

**To:** Luke Teater and Meredith Moon, Governor’s Office of State Planning and Budgeting  
**From:** Jen Janson, The Pew Charitable Trusts  
**Date:** August 20, 2021  
**Subject:** Budget stress testing

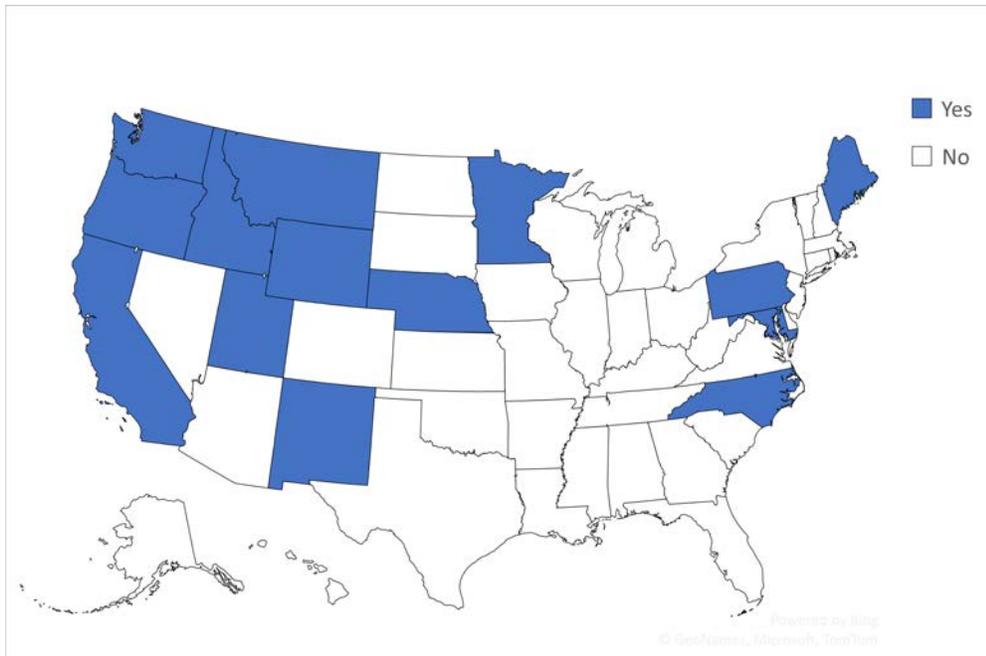
Budget stress tests, which forecast how budget conditions would change under multiple scenarios, are a proven tool for states to identify how much risk they face from adverse events such as economic downturns. These analyses have been produced by budget office staff, legislative fiscal staff, or state economists in more than a dozen states.

At your request, this memo discusses how states can implement budget stress tests effectively. It includes:

- A discussion of key methodological decisions
- A description of how states use stress tests to inform policy
- An inventory of stress tests produced by state governments

We’re happy to provide additional Colorado-specific analysis on this topic or others at your request.

## States that stress test their budget



Source: Pew analysis of publicly available state documents as of July 2021



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## Key methodological decisions

### What scenarios to use

Stress test analyses are shaped by the scenarios states choose to study. States should select plausible scenarios that will illustrate how the budget picture would change under a range of conditions.

To do so, some states use national economic scenarios published by economic modeling firms such as Moody's Analytics, IHS Markit, and S&P Global. But states often can learn more when they customize the scenarios to their unique economy and budget. Customization became more common during the pandemic, due to the atypical risks state budget faced. For example, to provide early data on how Covid-19 might affect state revenue, Pennsylvania's analyzed the effects of different lengths of business closures.

More recently, New Mexico's latest stress test estimates the impact of potential Biden administration policies on oil and gas leasing on federal lands. The analysis shows that these policies will play an outsized role in New Mexico budget situation—a 20% decline in oil and gas production would translate to a loss of \$1.2 billion in general fund revenue over five years. A good rule of thumb is to analyze national economic downturn scenarios such as the moderate and severe recession scenarios, such as Maine's stress test, while also identifying state-specific risk factors that are worthy of analysis.

