ANALYSIS
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Stress-Testing States: COVID-19—A Year Later

INTRODUCTION

In the spring of 2020, Moody's Analytics adapted its state stress-testing methodology in response to the COVID-19 pandemic to estimate the potential for government budget shortfalls that could harm the eventual economic recovery. Through periodic updates over the past year, the picture of state and local government fiscal conditions, blurred at times by the evolving economy and shifting estimates of federal aid, has slowly pulled into focus. With almost a year of hindsight, this paper updates those initial estimates and attempts to explain some of the impacts of the pandemic on the public sector.

Stress-Testing States: COVID-19—A Year Later

BY DAN WHITE, EMILY MANDEL AND COLIN SEITZ

n the spring of 2020, Moody's Analytics adapted its state stress-testing methodology in response to the COVID-19 pandemic to estimate the potential for government budget shortfalls that could harm the eventual economic recovery. Through periodic updates over the past year, the picture of state and local government fiscal conditions, blurred at times by the evolving economy and shifting estimates of federal aid, has slowly pulled into focus. With almost a year of hindsight, this paper updates those initial estimates and attempts to explain some of the impacts of the pandemic on the public sector.

The pandemic recession has posed a number of truly unique challenges to policymakers and state and local budget officials. It has been unique in the breadth of its fiscal impacts, in that effects are set to be felt across more fiscal years than any other downturn in modern history. It has been unique in the distribution of its fiscal impacts, with substantial shortfalls concentrated in less than half of states while others face more manageable levels of stress or even surpluses. It has been unique in the way that budgets are being impacted, with a substantially larger share of overall stress coming via spending pressures than is usual, particularly among social service programs.

Under our updated economic outlook, the pandemic recession is estimated to produce a fiscal shock of approximately $148 billion to state governments between fiscal 2020 and fiscal 2022.[1] When accounting for direct federal aid that has already been enacted and can be used to offset such stress, that number shrinks to a net shortfall of $56 billion, or about 6% of fiscal 2019 state general fund revenues.

Stress-Test Findings

» Thirty-one states have the reserves and federal assistance they need to fully absorb the economic stress of COVID-19.

» Seven states have most of the reserves and federal assistance they need to avoid making substantial budget cuts or tax increases.

» Twelve states would still need to fill budget gaps of 5% or more even after reserves and federal aid. Nine of those states would need to fill gaps of 10% or more.

This represents a significant improvement from our expectations nearly a year ago, when our baseline projections estimated a potential shock of nearly $260 billion, or a net shortfall of about $113 billion after accounting for federal aid over the same time-frame (see Chart 1).[2]

The availability of new detailed federal spending estimates allows us for the first time to take a state-by-state look at true shortfalls net of both available reserves and direct federal aid. Comparing these shortfalls to the funds that states had built up before the pandemic, we estimate that 31 states have the reserves necessary to fully absorb the economic stress of the pandemic recession.

Though the average state fiscal situation is much improved, the distribution around that average has become larger than ever before. At least 12 states are still expected to see cumulative shortfalls of more than 5% of their pre-pandemic general fund budgets, even after accounting for federal aid and reserves.

We see a similar story when trying to estimate the impact on local governments, which due to data limitations unfortunately cannot be gauged on a state-by-state basis. Based upon the updated state shortfall projections, we estimate that the combined level of fiscal shock for states and local governments totals nearly $220 billion from state fiscal 2020-2022. Accounting for direct federal aid that has already been allocated to states and local governments, that number shrinks to a net shortfall of approximately $61 billion.

These estimates should allow policymakers to breathe much easier in comparison to

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1   This represents July 2019 through June 2022 for all states but New York (April to March), Texas (September to August), and Alabama and Michigan (October to September).

2   Dan White, Sarah Crane and Colin Seitz, "Stress-Testing States: COVID-19," Moody's Analytics Regional Financial Review, April 2020.

