVID baseline, projected real GDP falls significantly early in the decade and is not projected to reach the pre-COVID baseline even by 2030 (Online Appendix Figure 1). The growth rate post-2030 is lower than under pre-COVID projections. The weaker economy, slower inflation, and aggressive Federal Reserve policy translate into sharply lower projections of interest rates for about a dozen years (Online Appendix Figure 2).¹¹ The average interest rate falls to 1.1 percent by mid-decade before rising to its pre-COVID baseline value (2.9 percent) by 2034 and then rising further to 4.1 percent by 2050. That is, the projection implies that nominal interest rates will rise above the nominal GDP growth rate around 2042 and will exceed the growth rate by 0.5 percentage points by 2050. These economic projections help drive the budget outcomes discussed below.

2. Effects of COVID: Comparing the pre-COVID Baseline and Current Law

Non-interest spending spiked in 2020 (Online Appendix Figure 3), mostly because of the CARES Act. Spending rose by 11 percent 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 percent by 2030. After that, non-interest spending under both the pre-COVID and current law baselines rises by about 2.3 percent 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.

¹⁰ 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.

¹¹ Appendix 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.

Revenues, as a share of GDP, dip somewhat in 2020 and 2021 but regain pre-COVID shares of GDP by 2022 and essentially mimic pre-COVID shares thereafter (Online Appendix Figure 4). 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 are projected to rise more slowly than non-interest spending, however. Between 2030 and 2050, projected revenues rise by less than 1 percent of GDP, reaching 18.6 percent 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 percent of GDP—but then falls sharply in the next few years and then hews closely to its projected values under the pre-COVID baseline (Figure 1). The primary deficit rises gradually from 3.2 (2.9) percent of GDP in 2030 to 4.5 (4.6) percent of GDP in 2050 under the current-law (pre-COVID) baseline.

Under the current law projections, interest payments plummet and then explode (Figure 2). Despite the increase in COVID-related debt, net interest payments fall from about 1.6 percent of GDP currently to 1.1 percent 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 percent of GDP in 2030 and continue rising over time, reaching 7.4 percent of GDP under current law in 2050, slightly higher than the 7.2 percent of GDP projected under the pre-COVID baseline. Both figures, however, far exceed the peak historical net interest level of 3.2 percent of GDP in 1991.

The unified deficit, combining the effects of primary deficits and interest payments, reached 16 percent of GDP in 2020—more than 11 percent of GDP larger than was predicted in the pre-COVID baseline, and much higher than even the peak deficit in the Great Recession—about 10 percent of GDP (Online Appendix Figure 5). The effect is projected to be temporary, however. Deficits are projected to decline sharply after 2020 and to 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 percent of GDP higher, net interest payments will be about 1 percent 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 percent of GDP under current law.

The projected 2020-2030 unified deficit rose from \$14.2 trillion in the pre-COVID

baseline to \$16.3 trillion under current law. Excluding net interest, legislative changes added \$2.6 trillion to the projected deficit—more than the entire increase in deficits. The effects of macroeconomic changes added another \$1.3 trillion, and other changes accounted 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 percent of GDP under both current law and the pre-COVID baseline.

Figure 3 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 percent of GDP at the end of fiscal year 2020 and 82 percent by the end of fiscal year 2021. Now, analogous current law projections are 98 percent and 104 percent, respectively. Projected debt rises gradually for the rest of the decade, reaching 109 percent of GDP in 2030 under current law, compared to 98 percent 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 percent of GDP under current law compared to 180 percent 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.

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 percent compared to 190 percent under current law. By 2050, revenues would be at 17.6 percent of GDP, compared to 18.6 percent under current law; the primary deficit would rise to 5.7 percent of GDP

and interest payments would rise to 8.7 percent of GDP, compared to 4.5 and 7.4 percent, respectively, under current law. The current policy projections use the same interest rate assumptions as the current law projections; incorporating any upward impact of higher debt in the current policy projections on interest rates would raise debt by additional amounts.

4. The Fiscal Gap

Turning to the fiscal gap, under current law projections, obtaining a debt-to-GDP ratio in 2050 equal its 2020 level of 99 percent would (ignoring any macroeconomic feedback effects) require permanent tax increases or non-interest spending cuts totaling 3.2 percent of GDP starting in 2021 (Table 1). This would be the equivalent to a sustained tax increase equal to about 34 percent of income tax revenues, a 15 percent increase in all tax revenues, or a 14 percent reduction in average non-interest spending. The longer policy makers wait to implement change, the larger are the required changes, because the debt must be brought down to meet the assumed target over fewer years.

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

5. Sensitivity Analysis

How future economic and budget outcomes evolve depends crucially on how the virus and the economy change over time. 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.¹² CBO's current GDP projection is that real GDP will be 1.1

¹² 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.

percent lower in 2030 than prior to the pandemic.¹³ 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 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 2030.¹⁴ 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 percent of GDP in 2050 under current law, compared to the 195 percent figure in its baseline.

Online Appendix 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 133 percent under current law and 157 percent under current policy. Net interest payments rise slowly, remaining below 1.4 percent of GDP, lower than their average value over the last 50 years. 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) percent of GDP by 2050 under current law.

C. 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.

¹³ According to the January 2020 long-term budget outlook (CBO 2020a) 2030 GDP would have been 25,885 (in billions of 2019 dollars), while in the September 2020 LTBO (CBO 2020f), 2030 GDP is projected to equal 25,595 (in billions of 2019 dollars). In both sources, see "Economic Vars", line 44.

¹⁴ Congressional Budget Office (2020d).

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 percent—occurred just after World War II, following which the debt-to-GDP ratio gradually dwindled to 28 percent over the ensuing 35 years, an outcome that contains both good and bad news for the current long-term fiscal shortfall.¹⁵ 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 percent of GDP, while spending on the three major entitlement programs accounted for 10.5 percent 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.

¹⁵ Gale (2019a, 2019b).

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 percent in 2020. If TCJA and other temporary provisions are extended in the usual manner, and revenues are projected to total just 17.0 percent over the 2020-2050 period. In the fifty years prior to 2020, revenues averaged 17.4 percent of GDP and reached a high of 20.8 percent 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,¹⁶ particularly if this rise in interest rates is not accompanied by a sufficiently large increase in the rate of productivity growth.¹⁷

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.¹⁸ 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 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, Hanson,

¹⁶ Ball, Elmendorf, and Mankiw (1998).

¹⁷ If the increase in interest rates is in response to higher productivity, the effect on debt sustainability is unclear (Sheiner 2018).

¹⁸ 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.

Rudolph, and Summers 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.¹⁹ 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).

III. Effects of COVID-19 on the State and Local Sector

The COVID-19 pandemic presents the states with potentially serious fiscal problems, but ones that differ from the federal situation. State and local governments generally must balance their operating budgets each year, which not only constrains their behavior, but does so in a way that is particularly damaging to the macroeconomy during a business cycle contraction. Specifically, when an economic downturn reduces revenues, state and local governments may be forced to cut spending or raise taxes to make up the budget shortfall. Not only do these changes deprive taxpayers of valuable services or reduce their disposable income in a time of economic stress, but they also impede the economic recovery.

This dynamic was particularly strong in the recovery from the Great Recession (e.g. Cashin, Lenney, Lutz, and Peterman 2018). As shown in Online Appendix Figure 6, state and local government purchases of goods and services—the state and local government contribution to GDP—were flat, on net, over the course of the economic expansion following the Great Recession. In contrast, these purchases rose significantly in most prior expansions.

