The COVID-19 Pandemic and the Revenues of State and Local Governments: An Update

By Jeffrey Clemens and Stan Veuger   September 2020

This report provides estimates of the revenue shortfalls state and local governments are likely to experience due to the COVID-19 pandemic. Our estimates apply to the 2021 fiscal year, which extends from the third quarter of 2020 through the second quarter of 2021 in most states. Nationally, we estimate that state governments' sales and income taxes will fall short of January projections by roughly $105 billion. Combined shortfalls in all state and local government revenue streams are likely to be on the order of $240 billion for the current fiscal year.

The COVID-19 pandemic is causing acute fiscal stress for state and local governments. The pandemic has both increased governments' expenditure needs and reduced their tax collections, which is problematic given their balanced-budget requirements.

In previous work (Clemens and Veuger 2020), we constructed estimates of revenue shocks specific to state governments' sales and income tax revenues. This work drew predominantly on two sources. First, we drew on May forecasts from the Congressional Budget Office (CBO) to project shortfalls in state governments' tax bases. Second, we drew on past research that estimates the relationship between tax bases and realized streams of revenue. These findings led us to estimate that state governments' sales and income taxes for the 2021 fiscal year would be roughly $106 billion less than they would have forecast in January.

Two developments make it possible to update and expand on our earlier estimates. First, new forecasts have been released, making it possible to bring our estimates closer to "real time" while the Senate, "the world's greatest deliberative body," continues its deliberations on fiscal assistance. Second, parallel research on the implicit tax bases associated with the full scope of state and local government revenue instruments (Whitaker 2020a, 2020b) makes it possible to extend our estimates, at least roughly, to the totality of state and local governments' revenues.

Our updating exercise proceeds as follows. First, we update our detailed methodology to estimate that state government sales and income tax revenues for the 2021 fiscal year will fall roughly $105 billion short of what they would have projected in January. A rough extension of our estimates to the totality of state and local government revenues implies a shortfall of approximately $240 billion. We conclude by contrasting our approach with estimates that draw on the historical relationship between state

Figure 1. Updates to the CBO's Macroeconomic Forecasts: GDP
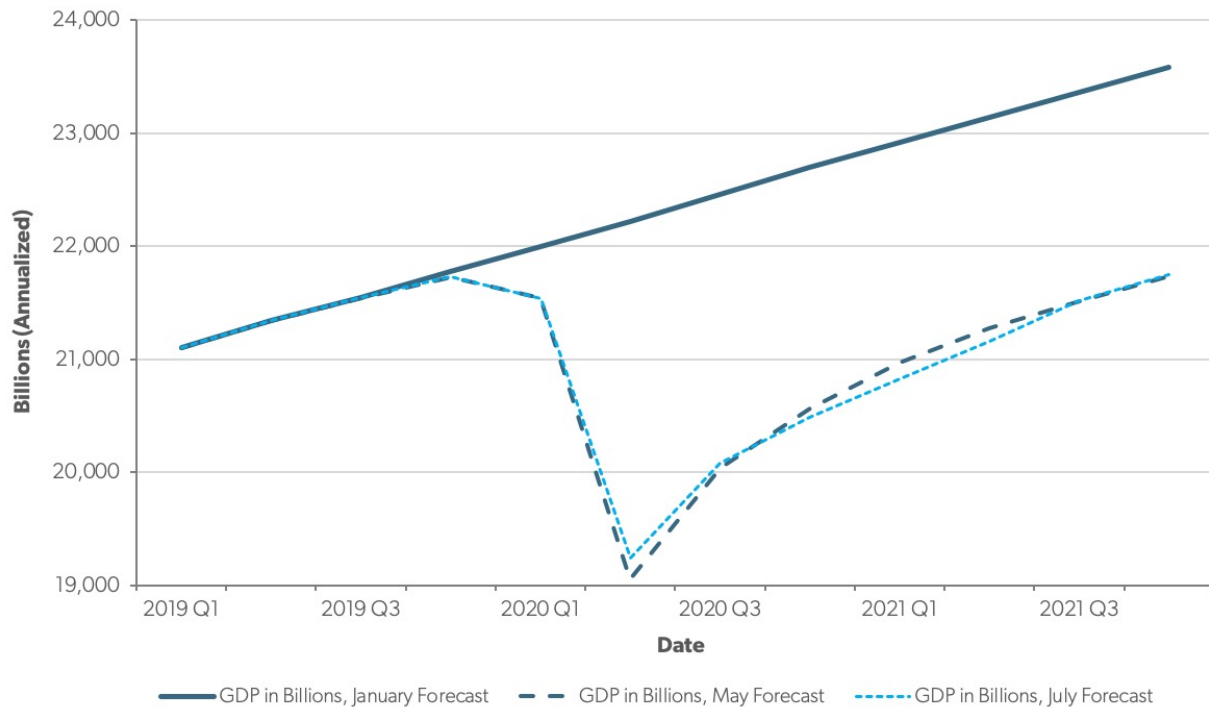
Source: CBO (2020a); CBO (2020b); and CBO (2020c).