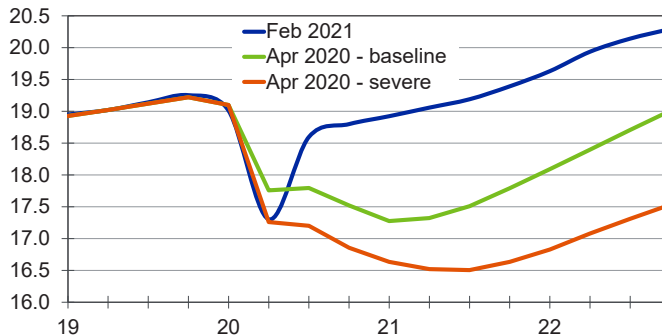## Chart 1: Estimated State Budget Shortfalls

U.S. state shortfalls by forecast vintage, FY2020-FY2022, $ bil
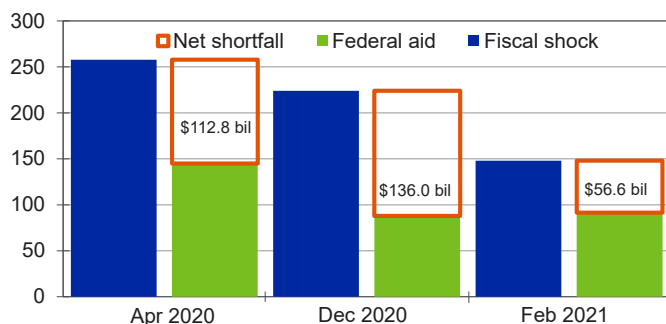
Source: Moody's Analytics

Chart 2: Improved Economic Outlook

U.S. real GDP forecasts by stress-test vintage, $ tril

Sources: BEA, Moody's Analytics

some of the more severe alternative scenarios examined earlier in the year, but also reinforce that some states and local governments are still experiencing significant levels of fiscal stress. Without help, some states and local governments will be forced to make severe spending cuts or tax increases, which will harm their local economies. However, many governments are experiencing much more manageable levels of fiscal stress and require no additional assistance at all.

All of these factors combine to suggest that any additional aid to states and local governments should be smaller and more targeted than what has been proposed to date. This will require some creativity in terms of economic policy to get assistance to those governments that truly need it without sending unnecessary aid to those that do not.

Stress-testing budgets

Moody's Analytics pioneered the concept of stress-testing the public sector in the wake of the Great Recession, and more recently we have taken to releasing annual state stress-testing exercises each fall.[3, 4] At no time have we seen the use of this technique by individual states and local governments prove so vital as during the pandemic.

The mechanics of stress-testing are relatively simple and depend on the use of economic scenarios that are fed through two sets of quantitative models estimating state general fund revenues and spending needs,

with no qualitative overlays applied to the model output.

This results in purely model-driven estimates intended to help measure the potential magnitude of fiscal stress that states will experience, and are not necessarily a direct reflection of a state's ability to weather that level of stress. Furthermore, the projections included in this analysis were performed by Moody's Analytics, not Moody's Investors Service. Therefore, the content of this analysis should not be misconstrued as having any bearing on past, current or future ratings actions. For a more detailed description of the methodology and assumptions behind these projections, please see Appendix B.

What's changed?

Since our first attempt to estimate pandemic-related shortfalls in April 2020, our policy and epidemiological assumptions have been a constantly moving target. In the aggregate, conditions have in many ways improved considerably for states and local governments versus what was first feared at the outset of the pandemic.

Nowhere is this more embodied than in the evolution of our baseline economic forecast (see Chart 2). Much of this is attributable to how little we truly knew about the virus and our ability to combat it at the outset of the pandemic.

A vaccine was rolled out sooner than many ever imagined, incomes proved much more resilient than was first thought possible as we found ways to work around COVID-19, and the federal government plunged truly massive amounts of fiscal stimulus into the breach.

Our assumptions around federal stimulus have made arguably the most significant impacts on the overall trajectory of the forecast. Since the December shortfall estimates were produced, two major infusions of federal aid were added to the forecast (see Chart 3). The first is the relief package passed by Congress and enacted by President Trump at the end of December. The second is a large portion of the stimulus proposed by the Biden administration, which looks increasingly likely to pass now that Democrats find themselves in control of the Senate.

Another major change was the unusual distributional makeup of the downturn and subsequent recovery. Incomes have proven

Chart 3: Record Level of Fiscal Support

Pandemic fiscal support, % of 2019 GDP
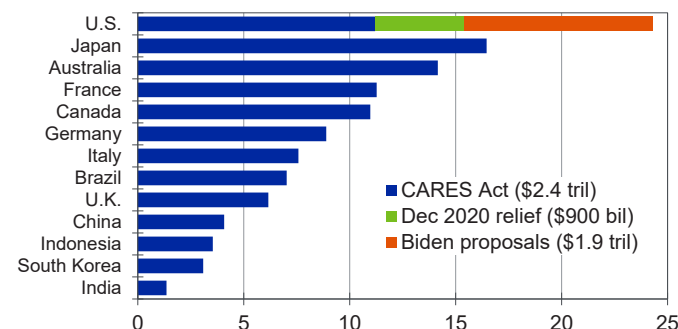
Sources: BEA, Moody's Analytics

3   Dan White, "Stress-Testing State and Local Reserves," Moody's Analytics Regional Financial Review, August 2014.
4   Sarah Crane and Colin Seitz, "Stress-Testing States 2019," Moody's Analytics Regional Financial Review, October 2019.