The states and localities entered the COVID-19 pandemic in a relatively strong fiscal position along some dimensions. State total balances—reserve accounts (so-call “rainy day” funds) plus general budget surpluses—stood at \$119 billion in fiscal year 2019, equal to 14 percent of general fund expenditures—a historic high (NASBO 2020). And the decision to sharply curtail infrastructure investment in recent years led to less need for borrowing and a gradual reduction in debt, which fell from around 20 percent of GDP prior to the financial crisis to around 14 percent currently; the interest payments of these governments fell from around 1.9

¹⁹ Several international central banks also have the authority to pay interest on reserves.

percent of GDP at the end of 2009 to roughly 1.4 percent currently.²⁰ Moreover, the federal government has provided aid to the states and localities of over \$200 billion to date.

Nonetheless, many believe that these savings and federal aid will be insufficient to meet the scale of the revenue losses and spending requirements these governments will experience over the next few years, and the state and local sector will again generate meaningful economic headwinds for the economic recovery (e.g.; Bernanke 2020). Moreover, state and local governments are responsible for many public goods that are crucial to the response to the pandemic – e.g. public health departments and public hospitals. Budget strain may impair their ability to mount an effective response to the COVID-19 outbreak.

Although most states have balanced budget requirements of some kind, some are more stringent than others. Some, for example, require mid-year adjustments to spending and taxes to offset any shortfalls, while others only require governors to submit budgets that they expect to balance. Thus, revenue shortfalls in the near term can constrain spending for many years, as we saw in the Great Recession. Capital expenditures—which are typically not subject to balanced budget requirements—are also surprisingly cyclical, perhaps because spending required to plan and maintain capital projects comes out of operating budgets, governments may wish to avoid the costs of servicing debt during times of economic stress, and because many areas require voter approval for any bond issuance, which is less likely to be forthcoming during an economic downturn. Finally, unemployment benefits, which are also not subject to balanced budget requirements, leave debts that need to be repaid within three years to avoid having the federal government raise the federal unemployment tax.

A. Estimates of Revenue Losses from COVID in the Literature

As shown in Table 2, a number of researchers have estimated the likely effects of the pandemic on the fiscal health of the states and localities. The estimates of state and local revenue losses over the two fiscal years starting from the onset of the pandemic vary widely, ranging from \$130 billion (White, Crane, and Seitz, 2020) to \$875 billion (Bartik, 2020).²¹ The range reflects both differences in underlying economic assumptions, differences in coverage (all state and local revenues, or some subset), as well as differences in methodology.

²⁰ Authors' calculations based Financial Accounts of the U.S. and BEA.

²¹ Fiscal years for states generally end on June 30, so these two fiscal years end June 30, 2021.

The top three estimates in Table 2 all rely on the work of Fiedler, Furman, and Powell (2020), who estimate that a 1 percentage point increase in the unemployment rate lowers real per capita total state revenues by 3.7%. Both Bivens and Bartik increase this number by about a third to roughly account for the impact of COVID-19 on local taxes. These estimates tend to show very large effects of the pandemic.

A second method—relied on by Clemens and Veuger (2020a)—uses the historical relationship between changes in personal income and income tax collections, and changes in personal consumption and sales tax collections²²; White, Crane and Seitz adopt a broadly similar approach at the state level. Whitaker (2020a, b) uses a variety of methods to project changes in the whole suite of state and local revenues and fees. Finally, Dadayan (2020a) uses information on states' own forecasts of revenue losses to project losses for the nation as a whole.

The estimates in the literature that relate changes in economic conditions to changes in revenue collections seem appropriate as a general rule of thumb to know what the effect of a typical recession might be on revenues. Indeed, Fiedler, Furman, and Powell note that their estimate is intended to capture not only the direct effect of unemployment on revenues, but also any indirect effects stemming from changes in economic conditions that occur in recessions. But there are reasons to believe that these historical relationships may not prove to be very accurate for the current very unusual recession. First, as noted by Chetty et al. (2020) and Long et al. (2020), while all recessions affect those with the lowest incomes the most, this one appears to have hit low-wage workers disproportionately hard relative to historic norms; these individuals often work in service industries that have been decimated by a fall in demand and are also the least likely to be able to work from home. Indeed, data on employment rates by income group from Opportunity Insights suggest that the recession is basically over for high-wage workers, but still very severe for low-wage workers.²³ This concentration of unemployment among the lowest-paid workers means that the increase in the unemployment rate may be less consequential for state and local revenues than in the past.

²² Clemens and Veuger (2020b) update the income and sales tax estimates in Clemens and Veuger (2020a) and also extend the estimates by accounting for other state taxes, as well as local taxes. They estimate a total state and local government revenue loss due to the COVID-19 pandemic of \$240 billion in fiscal year 2021. These papers, like this paper, base their COVID-19 shock on the evolution of CBO economic projections.

²³ Data from Opportunity Insights are at [Tracktherecovery.org](https://tracktherecovery.org).

Second, most recessions are accompanied by stock market declines. Stock market declines depress revenues by depressing taxable capital gains realizations and are likely associated with lower taxable business income. But although the market did fall by almost 30% in March of this year, the recovery in equity prices was swift and, as of October 29, the market was up almost 5% for the year, suggesting that capital gains tax revenues won't be significantly depressed relative to a typical year.²⁴

Third, the huge fiscal response to this recession at the federal level has important implications for state and local tax revenues. While the \$1200 rebate checks sent to most families are not taxable, much of the PPP spending will likely show up as higher profits for sole proprietorships, partnerships, and S-Corps (all taxed at the individual level) and the large expansion and increase in unemployment benefits is taxable in most states with an income tax.²⁵ ²⁶ ²⁷ Projections based on historical relationships between tax collections and the unemployment rate will miss these increments to taxable income, as they far surpass anything that has been enacted in the past. Projections based on the regressions on personal income, on the other hand, will capture the higher income from unemployment benefits, but will also capture the approximately \$300 billion in rebate checks, which are not taxable.²⁸

Fourth, the patterns of consumption changes in this recession are very different than in previous recessions. The drop in consumption is far larger than observed in previous recessions—suggesting that regressions based on income or the unemployment rate will understate the decline in sales tax revenues. But the composition of the consumption decline has also changed dramatically. Consumption of services—which are usually far less cyclical than consumption of goods—has plummeted, while consumption of goods has shown much more resilience. Given that most services are untaxed, this might lessen the hit to sales tax collections.

²⁴ The effects of changes in the stock market tends to affect tax receipts with a lag, as much of the effect occurs when people make estimated quarterly tax payments or final payments in April of the following year.

²⁵ Autor et al (2020) calculate that the PPP loans created 2.3 million jobs at an average annual wage of \$60,000. These loans covered only 2½ months of payroll, meaning that only \$29 billion went to firms who otherwise would have laid off their workers; the remaining \$489 billion accrued to business profits.

²⁶ Alaska, Florida, Nevada, New Hampshire, South Dakota, Tennessee, Texas, Washington, and Wyoming do not have income taxes on earned income and so don't tax unemployment benefits. In addition, California, Montana, New Jersey, Pennsylvania, and Virginia exempt unemployment benefits from income taxes.
<https://www.kiplinger.com/slideshow/taxes/t055-s001-state-taxes-on-unemployment-benefits/index.html>

²⁷ The \$1200 rebate checks may, however, indirectly boost sales tax revenues by supporting consumption.

²⁸ Clemens and Veuger (2020a) correct for this by taking out the rebate checks when doing their calculations.

State and local governments also rely importantly on fees and charges, however. With driving and flying way down, and many public parks closed, this category of revenues is likely to suffer much larger declines than in previous recessions.

Finally, as we show below, even after making various adjustments, these types of regressions are very sensitive to the experience of the Great Recession, when revenues fell sharply even given the very large rise in unemployment. It is unclear whether that outsized relationship reflected a structural change or something specific to the Great Recession.

B. A Reexamination of the Historical Relationships between State and Local Revenues and the State of the Economy

In Table 3, we reexamine some of the historical relationships at the national level. As noted by Fiedler, Furman, and Powell (2019), examining the relationship between actual tax revenues and economic conditions can lead to an underestimate of the true coefficients, because state and local governments may respond to lower anticipated tax revenues by raising taxes and fees. However, they show that such effects are quite modest, and so we ignore these policy responses here. In the “bottom up” approach we focus on below, we control for any such policy changes directly by using existing tax codes to project state and local revenues.