budgets and state unemployment rates, as estimates of this form have been prominently discussed in the context of the House of Representatives' Health and Economic Recovery Omnibus Emergency Solutions (HEROES) Act.

Updated Effects on Economic Activity

In this section, we present and discuss the central data underlying our analysis. The data come from macroeconomic forecasts produced by the CBO. Specifically, we present data from CBO's forecasts of gross domestic product (GDP), aggregate personal income, and aggregate personal consumption expenditures. We present these series for CBO's January, May, and July forecasts (CBO 2020a, 2020b, 2020c). Taken together, these forecasts shed light on CBO's evolving assessment of COVID-19's impact on the macroeconomy. The pandemic's impact on aggregate income and consumption are our proxies for its impact on state and local governments' income and sales tax bases.

Figure 1 reports CBO's forecasts for nominal GDP. The figure presents the forecast in billions of dollars. The values are presented on an annualized basis, as taken directly from spreadsheets that

supplement the reports containing CBO's forecasts. Over the 2021 calendar year, the series reveal that CBO expects aggregate economic output to be roughly 9 percent smaller due to the pandemic. In the fourth quarter of 2021, for example, CBO's July forecast holds that nominal GDP will amount to just under $21.7 trillion on an annualized basis. This forecast is little changed from May. Both forecasts are roughly 8 percent below the $23.6 trillion forecast from January.

As in our earlier paper (Clemens and Veuger 2020), Figure 2 presents data that connect more directly to our revenue estimates along two dimensions. First, the series underlying Figure 2 are aggregate personal income and aggregate personal consumption expenditures. These series translate more directly than GDP into states' personal income and sales tax bases. Second, for Figure 2 we have indexed each series relative to the values they took in the fourth quarter of 2019. Consequently, changes over time, as presented in the figure, translate into percentage terms. As in Figure 1, we present series from the January, May, and July forecasts from CBO.

Several interesting facts emerge from the figure. First, income in 2020's second quarter, for which

Figure 2. Updates to the CBO's Macroeconomic Forecasts: Income and Consumption
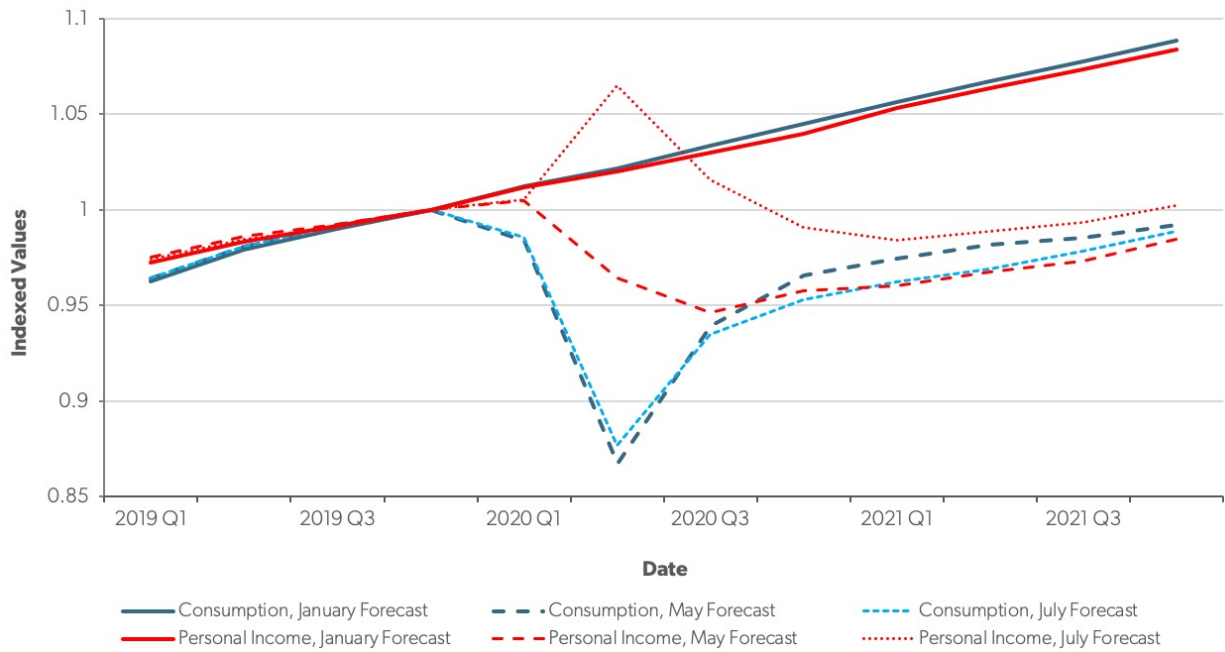
Source: CBO (2020a); CBO (2020b); and CBO (2020c).