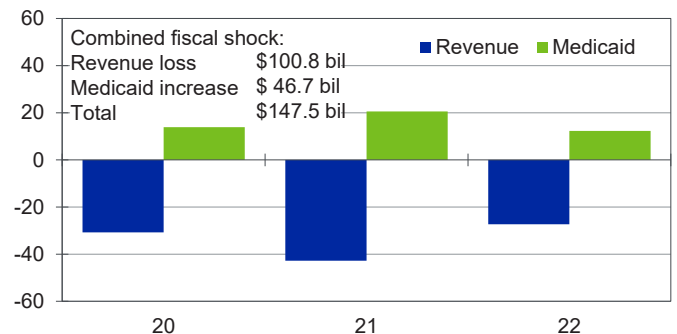## Chart 4: Uneven Recovery Buoying Taxes

Payrolls not yet recovered since Feb 2020 as of Jan 2021, mil
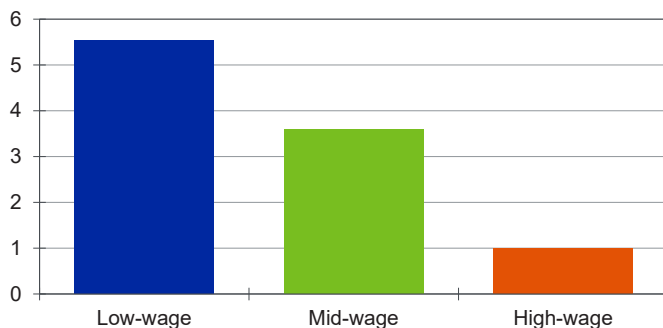
Sources: BLS, Moody's Analytics

Chart 5: State Budget Breakdown

Aggregate state government outlook by state fiscal yr, $ bil

Combined fiscal shock:
Revenue loss $100.8 bil
Medicaid increase $ 46.7 bil
Total $147.5 bil

Source: Moody's Analytics

incredibly resilient during this recession because of the scope of the federal stimulus enacted to date and because high-income earners have been much less impacted than low-income earners. Of the approximately 10 million jobs still missing from before the pandemic, less than a million are missing from what are considered high-wage industries (see Chart 4). For context, during the Great Recession, more than 20% of the jobs lost were in high-wage industries.

Because most taxes are paid by those in the mid- and high-wage tiers, revenue collections have been less impacted in turn. This is most prevalent in the state-by-state revenue results, where some unusual collection patterns have given revenue estimators fits all across the country. In California, for example, where an exceptionally progressive tax structure makes state revenues among the most volatile in the country, general fund revenues fell by about 20% in fiscal 2009 alone during the Great Recession. Our current projections

estimate that the state will see revenues decline by less than half of that amount over a three-year period because of the pandemic, despite California being one of the most highly impacted states in terms of the virus.

Additionally, government revenues have benefited from some advantageously timed tax law changes as well. As businesses have been forced to close their doors, consumer spending has remained markedly resilient as taxpayers shift their purchases online. Given recent changes in tax law, more of those purchases are now subject to state and local sales taxes than at any time before. If the COVID-19 pandemic had occurred even five years earlier than it did, the impacts to state and local sales taxes would have been truly devastating.

Another moving target throughout the year was the amount of federal aid directly available to states and local governments to combat budget shortfalls. Estimates of how much aid could be used for what purpose and

the enactment of new legislation changed our perception of how much aid was truly available and necessary throughout the last year. Even since our last estimate in December, $80 billion in new direct aid was allocated to schools.

