

ANALYSIS

Stress-Testing States 2018

Prepared by

Dan White
Daniel.White@moodys.com
Director

Todd Metcalfe
Todd.Metcalfe@moodys.com
Economist

Sarah Crane
Sarah.Crane@moodys.com
Economist

Contact Us

Email
help@economy.com
U.S./Canada
+1.866.275.3266
EMEA
+44.20.7772.5454 (London)
+420.224.222.929 (Prague)
Asia/Pacific
+852.3551.3077
All Others
+1.610.235.5299
Web
www.economy.com
www.moodyanalytics.com

Introduction

It has been almost a decade since the Great Recession, and many are rightfully beginning to look ahead to the next economic downturn. Recessions and their place in the business cycle are an accepted fact of life in any organization, especially government. Therefore, preparing for recessions is an equally inescapable concept, with potentially devastating consequences for those who treat it as an afterthought. To help state governments better prepare themselves for the next recession, Moody's Analytics has taken to performing annual stress tests on their budgets. This paper will serve as an update to our 2017 state stress-testing exercise, estimating the amount of fiscal stress likely to be applied to state budgets under different recession scenarios and comparing that stress to the amount of money states have set aside in reserve. This year's exercise also expands the scope of stress-testing by including a look at how economic stress translates to public pensions.

Stress-Testing States 2018

BY DAN WHITE, TODD METCALFE AND SARAH CRANE

It has been almost a decade since the Great Recession, and many are rightfully beginning to look ahead to the next economic downturn. Recessions and their place in the business cycle are an accepted fact of life in any organization, especially government. Therefore, preparing for recessions is an equally inescapable concept, with potentially devastating consequences for those who treat it as an afterthought. To help state governments better prepare themselves for the next recession, Moody's Analytics has taken to performing annual stress tests on their budgets. This paper will serve as an update to our 2017 state stress-testing exercise, estimating the amount of fiscal stress likely to be applied to state budgets under different recession scenarios and comparing that stress to the amount of money states have set aside in reserve. This year's exercise also expands the scope of stress-testing by including a look at how economic stress translates to public pensions.

Though this paper has a specific focus on states, most of the findings could apply just as easily to cities, counties, and other local governments. Focusing on states, though, is key because their budgets not only experience some of the largest changes during a business cycle, but also because local government fiscal conditions depend in large part on the amount of aid and support they receive from states.

The overall results of the 2018 exercise relative to a year ago are unmistakably positive. State governments as a whole have never been more prepared for a downturn; 23 have the amount of cash on hand they would need to weather a moderate recession without having to raise taxes or cut spending. However, the gap between the haves and have-nots has widened, with 17 states now significantly unprepared for even a small downturn. This will result in some painful decision-making in those states in the next few years and will undoubtedly hold certain states back in terms of economic performance relative to their peers.

This time really was different

To put the results of our 2018 stress tests into context, it is helpful to look back at ex-

Stress-Test Findings

- » 23 states have the funds they need for the next recession
- » 10 states have most of the funds they need for the next recession
- » 17 states have significantly fewer funds than they need for the next recession

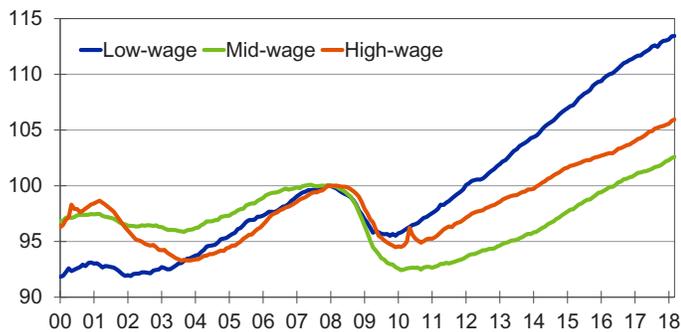
actly what happens to state budgets when they go through a recession. Breaking down the mechanics of a state budget during an economic downturn is a relatively simple process. As the economy worsens, demand for services goes up while revenue collections used to pay for those services fall. What makes state and local governments unique in relation to the federal government is that their budgets are ultimately a zero-sum game. Unlike the federal government, municipal governments have no explicit way of issuing debt to pay for operations. Therefore, their decisions are much more constrained during a downturn and are often limited to those focused on immediate survival as opposed to economic policy.

No example is more instructive to that end than the Great Recession, which stands out for its singular impact on state budgets even when controlling for its historic severity. Almost every state was forced to take extraordinary fiscal action by raising revenues or cutting spending during and after the Great Recession. Many did both. In the five fiscal years immediately following the start of the Great Recession, state and local governments shed almost 750,000 workers. Though this undoubtedly cut waste and increased efficiency in many governments across the country, it also was a painful and disruptive change to many parts of the economy. The loss of so many mid-wage jobs over so short a time is a big reason that the Great Recession was followed by the not-so-great recovery (see Chart 1). Research shows that extraordinary fiscal actions can harm regional and national economic recoveries, differentiating performance relative to that of neighbors.¹ Even a decade later, despite a national unemployment rate of less than 4%, state and local government payrolls have not

¹ Dan White, "A Tale of Two Recessions: The Influence of State Fiscal Actions on Regional Recoveries," Moody's Analytics Regional Financial Review (October 2011).