data are now largely complete, deviated dramatically from forecasts developed in May. CBO's May forecast projected that income in the second quarter of 2020 would fall roughly 6 percent short of its January forecast. In fact, incomes *rose*.[1] This surprising outcome reflects a combination of factors. CBO's forecasts for the second quarter of 2020 underestimated wages, nonwage compensation, capital income, and government transfers.

The facts most relevant to our current task, which is to estimate revenue shortfalls for the 2021 fiscal year, involve the evolution of each series from the third quarter of 2020 through the second quarter of 2021. As noted previously, these four quarters correspond with the 2021 fiscal year in the vast majority of states. The July forecasts for these series were quite similar to the May forecasts. Between May and July, CBO modestly increased its forecast of personal income and decreased its forecast of personal consumption expenditures. Looking ahead, these updates modestly increase our estimates of sales tax shortfalls and decrease our estimates of income tax shortfalls.

Updated State Income and Sales Tax Revenue Shortfall Estimates

In this section, we translate CBO's forecasts into estimated shortfalls in tax revenues. We present our primary estimates in Table 1. We estimate that state governments' sales and income tax revenues will fall roughly $105 billion short of what one would likely have projected in January. This includes a $57 billion contribution from sales taxes and a $48 billion contribution from income taxes. In total, the shortfall is very modestly changed from our earlier projection of $106 billion. As noted previously, this earlier estimate was based on CBO's May forecast. For details of our calculations, please refer to Clemens and Veuger (2020).

While the combined shortfall estimate has changed only modestly, the relative contributions of sales and income taxes have essentially reversed. Our earlier estimates forecast a $57 billion shortfall from income taxes and a $49 billion shortfall from sales taxes. This reversal reflects updates to CBO's forecasts, which were revised upward for personal income and downward for aggregate

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[1] Taxable income likely declined modestly because the substantial contribution from the CARES Act's Economic Impact Payments is not taxable.

Table 1. Estimated Shocks to State Sales and Income Tax Revenues Aggregated Across All States

	Based on CBO's May Forecast		Based on CBO's July Forecast	
	Sales Tax	Income Tax	Sales Tax	Income Tax
Calculation Inputs	(1)	(2)	(3)	(4)
Actual 2017 Revenue ($ Billions)	457	352	457	352
Counterfactual 2020 Revenues ($ Billions)	525	407	525	407
Tax Base Shock for Q3 2020–Q2 2021	–0.085	–0.089	–0.098	–0.075
Assumed Elasticity	1.1	1.6	1.1	1.6
Estimated Aggregate Revenue Shocks				
Q3 2020–Q2 2021 ($ Billions)	–49	–57	–57	–48

Source: CBO (2020a); CBO (2020b); CBO (2020c); US Census Bureau (2017); assumed elasticities from Holcombe and Sobel (1997); Kodryzcki (2014); Anderson and Shimul (2018); Walczak (2019); and Kaeding (2017).

consumption. This has potential implications for the distribution of shortfalls across states, since states differ in their degrees of reliance on sales and income taxes.

Overall State and Local Government Revenue Shortfall Estimates

Research conducted in parallel with our earlier analysis (Whitaker 2020a, 2020b) provides a basis for extending our estimates to the totality of state and local government revenues. We proceed in two steps. The first step is to incorporate state government revenues from sources other than sales and income taxes. The second step is to incorporate local government revenues.

According to the Census Bureau, states had $1,317 billion in total own-source revenues in 2017. Of this, $352 billion came from income taxes, and $457 billion came from "sales and gross receipts" taxes. This leaves $509 billion from other sources. We crudely estimate that these other sources will, on average, experience shortfalls proportional in magnitude to the sales tax shortfall. This implies an additional shortfall of $64 billion. Combined with the sales and income tax shortfalls presented

above, we estimate a total state government revenue shortfall of $169 billion during the 2021 fiscal year.