We first examine the relationship between the log difference of real state and local income taxes and sales taxes and two economic indicators: the change in the unemployment rate and the log change in real per capita personal income. In order to try to assess the importance of changes in stock market returns in depressing tax revenues during recessions, we include the lagged change in the log of the inflation-adjusted Wilshire 5000 index.

The regressions illustrate a few important points. First, excluding 2009 leads to much smaller estimates of the effects of changes in the economy—regardless of the economic indicator—on both income and sales tax collections. Second, including a measure of stock price changes similarly lowers the estimated coefficient, and including stock prices and excluding 2009 lowers the estimates yet again. For example, the effect on the percentage change in state and local income tax revenues from a one percentage point increase in the unemployment rate falls from -4.9% to -2.7%, or by about $\frac{1}{2}$, and a similar change is seen in the coefficient on the change in personal income. Third, the estimates are relatively variable across specifications. Using the change in unemployment projected by CBO for 2020 as a whole, for example, the

estimated revenue losses from income taxes decline from roughly \$160 billion using the estimates in the first column to about \$88 billion using the estimates in the fourth column. We also attempt to understand the relationship between changes in personal income and changes in income tax revenues. The Clemens and Veuger paper discussed above, for example, uses an elasticity of state income tax revenue with respect to personal income of 1.6, even though state income tax systems are not very progressive. We note that a large and growing share of personal income is not subject to taxation and is not very cyclical—including Medicare, Medicaid, Social Security, and imputed rent on owner-occupied housing. That means that when personal income falls by 1% in a recession, the “taxable” and more cyclical components fall much more, giving rise to a coefficient on personal income greater than 1 in a regression of tax collections on personal income. To test whether this wedge between taxable and total personal income accounts for the large elasticity of state income tax revenue with respect to personal income, we run the regression using the “taxable” portion of personal income. We define this as all personal income less: governments transfers other than unemployment insurance (which is taxable in most states); imputed rent on owner-occupied housing; and employer-provided benefits like health insurance and pensions. As shown in the third row of Table 3, a regression of income tax revenues on taxable personal income shows a much smaller coefficient. Indeed, it is just below 1 once the stock market is included in the regression.

But the large differences between this recession and previous ones suggest that relying on past experience may not necessarily provide very accurate projections of budget pressures for state and local governments. Indeed, data on state government tax collections suggest that, at least through mid-summer, the revenue shock may not have been as severe as suggested by some of the above estimates.

Figure 4 displays the percent change in year-to-date tax collections through July relative to 2019.²⁹ Tax revenue plummeted following the onset of the pandemic and as many states followed the federal government’s decision to delay final 2019 and estimated quarterly 2020 income tax payments from April and June to July. The decline in collections was historic and exceeded the declines experienced as a result of the Great Recession (Gordon, Dadayan, and

²⁹ The data are collected by State and Local Finance Initiative at the Urban Institute: <https://www.urban.org/policy-centers/cross-center-initiatives/state-and-local-finance-initiative/projects/state-tax-and-economic-review/data-subscriptions>.

Rueben 2020). However, year-to-date personal income tax collections rebounded smartly in July as delayed payments came in. Sales taxes staged a more muted recovery in June and July, reflecting the broader economic recovery as well as delays in filing and remittance deadlines in some states (Dadayan 2020b).

Overall, year-to-date personal income tax and sales tax collections in July were down around 2 percent and 3.5 percent, respectively, relative to last year; corporate collections were down a much larger 11 percent. The declines in personal income taxes and sales taxes are smaller than the decline in economic activity over the same period. This divergence likely reflects, in part, the effects of the massive fiscal stimulus enacted by the federal government – e.g. the boost to personal income attributable to the expanded UI program. Nonetheless, tax collections remain depressed due to the pandemic. Moreover, year-to-date growth in collections could well fall back in the months ahead – e.g. the end of the \$600 supplement to UI payments in July will reduce taxable personal income.^{30 31}

Given the unusual nature of the current economic downturn, and the corresponding uncertainty over the appropriateness of using elasticities based on historic experience, our preferred approach is to do a more detailed “bottom-up” method that accounts for the geographic variation in the magnitude of the impact on employment and consumption, the distributional effects, and the impact of federal fiscal policy on taxable income. We attempt to a detailed projection of revenues through the end of calendar 2022. These bottom-up estimates should be viewed as complementary to the more standard top-down estimates discussed above.

C. A Bottom-Up Methodology for Calculating State and Local Revenues

Our bottom-up approach explicitly accounts for heterogeneity across states and estimates revenue losses on a state-by-state basis. We consider state and local governments jointly by state.

³⁰ The 2020 year-to-date collections include revenue from the pre-pandemic months of January and February; these months will become a relatively smaller share of year-to-date collections as additional months of collections come in. Dadayan (2020b) documents that the percent declines in cumulative tax collections from March through July relative to 2019 are larger than the year-to-date percent declines reported here. Finally, looking to 2021 tax revenue, final tax payments for the 2020 tax year, to be collected in 2021, may well be weaker than 2019 final payments.

³¹ See Gordon, Dadayan, and Rueben (2020) for a much more detailed, point-in-time description of state and local government finances as of July 2020.

While this is appropriate given the substantial fiscal linkages between a state and its localities, it does gloss over the substantial heterogeneity in fiscal conditions at the local level.³²

We consider five categories of revenues for state and local governments: individual income taxes, which make up 16% of general own-source revenues (revenues excluding utility, liquor store, and insurance trust fund revenue, as well as grants from the federal government); sales taxes, which account for another 16%; corporate income taxes, which make up just 2% of general own-source revenues; and fees and charges, which make up 44%. House prices have held up well so far this recession and property taxes respond to changes in market values with a lag of several years (e.g. Lutz, Molloy, and Shan 2012). Accordingly, we assume no change to property taxes, which make up 22% of own source revenues.³³

Our basic methodology compares recent data on employment and consumption with what had been projected pre-COVID to measure the COVID “shock”, using CBO’s economic projection from January 2020 as the pre-COVID baseline. We project that shock forward using the difference between CBO’s economic post-COVID projections (July 2020) and their pre-COVID projections (January 2020), as well as CBO’s estimate of social distancing. We describe the methodology for each type of revenue briefly below and in detail in Online Appendix 2.

The CBO projections include much lower inflation over the next few years, which we take on board in the form of lower nominal wages, capital income, and consumption, and hence lower revenues. Whether lower revenues due to lower inflation represent strains for state and local governments depends on what happens to the prices of the items they purchase. While we think using nominal revenue decline is reasonable, we also report declines in real revenues.

1. The Effects of COVID on State and Local Income Taxes

To calculate state and local income tax revenues, we create a small-scale microsimulation model using data from the Current Population Survey and the NBER’s Taxsim, which, given a set of inputs about taxable income, calculates individual income tax liabilities by state using each

³² See Chernick, Copeland, and Reschovsky (2020) for a detailed examination of the effect of the pandemic on the fiscal position of large cities; these authors find substantial variation in the fiscal effect across cities.

³³ Delinquencies could push down property tax revenues. However, even during the housing crisis coincident with the Great Recession, delinquencies appear to have had only a minor effect on property tax collections. A decline in commercial real estate prices could, however, eventually push down property tax collections. See Chernick, Copeland, and Reschovsky (2020) for a discussion of these issues.

state's tax code.³⁴ We gross up state revenues to account for local income taxes, using the ratio of local to state income tax revenues in 2017. In using Taxsim, we are calculating annual tax liabilities, rather than tax payments – e.g. some of the declines in 2020 tax liability won't show up until April of 2021, when final payments are due.