Chart 1: The Jobs Difference

Employment, Dec 2007=100



Sources: BLS, Moody's Analytics

recovered to prerecession levels, plateauing around 260,000 jobs below the previous peak. On a per capita basis, there are actually fewer state and local government employees today than at any time since the late 1980s. It is clear that this time really was different, but how?

In previous research we identified three important lessons states need to have learned coming out of the Great Recession.

Lesson 1: Recessions affect both revenues and spending.

The most recognizable sign of a recession for most observers is a decline in tax revenue collections. However, it is not necessarily the first state budget indicator to set off recession alarm bells.

For evidence, look back to the summer of 2008. State fiscal conditions were extremely healthy in most cases, and states were still hiring workers. Indeed, state government

some were even giving rebates to taxpayers from what they thought were large surpluses. Though the recession had been in full swing for the better part of a year, many did not realize that something was genuinely wrong until the financial crisis hit a fever pitch that September with the collapse of Lehman Bros.

Meanwhile, there was at least one person in nearly every state who knew, or should have known, that we had entered a recession far earlier: the state Medicaid director. State Medicaid enrollment jumped significantly beginning in the first half of 2008 as the number of unemployed Americans began to rise in earnest (see Chart 2). To those looking for the signs, this indicated that things were not all right in the world of state fiscal policy almost a full nine months before state taxes began their first year-over-year declines. Increased Medicaid spending was more of a problem for states during the Great Reces-

employment did not peak nationally until August of that year, despite the fact that the Great Recession was already in its ninth month. At the outset of fiscal 2009, beginning in July 2008 for most states, many legislatures were enacting large budget increases, and

sion than during previous downturns because that spending has consistently grown at a much faster rate than the revenues that states use to fund the program (see Chart 3). By regularly outpacing revenues, the zero-sum nature of state budgets has made Medicaid a much larger portion of total state spending over time. Therefore, an increase of a few percentage points from one year to the next has a much larger impact on overall budget flexibility than it has in the past.

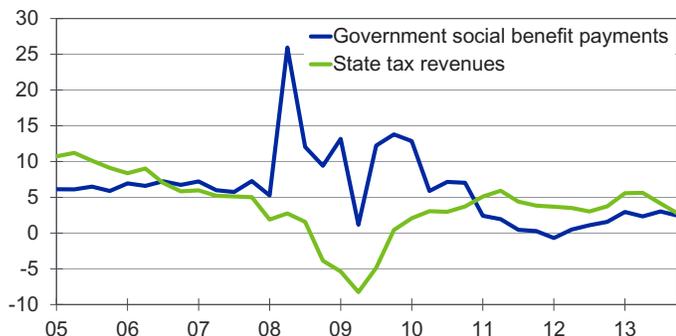
Lesson 2: Recessions affect revenues differently than they used to.

Although Medicaid will play a larger role in state budgets throughout the business cycle, the lion's share of recessionary state fiscal effects will still come by way of decreased tax revenues. However, the degree to which that revenue will decline because of a recession is not always as clear-cut as it might seem. The underlying relationship between state tax revenues and the economy has changed considerably, and tax revenues have become much more sensitive to fluctuations in the business cycle (see Chart 4).² As an example of the gradual impact that changes in state tax policy have had, before the 2001 recession, combined U.S. state tax revenues had never experienced an outright year-over-year decline. Such growing volatility is primarily the result of two long-term trends in state tax policy.

² Dan White, "Falling Behind: State Tax Revenues and the Economy," Moody's Analytics Regional Financial Review (October 2013).