It is estimated by the Committee for a Responsible Federal Budget that states and local governments

have received approximately $360 billion in direct aid from the federal government thus far into the pandemic. Though much of that assistance was specifically earmarked for COVID-19-related expenses, we estimate that a significant amount, nearly $160 billion, can still be used to backfill budget shortfalls arising from the weakened economy. This provides a greater offset against some of the fiscal stress thus far inflicted upon states and local governments by the pandemic recession, and results in smaller net budget shortfalls compared with our original forecasts in April 2020.
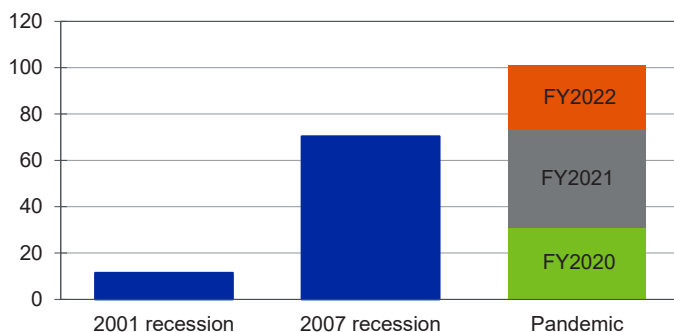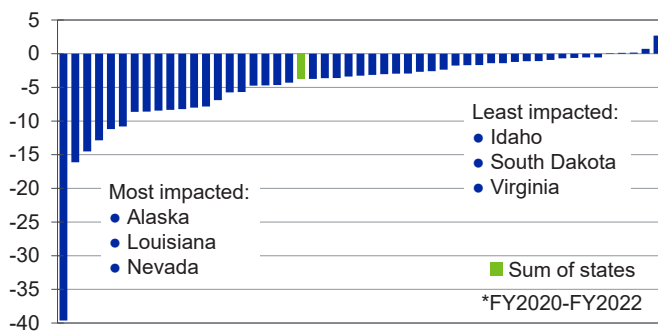
State budgets

Under our updated economic outlook, the pandemic recession is estimated to produce a fiscal shock of approximately $148 billion to state governments between fiscal 2020 and fiscal 2022. About two-thirds of that stress comes via lower tax revenues, while the rest is made up of faster growth in Medicaid spending (see Chart 5).

Tax revenues. The dramatic improvement in the economic forecast, especially for incomes, buoyed state tax revenues much more than was originally expected across most states. This resulted in smaller shortfalls than originally anticipated in most states, but the overall magnitude of the revenue stress is still historic (see Chart 6).

Revenue shortfalls for state governments are now expected to total more than $100 billion across fiscal 2020-2022, with the average state seeing an annualized general fund shortfall of 3.8%.[5] However, the distribution

Chart 6: Revenue Impacts in Context

Aggregate revenue declines, $ bil

Sources: NASBO, Moody's Analytics

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5   This compares with an inflationary baseline. Please see Appendix B for more details on our stress-testing methodology.

Chart 7: Wide Range of Revenue Impacts

Annualized state revenue shortfalls,* % of FY2019 general fund

Least impacted:
- Idaho
- South Dakota
- Virginia

Most impacted:
- Alaska
- Louisiana
- Nevada

■ Sum of states

*FY2020-FY2022

Sources: NASBO, Moody's Analytics

Chart 8: Shortfalls Net of Federal Aid

State shortfalls net of federal aid, % of FY2019 general fund

- No shortfall
- <5%
- 5% to <10%
- ≥10%

Sources: CRFB, Moody's Analytics

Chart 9: Bottom-Line Shortfalls

State shortfalls net of federal aid, reserves, % of FY2019 general fund

- No shortfall
- <5%
- 5% to <10%
- ≥10%

Sources: CRFB, Moody's Analytics

around that average is extraordinarily large, with 18 states seeing an annualized revenue shortfall of less than 2% and six states seeing an annualized shortfall of 10% or more (see Chart 7).

Those states with the largest revenue impacts tend to be those most reliant on tourism and energy. The pandemic has had obvious impacts on demand for oil and natural gas, lowering energy tax collections in the process. Those same travel impacts have also been heavily disruptive to those whose tax bases rely heavily on visitor spending as opposed to locals.

Medicaid spending. The improved economic outlook has had less of an impact on state Medicaid programs because they are more closely tied to employment trends than to incomes. The pandemic recession has thus far proven much more painful from a jobs standpoint than from an income standpoint. While nominal wage and salary income has already recovered to within 1% of its pre-pandemic level, there are still more than 10 million jobs that have yet to be recovered.