We compare the revenues under a pre-COVID baseline to one that reflects the effects of the pandemic on income. To calculate post-COVID income, we use CBO economic projections to shock wage rates, income, dividends, pensions, and business income on a national basis. To calculate wage income and unemployment rates, we use data from Opportunity Insights (OI) on employment by month by state for three broad income groups: those in the bottom quartile, those in the middle two quartiles, and those in the top quartile.^{35 36} These data allow us to capture the heterogeneity across state and across income groups in the effects of the recession. We adjust the size of the employment declines each month so that, rather than being relative to January (as the OI data are), they are relative to the employment levels in CBO's January 2020, pre-COVID economic projections.³⁷ Using these data, we have a different COVID "shock" for each state/income group combination. We use the unemployment benefits calculator in Ganong, Noel, and Vavra (2020) and our estimates of unemployment by month to calculate weekly unemployment insurance benefits by state.

We use OI data through August 2020. To calculate Q3, we assume that September employment was unchanged from August. To project employment into the future, we assume the recovery in employment for each state follows the recovery in the CBO unemployment projection. For example, the unemployment rates for Q3 and Q4 of 2021 in CBO's July 2020 projection are 8% and 7.6%, respectively, compared to 3.6% for both quarters in the January

³⁴ Taxsim currently has state income taxes only through 2018, but there have been few significant changes in tax laws since then. We use Taxsim based on the 2018 state tax codes.

³⁵ The OI data come from the private sector, whereas we are implementing the shocks for all workers. Because the private sector experienced, on average, somewhat higher relative employment losses than the public sector, we view the shocks to wages as an upper bound.

³⁶ The cutoffs for the bottom and top quartiles in the OI data are 27,000 and 60,000, respectively. Using these cutoffs with the CPS wage data put too many people in the top quartile, which would have understated unemployment. Instead, we used the 25% and 75% percentiles from the national CPS data to define the income groups.

³⁷ That is, we account for the fact that simply reaching January's employment doesn't mean that the economy is back to the pre-COVID baseline

2020 projection. Thus, the difference between CBO’s pre- and post-COVID unemployment rates falls 9% between Q3 and Q4 of 2021; we use that rate of decline for each state/income group.³⁸

One issue we had to contend with is that the incoming data have been far stronger than anticipated by CBO in their July projection. For example, CBO projected that the unemployment rate would be 14 percent in the third quarter, and then begin to decline, hitting 8.6 percent by the second quarter of 2021. In fact, the unemployment rate was 10.2 percent in July and 8.4 percent in August. We assume that CBO simply missed the timing of the recovery, and, rather than assuming the shock continues to dissipate over the remainder of the year, we have chosen to keep it constant at its current value through the middle of 2021, and then allow it to follow the CBO path. That is, we assume no improvements in employment relative to baseline until the middle of next year. While this is a less optimistic projection than many other forecasters, it may be reasonable given that, unlike these other forecasts, it is a current law projection that assumes no additional fiscal stimulus. Furthermore, it provides for the possibility of a “second wave” in the fall or winter that will slow the recovery.

Line (2) of Table 4 provides our results of the effects of the pandemic on state and local personal income tax collections. Appendix Table 1 contains projections for each state.

Income tax revenues decline 5.2% in 2020, 7.4% in 2021, and 7.5% in 2022, for totals of \$24 billion, \$36 billion, and \$38 billion, respectively. These revenues losses are the result of losses in taxable income of 4.3%, 6.3%, and 6.4%, suggesting that state tax systems are moderately progressive.³⁹ In real pre-COVID dollars, these declines are quite a bit smaller in 2021 and 2022 (line 17).⁴⁰

The moderate size of these declines—especially relative to the declines that would have been estimated using the regressions above—primarily reflects the low incomes of most of the unemployed and the sizable taxable fiscal stimulus. We calculate that, without the CARES Act, income tax revenues would have declined an additional \$11 billion in 2020, \$5 billion from unemployment insurance and \$6 billion from PPP.⁴¹

³⁸ The 9% decline comes from comparing 4.4 (8-3.6) to 4 (7.6-3.6).

³⁹ See Cooper, Lutz, and Palumbo (2015) for a discussion of state personal income tax progressivity.

⁴⁰ CBO lowered GDP inflation by 1.2 ppts in 2020, 1.3 ppts in 2021, and .5 ppts in 2022, which lowers revenues accordingly. Our “real” revenue losses exclude losses due to these changes in inflation.

⁴¹ As discussed in the Online Appendix, the amount of PPP money included in these estimates is quite minor.

2. The Effects of COVID on Corporate Taxes

While corporate tax collections make up only a small part of state and local revenues, they are also highly procyclical, and the large declines in federal corporate tax collections in the CBO forecast suggests that the revenue declines for state and local governments are likely to be substantial. CBO has adjusted its estimates of corporate tax receipts down because overall corporate profits are down, because the taxable share of profits tends to decline in recessions, and because of legislative changes made in the CARES Act. We adjust the July CBO projections to take out the legislative effects, as these are unlikely to affect state tax collections.⁴² We then calculate the COVID shock to corporate tax collections as the difference between this adjusted July projection and the January CBO projection and apply this percentage shock to our estimate of what state corporate tax revenues would have been in the absence of COVID. We calculate these counterfactual state corporate receipts using the 2017 Census of Governments, increased by the average growth rate of such taxes between 2014 to 2017. As shown in line (3) of Table 4, we project that state corporate tax collections will decline \$2 billion in 2020, \$29 billion in 2021, and \$14 billion in 2022.

3. The Effects of COVID on Sales Tax Revenues

The sales tax is a large source of revenue for state and local governments. Forty-six states impose general sales taxes and as do some local governments. Because the sales tax is based on the dollar value of sales, sales tax revenues move proportionally with consumption of taxed items. But because of the unusual patterns of consumption changes during the current recession—large increases in groceries and large decline in spending at restaurants and hotels, for example, and because not all items of consumption are subject to the sales tax—looking at the past relationship between aggregate consumption expenditures and, particularly, unemployment and sales tax revenues may not yield a reasonable estimate of the effect of the pandemic on sales tax collections, at least in the near term. Appendix Table 2 describes the composition of state sales tax bases.

To isolate some of these unique effects, we approximate changes in taxable consumption for each state by using a combination of changes in spending by consumption category from the

⁴² The largest legislative change affecting corporate profits involved an adjustment to how net operating losses are treated. Most states did not adhere to this change in treatment. (Ernst and Young 2020).

Opportunity Insights data, calibrated using national data for the second quarter from the NIPA, and state-by-state variation in the sales tax base. Our projections of sales tax revenues take the easing of social distancing into account. In particular, following CBO, we assume that the shock to spending coming from social distancing abates over the next three quarters. By the middle of 2021, we assume that the shock to consumption no longer reflects social distancing but instead, only reflects the overall state of the economy. The Online Appendix contains detailed information on our methodology as well as results on a state-by-state basis.

Line 4 of Table 4 shows our results for the nation over the next three years. The results by state are in Appendix Table 3. In aggregate, we project that sales taxes will decline \$49 billion this year, \$45 billion next year, and \$46 billion in 2022. As discussed above, part of this decline reflects the fact that CBO has lowered the price level substantially as a result of COVID. Examining constant “pre-COVID” dollars—line 19—the declines are somewhat smaller, \$44 billion, \$35 billion, and \$33 billion. These projections may be somewhat too pessimistic. While we assume that the effects of social distancing wane, we do not account for the possibility that some of the lost spending will be made up. It seems likely that at least some of the cars not purchased and trips not taken represent consumption delayed rather than foregone, especially given the large rise in the personal savings since the pandemic began.

4. The Effects of COVID on Other Taxes and Fees

State and local governments derive significant revenue from sources other than the individual income tax, corporate income tax, property tax, and general sales tax, including revenue from selective sales taxes, fees and charges, and various other sources. Online Appendix Table 5 provides a detailed breakdown.