Another innovation from the pandemic is the incorporation of scenarios that were more optimistic than the baseline. Early in the pandemic, a recession scenario effectively became the new baseline, as state revenue collections dropped precipitously. Furthermore, economic uncertainty reached unprecedented levels. States such as Oregon responded by routinely incorporating optimistic and pessimistic scenarios into revenue forecasts (in addition to baseline forecasts). For example, the state's May 2021 revenue forecast included a double dip recession scenario and an optimistic scenario in which "underlying strength in income and consumer spending propel the economy to full health by early 2022."

While not measures of "stress" per se, incorporating optimistic scenarios offers policymakers a more complete picture of possible budget outcomes. It allows them to plan ahead for potential surpluses and make decisions such as how much money should be deposited in reserves or go to increasing or restoring spending. In retrospect, if more states had analyzed optimistic scenarios early in the pandemic, policymakers may have been more prepared for unexpectedly strong tax collections in the second half of 2020 and into 2021.

Regardless of what scenarios they use, analysts should estimate the probability of the scenarios. Montana is one state that has done that. The state's 2018 stress test estimates the frequency of different size shortfalls, ranging from smaller ones that are likely to occur every eight years and much larger ones that are likely to occur every 40 years. The value of these estimates is that they can inform how policymakers use the results. If a shortfall will occur every eight years, policymakers might seriously consider putting enough in reserve to fully close the gap. But they may be willing to rely on less desirable budget balancing options to close shortfalls that will occur far less frequently.



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## Whether to incorporate analysis of the state’s structural budget position

The end product from stress tests varies in subtle but important ways. Some states focus on isolating the impact of the scenario under consideration—essentially asking “how much would this scenario increase or decrease revenue collections and increase or decrease spending?” Utah’s stress test uses this approach. Fiscal analysts calculate the “total value at risk” under economic downturn scenarios, which economists define as “the potential budget gap that could occur on account of declines in state revenue and increases in costs for counter-cyclical government services.”

Other states seek to calculate overall revenue and spending under the scenarios, taking into account both the state’s baseline position (e.g. a structural budget deficit) and the effects of the scenarios. In essence, these states are asking “how large would our total budget shortfall or surplus be each year under the scenarios?”

The California Legislative Analyst Office (LAO)’s November 2020 stress test used this approach. The analysis showed that the state faced a structural deficit in the current year, with ongoing revenue short of ongoing spending. In their primary forecast, LAO projected that revenue would grow by less than 1% per year, while spending would grow by 4.4 per year—causing the structural deficit to grow each year. But the forecast of revenue growth was just a rough estimate—as LAO noted, the economy faced unprecedented uncertainty. With that in mind, they also forecast revenue under a range of scenarios. This analysis showed that because of the growing structural shortfall by FY 2024 revenue would match spending only under highly optimistic scenarios, making budget gaps likely absent policy changes. Under pessimistic scenarios, the analysis showed, California could plausibly face annual budget gaps of \$50 billion or more.

There are advantages to both Utah’s approach and California’s approach. Utah’s approach of isolating potential cyclical shortfalls can help inform state officials’ plans for closing the gap. States should respond differently to budget shortfalls caused by temporary factors than those caused by structural deficits. If a state’s budget challenges are the result of a downturn or other temporary event, states can safely rely on reserves and one-time maneuvers to close the gap. In contrast, structural problems ultimately require higher revenue or reduced spending; temporary maneuvers will only delay the problem and perhaps make it more severe. Once a state has isolated the gap that a downturn or other adverse event might cause—as Utah does—policymakers can then identify reserves and one-time maneuvers to employ to deal with the potential shortfalls.

But there’s also value in analyzing the full budget picture, as in the California approach. The states that have the hardest time coping with cyclical challenges are often those that face structural problems too. Often, they’ve used up reserves and temporary maneuvers to balance their budgets routinely, leaving few good options during downturns. For example, both Illinois and New Jersey borrowed billions of dollars to pay for operating expenses early in the pandemic, in part because they held little or nothing in reserves. With that in mind, focusing purely on cyclical shortfalls risks understating the degree of budget stress downturn scenarios would cause, especially for states (such as California) with substantial structural deficits.