To calculate local government revenue shortfalls, we rely on the ratio between state and local government shortfalls in the intermediate, or "slow," recovery scenario from Whitaker (2020b). In this scenario, Whitaker estimates that shortfalls for all local governments will sum to just under 40 percent of the sum of all state government shortfalls. Given our estimated state government shortfall of $169 billion, this translates into an estimated $67 billion shortfall for local governments.[2] Adding across state and local governments, we obtain a total shortfall estimate of $236 billion for the 2021 fiscal year.

Alternatively, and as a sanity check, we carry out a straightforward—arguably simplistic—back-of-the-envelope calculation. Some major revenue sources (such as the income tax) tend to scale more than one-for-one with the economy, while others (such as the property tax) tend to scale less than one-for-one with the economy. In aggregate, it is not unreasonable to estimate that total state and local government revenues will scale roughly in proportion to the economy. CBO's July forecast numbers imply an average GDP shortfall of 9 percent relative to the January forecast for Q3 2020

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[2] As a share of total own-source revenue, the projected shortfall for local governments is smaller than for state governments. This reflects that local governments obtain a substantial share of their revenues through property taxes, which tend to be more stable than other revenue sources. Because property values are reassessed with lags, for example, the property tax base is more stable than the income and sales tax bases during recessions (Lutz, Molloy, and Shan 2011; Chernick, Reschovsky, and Newman 2020). Chernick, Copeland and Reschovsky's (2020) complementary analysis of the COVID-19 pandemic's effects on city budgets makes a related point regarding the revenue stability made possible by adjustments to property tax rates.

Figure 3. Updates to the CBO's Macroeconomic Forecasts: Unemployment Rate
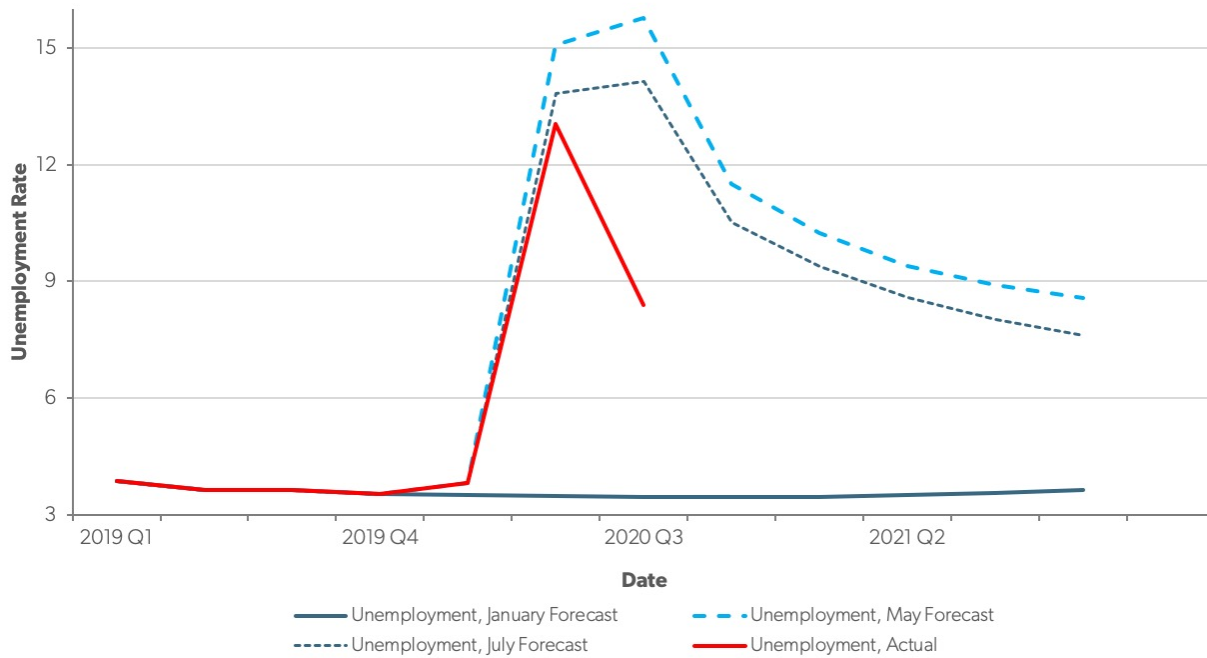
Source: CBO (2020a); CBO (2020b); CBO (2020c); BLS (2020a); and BLS (2020b).

through Q2 2021. Total state and local revenue for 2017 was $2,408 billion. We can project forward by three years, as we did for sales and income taxes, to get counterfactual 2020 revenue of $2,788 billion. A 9 percent shortfall on that counterfactual number is $251 billion. The estimate is reassuringly similar to our primary estimate.