We use an approach similar to Whitaker (2020a, b) to estimate the revenue declines. In most cases, we assign each revenue source a tax base measured at the monthly frequency in the NIPAs. For instance, higher education fees are assigned a base of consumption of proprietary & public higher education services. For most categories of spending, we do not have state-specific information and assume that the declines in the tax bases in the NIPA are uniform across the states. The exceptions to this are for our estimates of motor fuel tax collections and hospital fees. We use a similar method to project the shocks forward as used for sales taxes—assuming that categories of spending driven by social distancing rebound to the average national decline in

consumption by the middle of next year. The Online Appendix includes more detail on our methodology, and results by state are in Online Appendix Tables 6 and 7.

As shown in line 5 of Table 4, we estimate that the pandemic will lower revenues from “other taxes” and fees, excluding fees to public hospitals and institution of higher education, by \$82 billion this year, \$55 billion next year, and \$45 billion in 2022. Online Appendix Table 5 reports the components of the revenue loss. The largest source—by far—is related to transportation, accounting for \$46 billion in tax losses this year. This big hit to taxes and fees on transportation represents a massive difference from prior recessions.

We estimate that the pandemic will lower fees to public hospitals and institutions of higher education by \$33 billion this year, \$22 billion in 2021, and \$22 billion in 2022. It is difficult to assess the extent to which the projected declines in these fees should be included in our measures of revenue losses, because these fees are typically provided in exchange for services rendered. As fees decline, so too do services, and, possibly, expenditures. For example, the sharp decline in health expenditures in the spring meant that health care facility revenues plunged. To the extent that public hospitals reduced employment or cut back on supplies, these revenue losses were likely offset by declines in spending. On the other hand, running a hospital or university involves significant fixed costs, so the decline in revenues was likely not fully offset.⁴³

Furthermore, while reductions in revenues offset by reductions in expenditures do have macroeconomic implications, much of this is the result of social distancing rather than tight budgets. Providing aid to state and local governments would not likely boost these expenditures. Furthermore, unlike declines in revenues that are not offset by declines in spending, they don’t require any *further* changes in state and local spending beyond those already observed. Of course, some of these same dynamics apply to non-fee-based services. For example, according to BLS data, employment in local education declined about 5 percent in the spring. While some of these declines might have been in anticipation of tight budgets ahead, they also likely reflected, at least in part, layoffs of bus drivers, cafeteria workers, and other workers not needed for online schooling. From that perspective, these layoffs—while a negative for the macroeconomy, the

⁴³ Of course, it is possible that much of the lost revenue will be made up in the future as people ultimately get their conditions treated, a possibility we do not include in our projections.

workers, and the students—might be viewed as loosening budget constraints rather than as reflecting tight ones.

5. Total Revenue Losses

As shown on Line 1 of Table 4, we estimate total revenue losses, excluding those from fees to public hospitals and institutions of higher education, of \$156 billion in 2020, \$165 billion in 2021, and \$143 billion in 2022. These represent 5.8%, 5.9%, and 4.9% of general own-source revenues for 2020, 2021, and 2022, respectively. Part of the reason revenue losses remain high is because of CBO’s assumption of lower inflation post-COVID. Line 16 shows the revenue losses excluding the effects of lower inflation, which are quite a bit lower, particularly in 2022.

Figure 5 shows the variation in nominal revenue losses, excluding hospitals and higher education, as a share of pre-COVID own-source revenues from 2020-2022. The three states with the largest revenue losses—Nevada, California, and New York, have revenue losses exceeding 7% of own-source revenues, while the states with the smallest revenue losses—Wyoming, Alaska, South Carolina, and Kansas, have losses of less than 4% of own source revenues. Appendix Table 8 includes the revenue losses by state by year.

6. Accounting for Federal Aid to State and Local Governments

States and localities are due to receive over \$200 billion in extra federal aid this year. The largest portion of that aid is \$150 billion through the Coronavirus Relief Fund.⁴⁴ Legislation enacted last spring also provided aid to transit, education and health care providers, and raised the federal share of Medicaid spending by 6.2 percentage points—more than enough, we estimate, than necessary to cover additional Medicaid costs. The Online Appendix describes for our methodology for our Medicaid estimates and the allocations of aid by state.

At least for 2020, federal aid seems large enough to offset state and local revenue losses. Looking forward, however, should the economy remain below its pre-COVID baseline for many years, as the CBO projects, these governments will need additional aid in order to avoid cutting back on services or raising taxes and impeding the recovery.

⁴⁴ Although those funds are required to be used for COVID-related spending that was not anticipated in the prior’s year budget—the states have now mostly appropriated these funds, indicating they are likely to be spent (Gordon, Dadayan, and Rueben 2020).

Furthermore, even if state and local governments are not cutting back on spending in the aggregate, so that they are not a net drag on the economy, changes in the need for spending brought on by the pandemic could still mean that these governments might have to cut back on essential services. For example, if it is expensive to provide decent virtual education and public health services, then the ability to simply maintain pre-COVID levels of spending may not be enough. A complete analysis of the fiscal conditions of state and local governments requires knowing much more about the spending side of the budget than we do at this point.

In addition, just because federal aid appears sufficient in the near term in aggregate does not mean that it is sufficient for every state. As shown in Online Appendix Table 9, there is a great deal of variation across the states in the amount of aid received. While the largest source of federal aid, the \$150 billion Coronavirus relief fund, is generally distributed on the basis of population, states received a minimum of \$1.25 billion. That made the aid exceedingly generous for some states, while others are likely to face budget shortfalls even in the absence of significant increases in COVID-related spending. For instance, Vermont, South Dakota, and Montana each received aid exceeding 20% of 2020 own-source revenues, whereas Iowa, Missouri, Mississippi, California, Connecticut, and New York received aid of less than 6%.

D. The fiscal outlook for state and local governments in the medium term

Because state and most local governments have to roughly balance their operating budgets, near-term fiscal distress should mostly be accompanied by near-term cutbacks in spending and reductions in spending, although, as we saw in the Great Recession, severe near-term fiscal distress can linger on as states spread the fiscal distress over multiple years and rebuild their rainy day funds.^{45 46} The pandemic will also affect some sources of revenue that are not subject to balanced budget requirements—in particular, spending on unemployment insurance, interest costs on state and local debt, and asset returns on state and local pensions.

1. Effects of COVID on State Unemployment Insurance Financing

State unemployment insurance (UI) programs are funded jointly by the federal and state governments through an employer-side payroll tax. State UI taxes are deposited in a state-

⁴⁵ See Rueben and Randall (2017) for a discussion of the stringency of state balanced budget requirements.

⁴⁶ States held \$119 billion in budget balances (rainy day funds plus general fund surpluses) at end of 2019; these funds, which are not explicitly accounted for in the analysis in this paper, will initially allow the states to mitigate the magnitude of expenditure cuts and tax increases.

specific trust fund at the U.S. Treasury and used to pay UI benefits in that state. If the trust funds become insolvent, states may borrow from the U.S. Treasury to cover the shortfall. The UI program is typically viewed as an automatic stabilizer which buffers the economic cycle by increasing benefit payments as the economy slows. However, concerns have been expressed that increases in UI tax schedules due to depletion of trust funds may impede labor market recovery (e.g. Duggan and Johnston 2020) and the need to replenish trust funds may divert resources from other uses in already strained state budgets. Indeed, following the Great Recession most UI trust funds became insolvent and average UI tax rates rose.