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A related strength of California’s analysis is that it avoids the mistake of assuming that simply because revenue is increasing, the state won’t face a budget shortfall. Even if revenue increases, if spending demands increase faster policymakers will face a hole they need to fill. To prepare for this possibility, states should use a current services baseline when forecasting potential shortfalls, accounting for inflation and growth in enrollment for programs such as education and Medicaid. Colorado is well-positioned to perform this analysis because the state’s annual “fiscal outlook” includes forecasts for spending growth.

Ideally, stress tests would combine both approaches—isolating the effects of temporary scenarios, while placing these effects in the context of the state’s structural position. But states may have practical reasons for preferring one approach or the other initially—revenue forecasters can add downturn scenarios to their projections relatively quickly, for instance, but calculating a state’s structural budget position is potentially a more complex undertaking. At a minimum, analysts should make clear which approach they’re using and what that means for how policymakers should interpret and use their findings.

### What revenue streams or spending categories to analyze

States also must decide what revenue streams and spending categories to analyze. In general, economic downturns have bigger effects on revenue than spending. Because of that—and because some stress tests are conducted as part of revenue forecasting processes—many states, including Maine, Maryland, and Minnesota apply their stress test scenarios to revenue only. In their stress tests, these states often still account for expected spending increases from inflation, population growth, or caseload growth—they simply don’t adjust those forecast spending increases based on the scenarios. For example, they may assume that Medicaid costs will grow at a typical rate (and take those increases into account when calculating budget shortfalls), but not raise the rate of Medicaid spending growth in a recession scenario to account for the higher enrollment growth that usually accompanies downturns.

However, estimating the effects of scenarios on spending offers more comprehensive data on the effects of downturns—focusing on revenue alone tends to understate the challenges policymakers will face. For example, a 2018 Moody’s Analytics report estimated that a moderate recession would cost the 50 states \$75 billion in tax revenue, while leading to a \$17 billion increase in Medicaid spending (for Colorado the figures were \$1 billion and \$479 million, respectively). And, while Medicaid is the most obvious program for which costs increase during periods of stress, it is not the only one. For example, Utah’s stress test also analyzes countercyclical spending increases in higher education (because people who can’t find good jobs may pursue additional schooling) and public employee pensions (because weaker investment returns may increase actuarially recommended contributions).

### What time period to study

Stress tests also vary in the periods of analysis they consider. States should look out multiple years to capture the full fiscal effects of adverse scenarios. Maine’s stress test illustrates this point. Their November 2020 analysis found that a moderate recession would cause individual income and sales tax revenue to fall below baseline forecasts for three years, while a severe recession would lead revenue to



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fall below their forecasts for their entire five year period of analysis. As a result, if Maine didn't extend their analysis to five years, they would be missing some of the effects of a severe recession—and the state would appear more prepared than it actually is.

## How states use stress test to inform policy

The primary reason to conduct stress tests is to provide information to help policymakers prepare for downturns and other adverse events. To make these preparations, states can use stress tests in several ways.

### Setting savings targets

Minnesota uses its stress test to set savings targets. Each year, executive branch economists analyze the level of reserves necessary to offer 95% confidence that the reserves could offset a biennial deficit caused by revenue volatility. The state's rainy day fund deposit rule links directly to this analysis: When the state experiences a budget surplus, up to a third of the extra money is deposited in the fund until the reserve target is reached. Due in part to this policy, in FY 2020 Minnesota reached its reserve target of \$2.3 billion. By tying the amount of savings to the size of budget shortfalls the state is likely to face under adverse scenarios, states are less likely to be forced to make harmful, disruptive cuts to services or tax increases during periods of budget stress. This approach is major improvement over the flat savings goals of roughly five or 10% of revenue or expenditures that states have historically used.