An alternative approach, which estimates shortfalls using forecasts of unemployment rates (Bartik 2020), has generated much larger numbers. Specifically, Bartik estimates that the combined state and local shortfall from the third quarter of 2020 through the second quarter of 2021 would amount to $568 billion. The total shortfall he estimates for the 2020 and 2021 calendar years is $956 billion, which is quite similar in magnitude to the aid found in the HEROES Act.

Bartik's calculations rely on a mix of April unemployment data (as reported on May 8 by the Bureau of Labor Statistics) and unemployment forecasts from an April 24 blog post by CBO (Swagel 2020). McNichol and Leachman (2020) arrive at moderately smaller estimates by applying

essentially the same methodology to CBO's July forecast for unemployment. Over the 2021 fiscal year, they estimate that the shortfall for state governments alone will be $290 billion. Extending their estimate to include local government shortfalls would yield a combined shortfall, comparable to Bartik's $568 billion estimate, of $432 billion.

As shown in Figure 3, realized unemployment rates have been far lower than CBO's forecasts over subsequent months. Both the April (not shown) and May forecasts for the third-quarter unemployment rate were near 16 percent. The realized unemployment rates for July and August, however, were 10.2 and 8.4 percent, respectively. In Bartik's calculation, each percentage-point change in the average annual unemployment rate adds $67 billion to the estimate of combined state and local government shortfalls ($45 billion for state governments and $22 billion for local governments). If the unemployment rate were to remain at its most recent reading through the second quarter of 2021, Bartik's methodology would imply a $325 billion shortfall for the current fiscal year.[3]

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[3] This calculation averages July's 10.2 percent unemployment rate with August's 8.4 percent unemployment rate projected forward for the remainder of the fiscal year.

That is, an updated version of the unemployment-based approach yields a shortfall estimate much closer to estimates, like ours and those in Whitaker (2020b), that are built up from projections for specific sources of revenue.

Issues in the Design of Automatic Stabilizers for State and Local Governments

A broader question facing policymakers involves the design of automatic stabilizers for state and local governments. Both researchers and policy advocates have reflected on the need for and size of stabilizers of this sort. The basic idea is to establish federal stabilization grants to states that adjust with macroeconomic conditions. The goal is to keep balanced-budget requirements from triggering aggressively countercyclical fiscal policy at the subnational level.

Federal stabilization grants could either supplement or replace existing intergovernmental transfers. Existing transfers contribute to the financing of state Medicaid programs, transportation infrastructure, and schools, among other things. Some of these existing arrangements are, of course, implicit automatic stabilizers themselves. More people become eligible for Medicaid, for example, during a downturn. This triggers increased federal contributions as states' Medicaid programs finance their health care.

In existing proposals, the most common approach is to benchmark federal stabilization grants to states' unemployment rates. This approach underlies the estimates of Bartik (2020), discussed earlier, which extrapolate from estimates provided by Fiedler, Furman, and Powell (2019). Clemens and Ippolito (2018) discuss a similar concept for benchmarking federal support for Medicaid.

As shown above, however, shortfalls calculated using unemployment data have been less stable than shortfalls constructed using other data have been. Here we discuss several reasons why alternative measures of macroeconomic conditions might, as a general proposition, be superior to states' unemployment rates for the task at hand.

The conceptual problem with the unemployment rate is that it is only indirectly related to states' revenue bases. Further, the relationship between the unemployment rate and fiscal shortfalls may vary substantially across recessions and over time. This makes the unemployment rate a relatively poor guide for projecting state and local governments' revenue shortfalls using historical data.

For that reason, we see value in approaches that draw on data that relate more directly to state and local governments' revenue streams.

One approach, as taken here and in Clemens and Veuger (2020), is to look to measures of aggregate income and consumption. These measures relate far more directly to actual revenue sources. Further, these measures are available with only a modest lag relative to the unemployment rate. This is not, in our view, a serious drawback because the relevant grants need only be updated at the end of the fiscal year; they need not adjust in real time.