The impacts across state Medicaid programs have been more uniform as a result. Unlike tax revenues, all state Medicaid programs see at least some material bump in outlays versus our pre-COVID-19 baseline.[6]

Medicaid spending across all states is projected to be nearly $47 billion higher from fiscal 2020 to fiscal 2022 because of the pandemic. Those programs seeing the largest

uptick in spending are those whose states have a larger concentration of low-wage earners and industries. The number of unemployed workers has been persistent in these industries, especially in leisure/hospitality and retail. What is more, there are a considerable number of workers who have altogether left the workforce and have yet to return, potentially leaving them on Medicaid rolls for an extended period of time.

Shortfalls. The net effect of these two influences is persistent fiscal stress throughout the country. However, that stress is proving much more manageable thanks to resilient incomes and substantial federal assistance.

Gross state budget shortfalls, the aggregate stress from lower revenues and higher social service spending, before accounting for aid or reserve funds are to be found in nearly every state across fiscal 2020 through fiscal 2022. However, after accounting for direct aid to state governments already appropriated by the federal government, that number drops considerably (see Chart 8).

For the purposes of these estimates we relied on the very detailed work published by the Committee for a Responsible Federal Budget. Of the already-appropriated $157 billion of direct aid to states and local governments that can be used to backfill budget
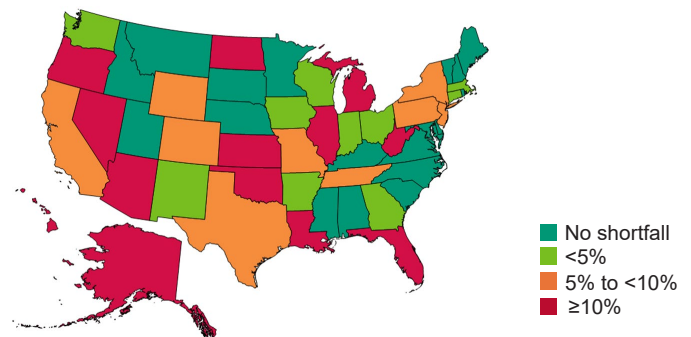
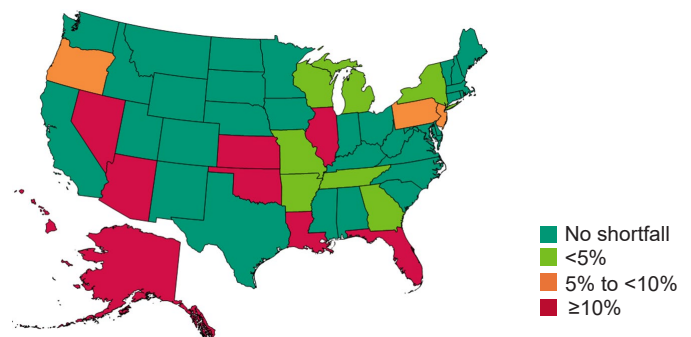shortfalls, approximately $91 billion flows directly to state governments.[7] The CRFB data show a tremendously large variance in the amount of aid that states have received as a share of their general fund budgets. This is based on the underlying formulas baked into the appropriations on how funds were to be allocated.

The number of states with substantial shortfalls shrinks even further when we take into account those that have adequately prepared for an economic downturn by stowing away budget reserves before the pandemic. Including all state reserves lowers the number of state governments with shortfalls over the three-year period in question to 19 (see Chart 9). While it is absolutely true that states can and will rarely choose to liquidate all of their reserves at one time, using up all

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6   Our pre-COVID-19 baseline is determined using a pre-COVID-19 economic forecast. Please see Appendix B for more information on our stress-testing methodology.

7   Direct federal aid to states is compiled by the Committee for a Responsible Federal Budget. The data used in this analysis were downloaded in February 2021. For more information on the methodology used by CRFB, please see www.covidmoneytracker.org.

Table 1: Shortfalls Net of Federal Support

State FY2020-FY2022, $ bil

	State governments	State and local governments
Fiscal shock	147.6	218.4
Enhanced FMAP (FFCRA - March)	84.6	84.6
Education grants (CARES - March)	2.9	15.7
Education grants (RRA - December)	3.9	56.7
Shortfall net of existing federal help	56.2	61.3

Sources: CRFB, Moody's Analytics

of a state's reserves over a three-year period is certainly feasible.

Unfortunately, many of those 19 states still see substantial deficits even after accounting for federal aid and reserve funds. In these states, the actions that will be necessary to bring their budgets back into balance are likely to carry significant economic consequences for their regional economies and taxpayers. More detailed state-by-state estimates can be found in Appendix A.