### Designing a budget balancing toolkit

The results of budget stress tests can also help states determine what other options may be necessary to close budget gaps under adverse scenarios. Utah is one state that uses its stress test in this way, by developing a budget balancing "fiscal toolkit." The toolkit includes seven categories, including revenue increases, spending cuts, and various types of reserves and budget maneuvers. These categories are ranked by the order the state would likely use them, based on statutory or constitutional rules and political preferences. Within each category, the state has inventoried specific budget balancing options and tied them to specific dollar figures—identifying how much in savings or additional revenue they would offer. By combining the stress test and the toolkit, Utah officials can estimate how large budget gaps are likely to be under adverse scenarios and which budget balancing options they would need to employ to close the gap in each scenario.

To close the FY 2020 budget gap caused by the pandemic, Utah used ideas outlined in the toolkit. For example, lawmakers gave state agencies flexibility to use money left over from FY 2019 to pay for FY 2020 expenses. Likewise, they authorized the state to borrow to pay for infrastructure projects that the state otherwise would have paid for in cash, freeing up dollars to redirect elsewhere in the budget. As a result, they were able to avoid options that policymakers had deemed less desirable, including revenue increases and rainy day fund withdrawals.

## Informing long-term budget planning

Stress testing can also complement long-term budget projections to inform a range of budget decisions. For example, as we’ve noted in previous memos, as policymakers decide how to spend billions of dollars in flexible federal aid from the American Rescue Plan Act (ARPA), they would benefit from data and analysis of what their budgets will look like after the money expires. This information can help policymakers make key decisions, such as how much ARPA funding to dedicate one-time spending versus ongoing expenses.

Of course, it’s hard to predict how a state’s budget and economy will change four years from now and beyond. This is where stress tests can help. By analyzing a range of scenarios and assessing the probability of these scenarios, states can estimate how likely they are to confront a deficit or surplus after ARPA expires.

These analyses could use typical stress testing scenarios such as economic downturns. But, in keeping with the approaches states have employed since the pandemic began, they could also use customized scenarios that reflect key economic and policy questions in the years ahead. Just as New Mexico’s most recent stress test focused heavily on federal oil and gas leasing policies, Colorado could identify which budget pressures and uncertainties present the greatest risk to the state’s budget and analyze scenarios around those. The state could also build Colorado-specific considerations such as TABOR’s revenue limits into this analysis. In doing so, Colorado could make better-informed budget decisions today, while preparing for future downturns and other fiscal challenges.

## Stress test inventory

State	Who performs analysis?	Is test required by law?	Period of analysis
<a href="#">California</a>	Legislative Analyst's Office	No	5 fiscal years
<a href="#">Idaho</a>	Division of Financial Management	No	5 years
<a href="#">Maine</a>	Consensus Economic Forecasting Commission/ Revenue Forecasting Committee	<a href="#">Yes</a>	5 fiscal years
<a href="#">Maryland</a>	Bureau of Revenue Estimates	No	3 fiscal years



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<a href="#">Minnesota</a>	Management and Budget	No	During first FY of biennium, current FY and next. During second year of a biennium, current FY and next two.
<a href="#">Montana</a>	Legislative Fiscal Division	No	Varies
Nebraska	Legislative Fiscal Analyst	<a href="#">Yes</a>	Not yet available
<a href="#">New Mexico</a>	Consensus Revenue Estimating Group	No	3 fiscal years
North Carolina	Office of State Budget and Management	<a href="#">Yes</a>	2 years
<a href="#">Oregon</a>	Office of Economic Analysis	No	10 fiscal years
<a href="#">Pennsylvania</a>	Independent Fiscal Office	No	Projected impact FY 19-20; preview estimate FY 20-21
<a href="#">Utah</a>	Legislative Fiscal Analyst	<a href="#">Yes</a>	5 years
<a href="#">Washington</a>	Economic and Revenue Forecast Council	<a href="#">Yes</a>	6 years
<a href="#">Wyoming</a>	Consensus Revenue Estimating Group	No	3 fiscal years

Source: Pew analysis of publicly available state documents as of July 2021