That said, there is a potentially attractive alternative source for tracking state and local government revenue fluctuations within the category of labor market statistics: Current Employment Statistics (CES) data. The CES survey is perhaps better known as the establishment payroll survey from the Bureau of Labor Statistics monthly summary of the employment situation. The data are generated through surveys of establishments rather than households. Because they are released in tandem with the unemployment rate, they can be used for similarly "real-time" analyses. Whitaker (2020b), for example, uses CES data from February and April to inform his estimates of changes in the income tax base.[4]

During recent months, forecasts and realizations of the unemployment rate have fluctuated quite dramatically. This is driven partly by the unemployment rate's exclusion of individuals who are "out of the labor force" because they are no longer looking for work. While these "discouraged" workers complicate the measurement and interpretation of the unemployment rate, they are directly accounted for by measures of employee head counts at firms.

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[4] In a related analysis, Makridis and McNabb (2020) project revenue shortfalls by linking historical estimates of the relationship between revenues and employment with recent employment changes.

Figure 4. Updates to the CBO's Macroeconomic Forecasts: Total Nonfarm Employment
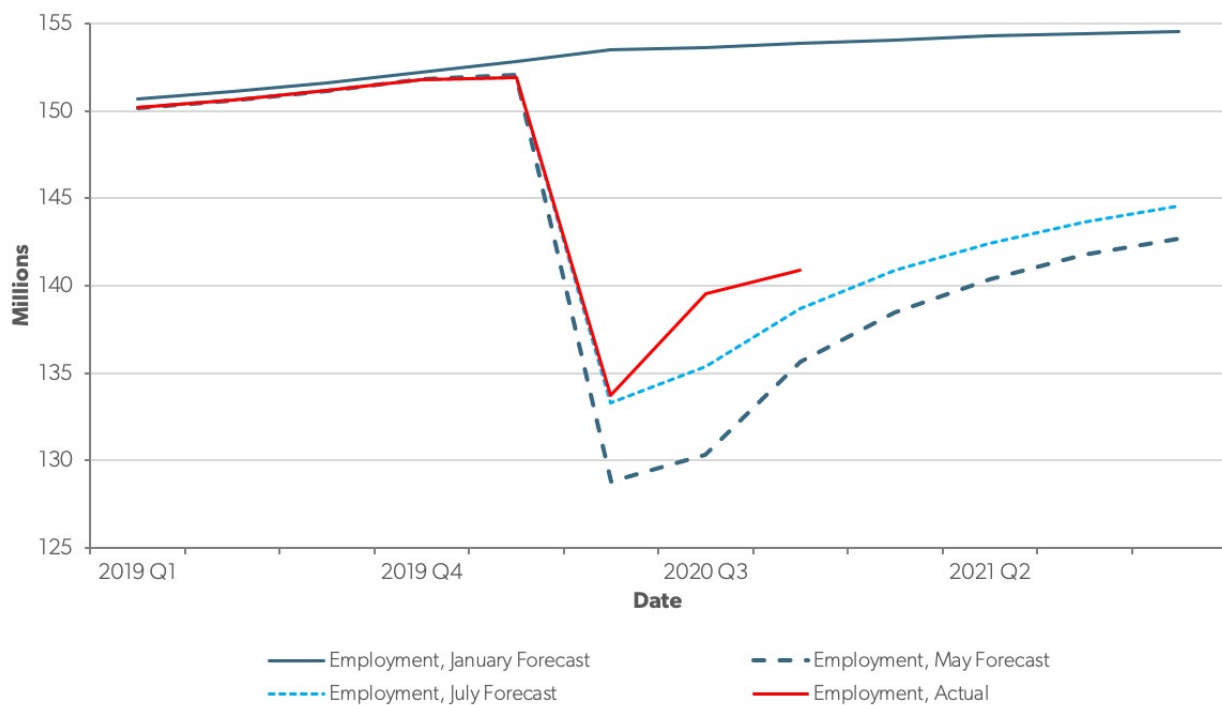
Source: CBO (2020a); CBO (2020b); CBO (2020c); BLS (2020a); and BLS (2020b).

Figure 3 provides evidence on the difficulty of forecasting COVID-19's impact on the unemployment rate. From January to May, for example, CBO's forecast for the third-quarter unemployment rate rose from 3.5 percent to 15.8 percent, or by 12.3 percentage points. The realized August unemployment rate of 8.4 percent, however, was 4.9 percentage points higher than the January forecast. Roughly three-fifths of the sharply elevated forecast from May thus failed to materialize. As laid out above, this forecast error had substantial implications for shortfalls projected based on the historical relationship between state budgets and state unemployment rates.