Local governments

Local government fiscal data are difficult to aggregate with the same level of detail and reliability as state governments. Therefore, we will do our best to estimate the impact of the pandemic recession on local governments in the aggregate as opposed to state by state.

Based on previous studies on the relationship between state and local government shortfalls, we roughly estimate that local governments will experience nearly $70 billion in fiscal shock above and beyond that experienced by states. This brings the total estimate for state and local government fiscal shock from fiscal 2020 through fiscal 2022 to nearly $220 billion (see Table 1). However, accounting for the sizable federal aid that has already been allocated toward local governments, that shrinks to a net shortfall of approximately $61 billion.

This undoubtedly represents a best-case scenario, as it accounts only for fiscal stresses resulting from the weaker pandemic economy and does not account for extra spending pressures outside of social services. For example, it does not include new needs for implementing IT enhancements or facility upgrades to account for social distancing measures or virtual workplaces. It also, outside of Medicaid, does not account for public health spending increases as a result of the pandemic.

With the possible exception of very large cities and counties whose tax structures more closely resemble states, the pain within school districts and local governments in general has thus far been much more concentrated on the expenditure side of the ledger than on the revenue side. Local government services are in as high a demand as ever, and the pandemic is making the delivery of those services much more costly as, depending on the state, so much of the local emergency health response has been put on local jurisdictions. Limited data exist as of yet to properly account for these costs and are outside the scope of this study. However, we do our best to control for those absences by also excluding federal aid that has been appropriated explicitly for those purposes.

Nailing down local government revenue shortfalls is also complicated by how much of their budgets are made up of aid from the federal and state governments. Especially during an economic downturn, states have a history of pushing some of their economic stresses down to the local level, making it difficult to disentangle where the true shortfall lies.

Local governments have in many ways been more adversely affected than state governments thus far into the pandemic, as evidenced by how concentrated job losses have been at the local level. Since last February, state and local governments have shed more than 1.3 million jobs, dropping them to the lowest level of overall employment in nearly two decades (see Chart 10). More than three-quarters of those job losses have been concentrated at the local level, specifically local government education (see Chart 11). This is a direct result of the move to online learning. Without students in the classroom, in-building personnel, especially lower-wage hourly workers, are finding themselves on the outside looking in. This also goes for contractors who employ all manner of workers from
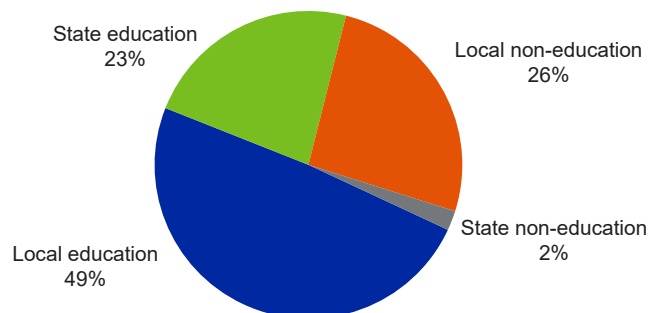
Chart 10: Job Tally Reveals More Stress

State and local government employment, mil

Sources: BLS, Moody's Analytics

Chart 11: Education Jobs Suffering Most

Share of state and local government jobs lost since Feb 2020

State education 23%
Local non-education 26%
State non-education 2%
Local education 49%

Sources: BLS, Moody's Analytics

bus drivers to custodians and other auxiliary jobs as well.

The good news is that bringing students back into the classroom will bring more of these jobs back into the economy. The faster that many of the country's largest school districts are able to accomplish this, the faster we will see state and local government jobs rebound. What is more, school districts tend to rely most heavily on property taxes for revenues, which will mostly be held harmless thanks to low mortgage rates and booming house prices. The obvious exception is more urban districts whose tax bases consist more of commercial real estate than residential. Property taxes will provide a stable and much-needed platform for school boards looking toward next year, as aside from them there will be little certainty.

The tectonic shift in the ways schools have to operate during the pandemic comes with its own funding needs, and it is unclear how much help schools will be able to count on from states, especially in those states with the largest budget shortfalls. This highlights the continued focus on education in the grants and aid that have already come from Washington to help states and local governments.