Nevertheless, the effects of UI financing strains seem likely to be fairly moderate. The various expanded UI benefits are not subject to experience rating and hence will not trigger increased tax rates. In addition, as of May 11, over half the states had exempted at least some current UI benefit charges from experience rating (Loughead 2020). Moreover, although UI tax rates increased significantly in percentage terms in the aftermath of the Great Recession and some firms and industries experienced large increases, in aggregate the average tax rate was only 0.6% of payroll in 2008 and rose to only 0.9% in 2012 before falling back.⁴⁷

In terms of state budget strain, states may borrow to address UI financing shortfalls; as a result, they can adjust to the shock gradually over many years, as opposed to the much quicker adjustment necessitated by general revenue shortfalls. Indeed, following the Great Recession, states in aggregate eliminated their UI debt very slowly, only extinguishing it in 2019 (U.S. DOL, 2014, 2020).

2. Effects of Lower Interest Rates on State and Local Finances

State governments are both borrowers and savers. The saving is mostly in the form of contributions to state and local employee pension funds, while the borrowing is through the issuance of municipal debt—mostly to finance long-term capital projects. According to the Census of Governments for 2017, total state and local government debt equaled \$3 trillion in 2017, while total financial assets were \$6.9 trillion. Thus, on net, state and local governments are net lenders rather than borrowers; this was true not just for the U.S. as a whole, but for each state individually as well.

⁴⁷ See <https://www.bls.gov/opub/mlr/2020/article/the-cost-of-layoffs-in-ui-taxes.htm>. In dollar terms, state UI taxes rose from about \$30 billion in 2008 to about \$50 billion in 2012..

To a first approximation, the immediate fiscal pressures coming from lower interest rates can be calculated as the change in rates of return multiplied by net financial assets, assuming that changes in Treasury rates are passed on one-for-one to changes in rates of return on other assets.⁴⁸ CBO lowered their projection of rates on Treasuries by about 1.1 percentage points in 2020, 1.4 percentage points in 2021, and 1.6 percentage points in 2022. In the aggregate, we estimate that the lower real interest rates lower funds available to state and local governments by roughly \$45 billion in 2020, \$55 billion in 2021, and \$65 billion in 2022.

Looking beyond the near term, a longer-term decline in interest rates would place additional stress on state and local employee pension funds. But, as argued by Lenney, Lutz, Schuele, and Sheiner (2020)—lower real interest rates not only increase the rate of contributions needed to close existing pension funding gaps; they also make the case for pre-funding pensions weaker. Lenney et al. note that when valuing the liabilities at risk-free rates, these plans have always been less than fully funded, and thus state and local governments have long been carrying implicit debt. Lower interest rates lessen the value of pre-funding.

Furthermore, recognizing that not fully funding pension contributions is a form of borrowing, it is worth asking whether lowering contributions could provide fiscal space if necessary. State and local governments contributed \$169 billion to their defined benefit pension plans in 2019.⁴⁹ Budget balances (rainy day funds plus general fund surpluses) at end of 2019, while at a record high of \$119 billion, can only be used once—whereas contributions can be cut for multiple years. Furthermore, while budget balances were at record high for the country as a whole, not all states were in such a good position. Yet, as shown in Appendix Figure 7, many states without much in reserves do make sizable pension contributions, which could provide them some fiscal space if needed. Thus, cutting back on pension contributions could go some distance toward mitigating spending cuts. However, cutting back on pension funding comes at the cost of making pension commitments less sustainable over medium and longer terms. Moreover, higher grants from the federal government would be a more efficient way of smoothing through the costs of the pandemic: the federal government is better able to bear debt,

⁴⁸ This calculation ignores the fact that not all debt and financial assets roll over immediately but should nevertheless give a reasonable measure of the near-term fiscal effects of lower rates of return.

⁴⁹ NIPA, Table 7.24., line 5.

has lower borrowing costs, and can internalize the economic spillovers arising from the macroeconomic effects of higher state and local spending.

IV. 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.

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Table 1. Fiscal Gap (% GDP)						
	Current Law			Current Policy		
Target	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

Table 2. Summary of Recent Projections for Revenue Losses From COVID in the State and Local Sector

Authors	Revenue or Spending	Revenue Losses FY2020 + FY2021 (billions)	Economic Forecast Underlying Estimate	Methodology
Bartik (May 2020) Upjohn Institute	State and Local Taxes	\$875	April CBO.	Historical relationship augmented for assumed local revenue effect. 1% increase in unemployment lower state and local revenues by \$60 billion.
McNichol, Leachman, and Marshall, 2020, Center on Budget and Policy Priorities	State Taxes	\$395	April CBO.	Historical relationship: 1% increase in unemployment rate lowers revenues 3.7%
Bivens and Walker (April 2020) Economic Policy Institute	State and Local Taxes	\$345	Goldman Sachs forecast April.	Historical relationship augmented for assumed local revenue effect. A 1% increase in unemployment associated with a \$60 billion decline in state and local revenues.
Clemens and Veuger (June 2020)	State Income and Sales Tax	\$148	April CBO.	Historical relationship : 1% decline in personal income lowers revenues by 1.6%.
White, Crane and Seitz (April 2020) Moody's Analytics	State Revenues General Funds	\$130 baseline \$203 more severe scenario	Baseline: Max 10% decline real GDP, gradual recovery. More severe: Max 14% decline real GDP, gradual recovery.	Proprietary model that includes state-by-state regressions of state revenues on economic revenues.
Whitaker (June 2020)	All State and Local Revenue (including fees, charges, etc.)	\$200 -\$490	Best: Recovery complete by 2020 Q4. Worst: Second wave shutdown 2020 Q4 . Economy recovered by Q4 2021.	For income taxes: estimate wage declines and assume tax revenues decline proportionally. For sales taxes, use national changes in portions of PCE likely subject to sales tax.
Dadayan (July 2020) Urban Institute Tax Policy Center	State Taxes	\$200	States forecasts.	Estimated for all 50 states based on forecast data from 27 states.

Table 3. State and Local Tax Revenues and the Business Cycle, 1985-2019

		Dependent Variable: Log Change in Real per Capita State and Local Income Taxes			
Independent Variable		All	Exclude 2009	Include Stocks	Include Stocks and Exclude 2009
Change in UR	Coeff.	-4.9	-3.5	-3.3	-2.7
	Rsq Adj.	0.56	0.24	0.65	0.35
Log change real per cap personal income	Coeff.	2	1.4	1.4	1.1
	Rsq Adj.	0.58	0.28	0.65	0.36
al per cap "taxable" pe	Coeff.	1.5	1.1	1.1	0.89
	Rsq Adj.	0.61	0.33	0.67	0.4
		Dependent Variable: Log Change in Real per Capita State and Local Sales Taxes			
Change in UR	Coeff.	-3	-2.3	-2.4	-2
	Rsq Adj.	0.72	0.44	0.75	0.49
Log change real per cap personal income	Coeff.	1.1	0.7	0.8	0.6
	Rsq Adj.	0.6	0.27	0.64	0.31

Data on taxes and personal income from BEA; unemployment rates from BLS; stock market uses the Wilshire 5000 from Fred.