Figure 4 shows that forecasts for simple employment counts performed modestly better than forecasts for the unemployment rate did. From January to May, CBO's forecast for third-quarter employment declined from 154 million to 130 million, or by 24 million jobs. The measured August employment level was 141 million, which is 13 million jobs lower than the January forecast. Roughly 46 percent of the third-quarter employment shortfall, as forecast in May, thus failed to materialize.

An additional key factor involves COVID-19's impacts across industries. Because COVID-19 has disproportionately harmed the leisure and hospitality sector, the pandemic's employment impacts have been more concentrated among low-income workers. This is relevant because it may render the historical relationship between the unemployment rate and state revenues a poor guide for assessing the pandemic's effect on the income tax base.

Through his use of CES data, Whitaker (2020a) subtly takes this into account by adjusting for differences in the earnings of workers in different industries and occupations. The resulting estimates will, as a result, more closely track total payroll, and hence the tax base, than total employment will. One could alternatively make direct use of series constructed by the US Bureau of Economic Analysis (BEA), such as its "wages and salaries," total "compensation of employees," or "personal income" aggregates. Indeed, our preferred approach is to estimate revenue shortfalls through direct use of BEA's economic aggregates.

Implications for Policy

Federal policymakers continue to consider whether to extend further support to state and local governments. As they do so, several considerations

should be taken into account in addition to the estimates presented here.

Fiscal year 2021 revenue shortfalls are only one facet of the fiscal situation experienced by subnational governments. We estimate that state governments' sales and income taxes will fall short of January projections by roughly $105 billion, while combined shortfalls in all state and local government revenue streams are likely to be on the order of $240 billion for the current fiscal year. These problems are compounded by revenue shortfalls experienced during the second quarter of 2020 and increased expenditures driven by both the public health crisis and the economic slowdown. Gordon and Reber (2020), for example, consider the pandemic's effects on schools' expenditure needs.

Partially offsetting these additional stressors are grants the federal government provided for in legislation enacted earlier this year. As described in more detail in Clemens and Veuger (2020), the Coronavirus Aid, Relief, and Economic Security (CARES) Act and other pieces of legislation included significant support for state and local governments. Relevant initiatives include the increased federal matching rate for Medicaid (as much as $50 billion), moneys from the Coronavirus Relief Fund ($110 billion), and some share of the funds appropriated for the Public Health and Social Service Emergency Fund ($175 billion), the Federal Emergency Management Agency Disaster Relief Fund ($45 billion), the Education Stabilization Fund ($30 billion), transit infrastructure grants ($30 billion), and test-and-trace programs ($11 billion). Public higher education institutions and hospitals that generate significant amounts of fee-for-service revenue are important recipients of some of these funding flows.

In addition, the states and some local governments have a fiscal buffer thanks to their rainy-day funds. These, too, are explored in Clemens and Veuger (2020) in additional detail. Rainy-day funds are perhaps the most obvious way in which entities constrained by balanced-budget rules can avoid heavily pro-cyclical fiscal policy. Substantial federal aid risks undermining states' willingness to engage in this type of prudent planning for times of economic stress.

Finally, the CBO's July forecast projects that nominal GDP in 2030 will remain 4 percent below what it had forecast in January. On a 10-year time horizon, reduced levels of GDP are better described as permanent reductions in output than as temporary shortfalls. If lower levels of output persist, state and local governments will need to augment temporary infusions of aid with long-run adjustments.

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Acknowledgments

References

Anderson, John E., and Shafiun N. Shimul. 2018. "State and Local Property, Income, and Sales Tax Elasticity: Estimates from Dynamic Heterogeneous Panels." *National Tax Journal* 71, no. 3: 521–46.

Bartik, Timothy J. 2020. "An Updated Proposal for Timely, Responsive Federal Aid to State and Local Governments During the Pandemic Recession." W.E. Upjohn Institute for Employment Research, May 22. https://www.upjohn.org/research-highlights/updated-proposal-timely-responsive-federal-aid-state-and-local-governments-during-pandemic-recession.

BLS (US Bureau of Labor Statistics). 2020a. "Employment, Hours, and Earnings—National." https://www.bls.gov/data/.

———. 2020b. "Labor Force Statistics Including the National Unemployment Rate." https://www.bls.gov/data/.

CBO (Congressional Budget Office). 2020a. "An Update to the Economic Outlook: 2020 to 2030." July 2. https://www.cbo.gov/publication/56442.

———. 2020b. "Interim Economic Projections for 2020 and 2021." May 19. https://www.cbo.gov/publication/56368.

———. 2020c. "The Budget and Economic Outlook: 2020 to 2030." January 28. https://www.cbo.gov/publication/56020.