Bottom line

The results of this analysis ultimately point to a smaller but more targeted approach to helping state and local governments efficiently navigate the fallout of the pandemic than what has thus far been proposed. This perhaps serves as a microcosm of the broader stimulus debates going on among federal policymakers at the moment.

Getting assistance to those governments that truly need it without sending unnecessary aid to those that do not will require some exceptional creativity. While the average state government is experiencing a manageable amount of fiscal stress at the moment, the distribution around that average state is extremely large. Though a number of states are enjoying windfalls thanks to their economic resiliency and unprecedented federal fiscal response, there are still an uncomfortably large number of states facing devastating fiscal decisions during legislative sessions this spring as well as hundreds of local governments in limbo based on those state government decisions.

What is clear from the experience of the pandemic thus far is that aid to the general economy does pay tremendous dividends to state and local government budgets as their tax bases are reinforced. That type of assistance, along with extremely targeted direct help through existing programs such as Medicaid, may be the most efficient way of protecting the economy.

Appendix A

State stress-test results as a % of fiscal 2019 general fund revenues

	Fiscal shock	Shorfall net of federal aid*	Shortfall net of federal aid and reserves**
Louisiana	-54.1%	-38.2%	-34.2%
Nevada	-51.5%	-35.5%	-27.7%
Hawaii	-30.2%	-27.2%	-22.4%
Oklahoma	-42.0%	-28.5%	-16.7%
Alaska	-120.2%	-103.7%	-16.7%
Arizona	-38.2%	-21.9%	-15.6%
Florida	-32.2%	-19.5%	-15.1%
Kansas	-17.5%	-13.7%	-13.7%
Illinois	-18.1%	-12.2%	-12.2%
Oregon	-29.7%	-20.0%	-8.8%
New Jersey	-14.1%	-9.3%	-8.2%
Pennsylvania	-19.5%	-6.6%	-6.5%
New York	-18.0%	-5.8%	-2.9%
Arkansas	-20.2%	-4.6%	-2.4%
Tennessee	-20.6%	-8.2%	-2.3%
Missouri	-29.8%	-8.6%	-1.8%
Michigan	-34.0%	-11.4%	-1.1%
Wisconsin	-13.3%	-4.0%	-0.3%
Georgia	-9.6%	-0.1%	-0.1%
Colorado	-18.2%	-8.0%	0.7%
Sum of states	-16.6%	-6.3%	1.8%
West Virginia	-27.9%	-14.0%	1.8%
North Dakota	-32.0%	-23.3%	2.4%
Rhode Island	-8.2%	2.6%	3.2%
Massachusetts	-12.1%	-4.6%	3.6%
Iowa	-10.9%	-4.8%	4.9%
Ohio	-12.3%	-2.1%	5.9%
Indiana	-14.0%	-2.8%	6.0%
Washington	-8.6%	-0.6%	6.8%
Kentucky	-5.7%	6.2%	7.3%
California	-14.7%	-6.9%	7.4%
South Carolina	-10.0%	2.3%	7.9%
New Hampshire	-26.2%	0.9%	8.0%
Montana	-3.5%	5.7%	8.0%
Virginia	-4.0%	4.8%	8.7%
Texas	-21.0%	-8.4%	9.0%
Delaware	-5.6%	3.9%	9.1%
Maryland	-4.3%	5.5%	10.3%
Minnesota	-9.0%	0.3%	10.9%
Maine	-13.8%	3.2%	11.2%
Connecticut	-8.5%	-0.7%	12.0%
Utah	-3.6%	2.8%	12.0%
Nebraska	-3.3%	6.1%	12.9%
North Carolina	-2.9%	8.9%	14.0%
Alabama	-8.3%	6.3%	15.4%
Mississippi	-5.9%	9.5%	15.4%
New Mexico	-13.2%	-4.7%	18.6%
South Dakota	-1.2%	12.5%	22.6%
Vermont	-16.8%	9.8%	23.7%
Idaho	3.0%	15.3%	25.3%
Wyoming	-25.8%	-10.0%	109.6%

*Direct federal aid to states is compiled by the Committee for a Responsible Federal Budget. The data used in this analysis were downloaded in February 2021. For more information on the methodology used, please see www.covidmoneytracker.org.

**Reserve fund balances are as of the end of fiscal 2019 as published by NASBO. All numbers are shown as a % of fiscal 2019 general fund revenues also published by NASBO. For more information, please see its "Fiscal Survey of the States" report at www.nasbo.org/reports-data/fiscal-survey-of-states.