Table 4. Effects of Pandemic on State and Local Fiscal Outlook, National Summary

	2020	2021	2022
Projected Nominal Declines in Revenues excluding Fees from Higher Ed and Hospitals			
1	\$156	\$165	\$143
2	Personal Income Tax Revenues	\$24	\$36
3	Corporate Income Tax Revenues	\$2	\$29
4	Sales Tax Revenues	\$49	\$45
5	Other Taxes and Fees	\$82	\$55
Projected Nominal Declines in Fees to Public Hospitals and Institutions of Higher Education			
6	\$33	\$22	\$22
7	?	?	?
8	Nominal State Aid excluding Hospitals and Higher Ed	\$212	\$19
9	Covid Relief	150	
10	K-12 Aid	13	
11	Transit	25	
12	Medicaid (Excess over additional Spending)	24	19
13	Nominal State Aid to Hospitals and Higher Ed	\$42	
14	Health Provider Relief	35	
15	Higher Ed Relief	6.5	
	Note: Declines in Real Revenues (pre-COVID \$)		
16	Revenues excluding Fees from Higher Ed and Hospitals	140	130
17	Personal Income Tax Revenues	19	25
18	Corporate Income Tax Revenues	1	29
19	Sales Tax Revenues	44	35
20	Other Taxes and Fees	76	42
	Fees to Public Hospitals and Institutions of Higher		
21	Education	30	15