Chernick, Howard, David Copeland, and Andrew Reschovsky. 2020. "The Fiscal Effects of the COVID-19 Pandemic on Cities: An Initial Assessment." *National Tax Journal* 73, no. 3: 699–732.

Chernick, Howard, Andrew Reschovsky, and Sandra Newman. 2020. "The Effect of the Housing Crisis on the Finances of Central Cities." Working Paper. La Follette School of Public Affairs, University of Wisconsin–Madison. June. https://lafollette.wisc.edu/images/publications/workingpapers/Reschovsky_housing_2020-001.pdf.

Clemens, Jeffrey, and Benedic Ippolito. 2018. "Implications of Medicaid Financing Reform for State Government Budgets." *Tax Policy and the Economy* 32, no. 1: 135–72. https://ntanet.org/NTJ/73/3/.

Clemens, Jeffrey, and Stan Veuger. 2020. "Implications of the COVID-19 Pandemic for State Government Tax Revenues." *National Tax Journal* 73, no. 3: 619–44.

Fiedler, Matthew, Jason Furman, and Wilson Powell III. 2019. "Increasing Federal Support for State Medicaid and CHIP Programs in Response to Economic Downturns." Brookings Institution. May 16. https://www.brookings.edu/research/increasing-federal-support-for-state-medicaid-and-chip-programs-in-response-to-economic-downturns/.

Gordon, Nora, and Sarah Reber. 2020. "Federal Aid to School Districts During the COVID-19 Recession." *National Tax Journal* 73, no. 3: 781–804.

Holcome, Randall G., and Russell S. Sobel. 1997. *Growth and Variability in State Tax Revenue: An Anatomy of State Fiscal Crisis*. Westport, CT: Greenwood Publishing Group.

Kaeding, Nicole. 2017. "Sales Tax Base Broadening: Right-Sizing a State Sales Tax." Tax Foundation. October 24. https://taxfoundation.org/sales-tax-base-broadening/.

Kodrzycki, Yolanda K. 2014. "Smoothing State Tax Revenues over the Business Cycle: Gauging Fiscal Needs and Opportunities." Working Paper. Federal Reserve Bank of Boston. October 30. https://www.bostonfed.org/publications/research-department-working-paper/2014/smoothing-state-tax-revenues-over-the-business-cycle-gauging-fiscal-needs-and-opportunities.aspx.

Lutz, Byron, Raven Molloy, and Hui Shan. 2011. "The Housing Crisis and State and Local Government Tax Revenue: Five Channels." *Regional Science and Urban Economics* 41, no. 4 (July): 306–19. https://www.sciencedirect.com/science/article/abs/pii/S0166046211000469.

Makridis, Christos A., and Robert M. McNab. 2020. "The Fiscal Cost of COVID-19: Evidence from the States." Working Paper. Mercatus Center. August. https://www.mercatus.org/system/files/makridis-cost-covid-mercatus-working-paper-v1.pdf.

McNichol, Elizabeth, and Michael Leachmen. 2020. "States Continue to Face Large Shortfalls Due to COVID-19 Effects." Center on Budget and Policy Priorities. July 7. https://www.cbpp.org/research/state-budget-and-tax/states-continue-to-face-large-shortfalls-due-to-covid-19-effects.

Swagel, Philip L. 2020. "CBO's Current Projections of Output, Employment, and Interest Rates and a Preliminary Look at Federal Deficits for 2020 and 2021." Congressional Budget Office. April 24. https://www.cbo.gov/publication/56335.

US Census Bureau. 2017. "Annual Survey of State and Local Government Finances." https://www.census.gov/programs-surveys/gov-finances.html.

Walczak, Jared. 2019. "2020 State Business Tax Climate Index." Tax Foundation. October 22. https://taxfoundation.org/2020-state-business-tax-climate-index/.

Whitaker, Stephan D. 2020a. "Estimates of State and Local Government Revenue Losses from Pandemic Mitigation." Federal Reserve Bank of Cleveland. May 13. https://www.clevelandfed.org/newsroom-and-events/publications/cfed-district-data-briefs/cfddb-20200513-estimates-of-state-and-local-government-revenue-losses-from-pandemic-mitigation.aspx.

Whitaker, Stephan D. 2020b. "How Much Help Do State and Local Governments Need? Updated Estimates of Revenue Losses from Pandemic Mitigation." Federal Reserve Bank of Cleveland. June 29. https://www.clevelandfed.org/newsroom-and-events/publications/cfed-district-data-briefs/cfddb-20200629-updated-estimates-of-revenue-losses-from-pandemic-mitigation.aspx.