Sources: CRFB, NASBO, Moody's Analytics

Appendix B – How We Stress-Test State Budgets

Simplifying assumptions

To perform the stress tests, several simplifying assumptions were made. First, state balanced-budget requirements were assumed to hold true. State and local governments, in general, are not permitted to issue long-term debt for operations. There are some practical ways around this, particularly with regard to public pensions and other post-employment benefits, but for the purposes of this exercise, we assume that state spending habits are constrained by the amount of revenue collected.

Second, the levers used to stress state budgets are limited to changes in general fund revenues and Medicaid spending. As revenues decline during a recession, subnational governments have less to spend, even as there is more demand for government services. To avoid having to drastically cut spending or raise taxes, governments would need to hold in reserve at least enough funds to make up for declines in revenue and meet higher demands for services. These services obviously extend beyond Medicaid. Funding demands for other general fund programs would also increase, along with programs that typically fall outside the state general fund such as unemployment insurance. However, these programs pale in comparison with the scope of Medicaid in terms of their state general fund impact. Therefore, the recessionary effects estimated on the spending side of the ledger in this exercise should be considered a lower bound. More precise spending effects could be estimated by individual states, both for social service programs and discretionary needs such as education, by injecting more detailed spending data into the process.

Third, because the current Moody's Analytics baseline already includes a near-term economic contraction from the effects of COVID-19, it proved inadequate for true stress-testing purposes. As a result, the alternative forecasts in this paper will be compared with a more optimistic pre-COVID-19 scenario from the beginning of March. This scenario is akin to what most states would have relied on as a baseline prior to the more serious travel and business disruptions put in place over the past few weeks.

As in our previous stress-testing exercises, alternative scenarios for revenues will be judged compared with the underlying rate of inflation. Though state policymakers may have originally included more revenue growth in their budget projections, it is more realistic to compare changes in revenue with the previous year's figures plus inflation as opposed to a potentially optimistic or inconsistent baseline revenue forecast. This gives us a true measure of how much funding would be necessary to strictly maintain current levels of real spending and avoid disruptive fiscal corrections during and after a recession.

Modeling methods

General fund revenues were forecast using the Moody's Analytics proprietary state revenue models. These models rely on ordinary least squares regression techniques to tie underlying forecasts for major economic variables to future changes in state revenues. The regressions are based on historical general fund revenue data reported by the National Association of State Budget Officers in its semiannual "Fiscal Survey of the States" publications and attempt to control for past legislative tax changes, which can distort historical revenue data during economic downturns. These forecasts are prepared using an individual regression equation for each state, allowing the use of specific economic drivers custom-tailored to each state's specific tax and industrial structure.

Spending needs were forecast using the Moody's Analytics proprietary Medicaid models. This is accomplished through OLS regression techniques tying forecasts for measures of underlying economic growth, specifically the number of unemployed people in the economy, to future levels of Medicaid enrollment. Enrollment forecasts are married to costs per enrollee to develop a full estimate of future state Medicaid spending needs. Costs-per-enrollee forecasts are taken from the Centers for Medicare & Medicaid Services annual "Actuarial Report on the Financial Outlook for Medicaid," and individual state costs are assumed to maintain their current relationship to the national average throughout the forecast.

The Medicaid projections assume a current law baseline, meaning that no new states are assumed to expand their Medicaid programs during the forecast period. Similarly, the forecasts included in this analysis do not explicitly account for the enhanced FMAP provisions recently enacted as part of the Families First Coronavirus Response Act.

More information

More information regarding the theory and practice of stress-testing public sector entities can be found in the following two papers:

» Dan White, "Stress-Testing State and Local Reserves," Moody's Analytics Regional Financial Review, July 2014.

» Sarah Crane and Colin Seitz, "Stress-Testing States 2019," Moody's Analytics Regional Financial Review, October 2019.

About the Authors

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Before joining Moody's Analytics, Dan worked as a financial economist for the State of New Mexico, where he forecast revenues and analyzed a wide range of policy issues concentrated around economic development, public investment and debt management. Dan holds an MA in economics as well as undergraduate degrees in finance and international business from New Mexico State University.

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Colin's most recent research focused on developing a quality of life indicator for metropolitan areas. Using data from a variety of sources focused on economy and well-being, he created estimates of quality of life across nearly all the metropolitan areas in the U.S. Colin has also done research on trade in Latin America. He has a bachelor's degree in economics from Haverford College.

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