Figure 1. Primary Deficit, 2000 - 2050

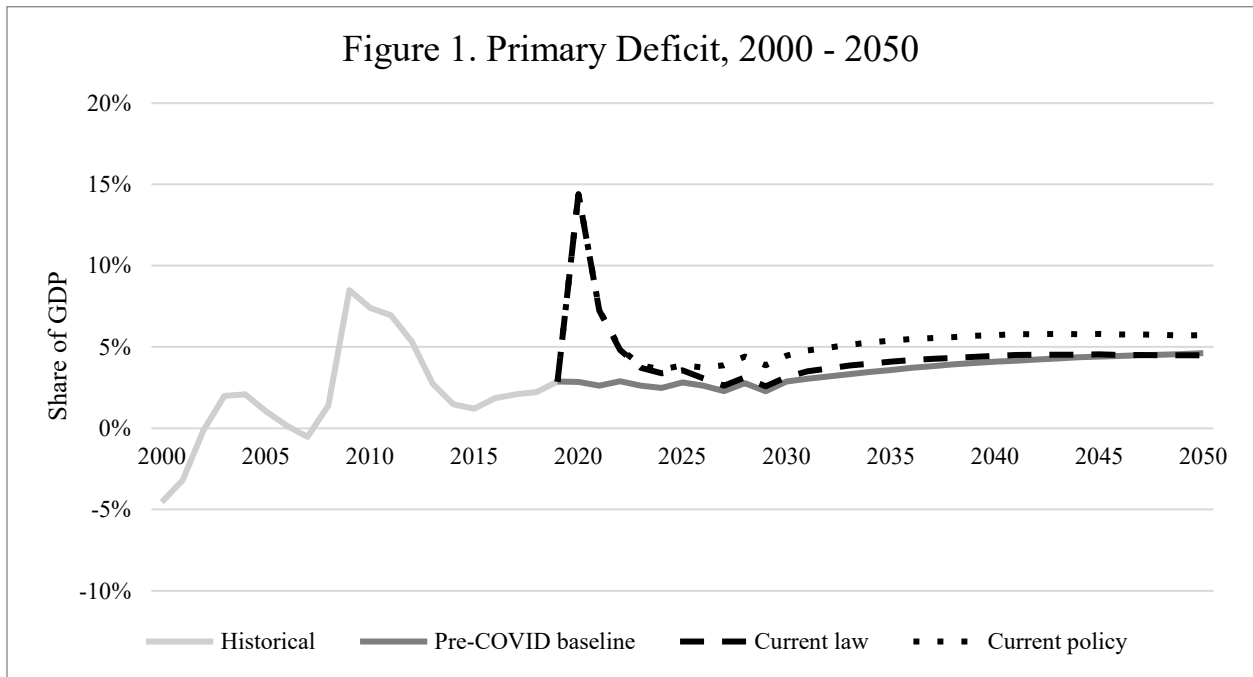


Figure 2. Net Interest, 2000 - 2050

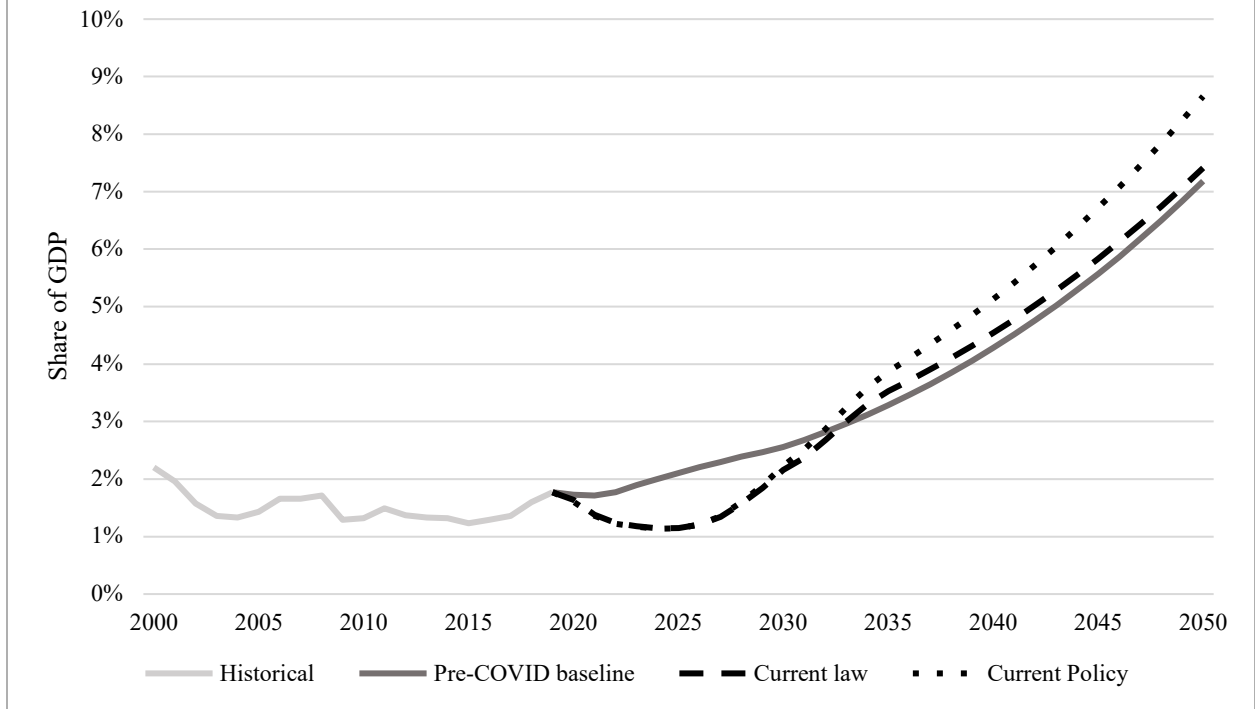


Figure 3. Public Debt, 2000- 2050

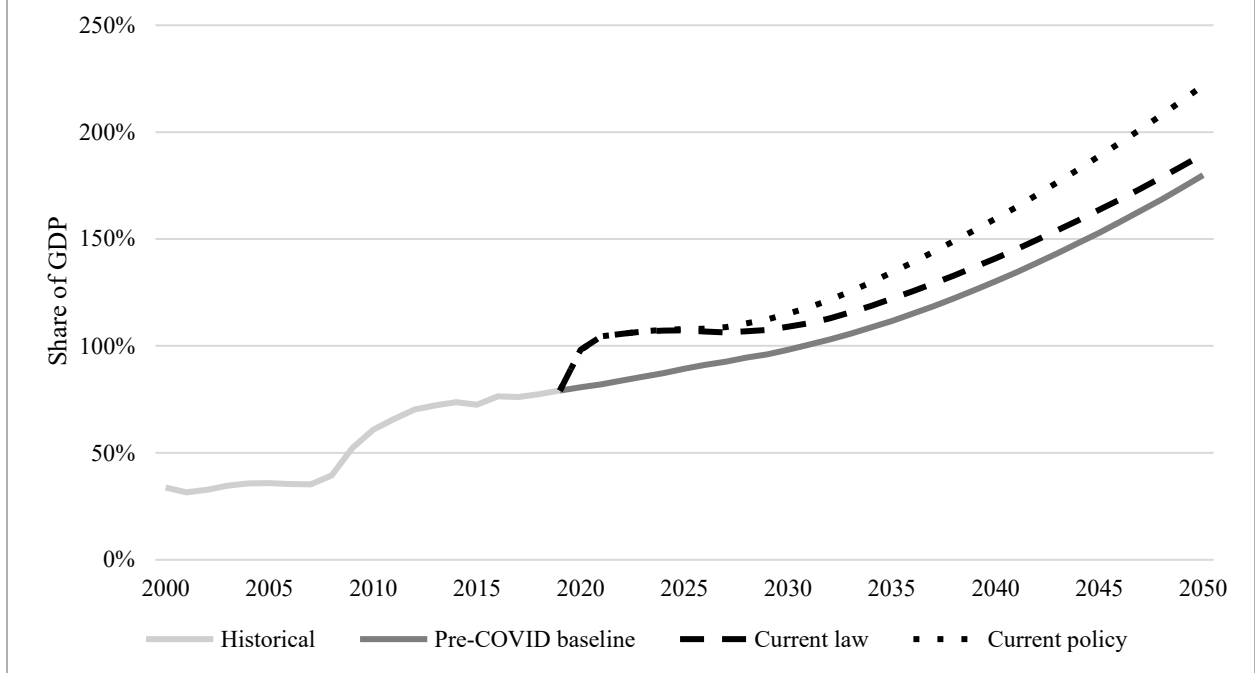
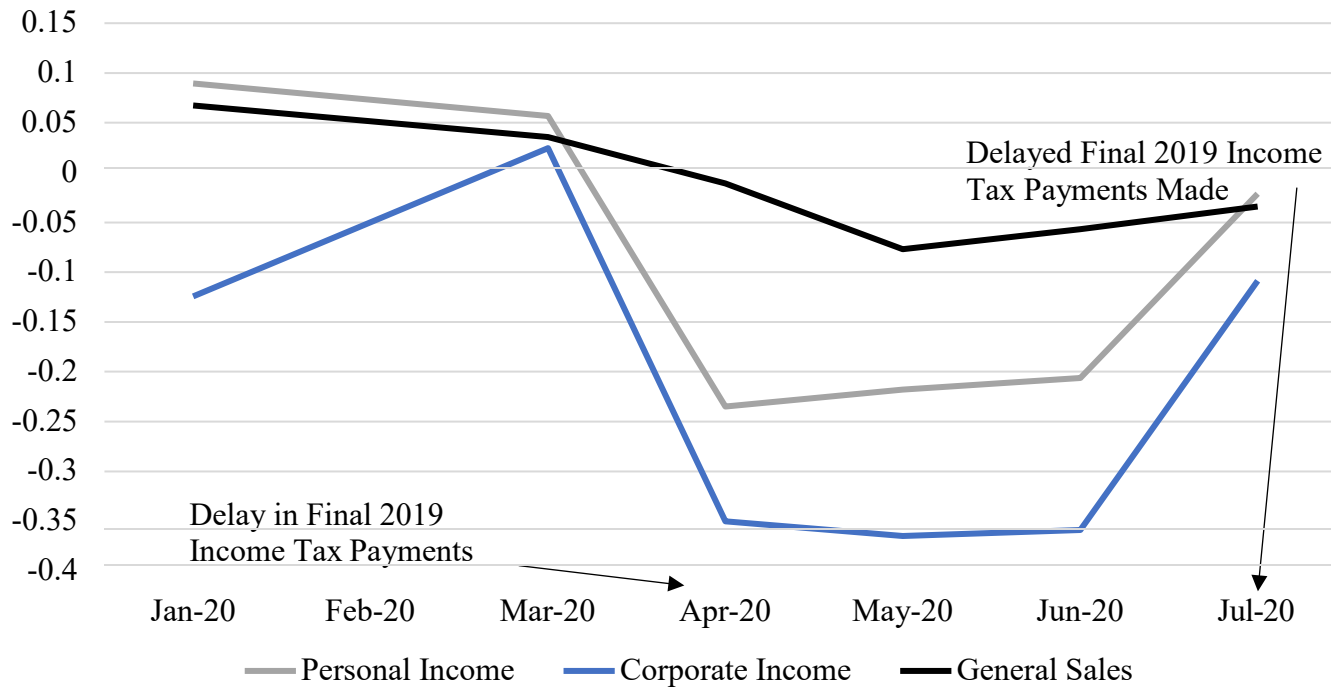
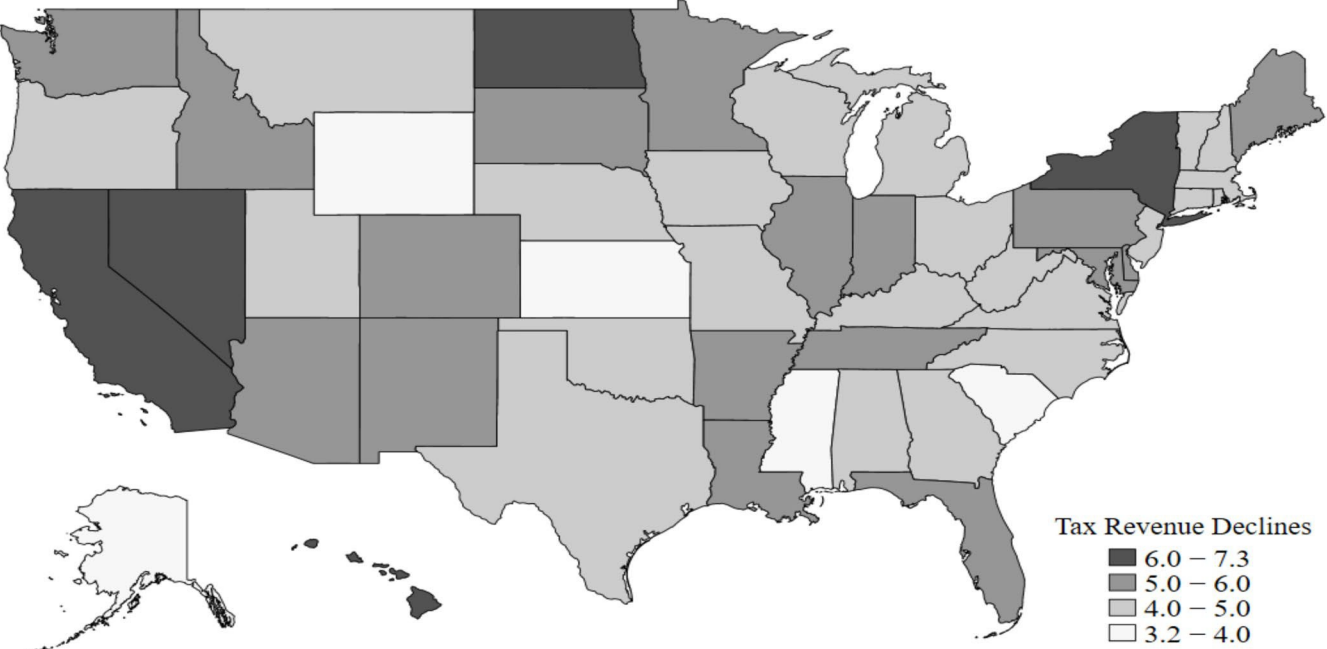


Figure 4. State Taxes Year-to-Date Percent Change Relative to Previous Year



Note. Figure displays percent changes for 2020 relative to 2019 for year-to-date state government tax collections. Personal income tax collections reflect data for 33 states which accounted for roughly 85 percent of national income tax collections in 2019; corporate income tax collections reflect data for 36 states which accounted for roughly 82 percent of national corporate income tax collections in 2019; sales tax collections reflect data for 36 states which accounted for roughly 88 percent of national sales tax collections in 2019. Source: Analysis is based on data provided by the Urban Institute available at: <https://www.urban.org/policy-centers/cross-center-initiatives/state-and-local-finance-initiative/projects/state-tax-and-economic-review/data-subscriptions>

Figure 5. Variation in Total Revenue Declines Across States



Note: This map shows the average decline in tax revenues from 2020 to 2022, as a share of total own source revenues. State by state numbers can be found in Appendix Table 6.