Chart 2: Revenues and Spending

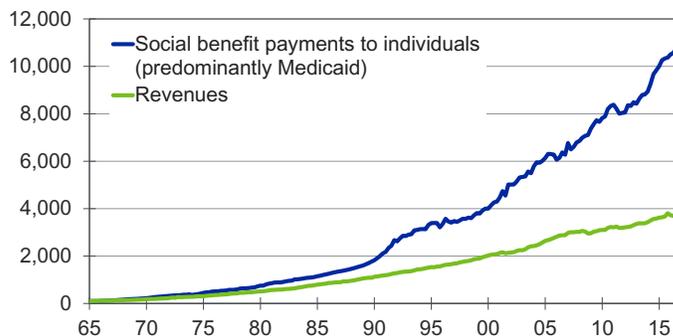
% change yr ago



Sources: BEA, Moody's Analytics

Chart 3: Unsustainable Medicaid Path

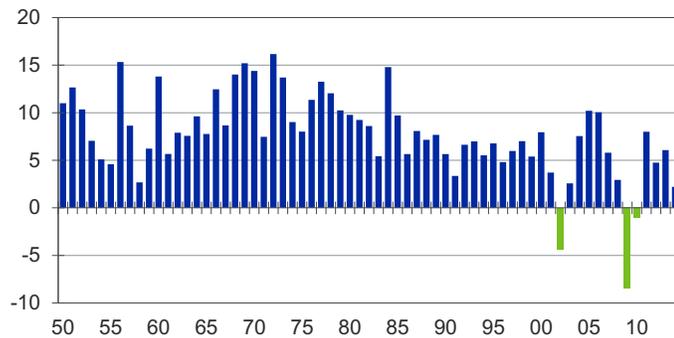
State and local governments, 1965Q1=100



Sources: BEA, Moody's Analytics

Chart 4: Revenues Are Stressing More

State tax revenue, % change



Sources: Census Bureau, Moody's Analytics

First, states are relying more heavily on increasingly progressive personal income tax structures. Personal income tax revenues are much more volatile than sales taxes because they are linked explicitly to personal income and not personal consumption, which proves much more stable over time. What is more, as part of more explicit tax reforms taking place largely over the past two decades, states have exacerbated that volatility by moving to more progressive personal income tax structures targeting their highest earners. More volatility is often an unintended side effect of that progressivity. By states putting more of their eggs in one basket, tax bases have become more dependent on a smaller number of taxpayers with extremely volatile incomes, manifesting higher highs and lower lows for tax collections.

The second reason that state revenues have grown more volatile relates to distortions introduced through the growing use of economically targeted tax incentives. These incentives can generate faster economic growth but can also mean that some of the fastest growing pieces of an economy are growing tax-free. Additionally, these incentives are often not tracked closely. This decouples tax collections from underlying measures of economic growth and can make life extremely difficult for economists and revenue estimators trying to project revenue collections.

Lesson 3: Preparedness is key.

Past performance is not always a good indicator of future success or, in this case,

with the best available information. Though the risk of forecast error can never be eliminated, it can be mitigated through proper preparation and flexibility. This preparation can provide a government the fiscal resilience to help its economy thrive when others are struggling. If state policymakers are constantly in emergency mode, moving from one crisis to the next, they will have neither the time nor resources to focus on the longer-term investments necessary to help their economies outcompete. These include investments in education, infrastructure and energy policies that help to keep a state ahead of the curve as it relates to the 21st century economy. Without such investment, states can fall behind in terms of competitiveness.

One characteristic of the financial crisis that stands out most was the degree to which state and local governments were generally underprepared for any downturn, let alone one the size of the Great Recession. This lack of preparation left some policymakers budgeting without a net at the absolute worst time and has prevented them from being more proactive with their policy decisions even a decade later.

At the start of fiscal 2008 the median rainy-day fund balance of states was approximately 5% of general fund expenditures, which proved wholly inadequate to offset the full brunt of the Great Recession. It should be noted that total state balances were higher, at just more than 8% of general fund expenditures, giving those states with adequate financial flexibility a

failure. Even under the best of circumstances the most seasoned professional forecaster will not be able to consistently and routinely predict the precise timing and severity of every oncoming recession. Nevertheless, policymakers must make major decisions

marginally higher line of defense against the recession. However, many states had no such flexibility, which limited their ability to react outside of budget cuts and tax hikes. What is more, some of those states that did have sizable reserves had trouble using them because of vagaries about what the fund balances were intended for. In these instances, policy debates about the true intention of the reserves were often lengthy enough to delay the use of funds until economic and fiscal conditions had worsened considerably.

To properly prepare for the next recession, it is vital for states to formulate specifically targeted reserve levels with intentionally crafted policy goals in mind. A well-crafted reserve policy, fiscal flexibility, and careful planning are still the best ways to protect a state's budget and economy in times of economic distress. This, of course, raises one additional question: How much should a state put away in its rainy-day reserve to truly be prepared?

There is not always an easy answer. Planning for the next recession involves the difficult balancing act of putting away enough money to avoid having to make a major fiscal correction without stunting the pace of economic growth by underfunding investments in important public programs and services.

The tool that can make that balancing act more manageable is stress-testing.

Stress-testing

In the wake of the Great Recession, the private sector has become acutely aware of the necessity of planning for economic downturns. Indeed, the U.S. government and financial regulators in some cases have moved to require the private sector, specifically banks, to publicly stress-test for a rainy day. These same principles can be redirected to government with the aim of protecting budgets and the economy.

Moody's Analytics pioneered the concept of stress-testing the public sector several years ago, after our first study found that a typical state would need a dedicated rainy-day reserve fund of approximately 8.5% of general fund revenues to survive one year of recessionary effects without cutting spend-

ing or raising revenues.³ However, the outcome of that paper was limited by the fact that it modeled the effects of a hypothetical recession on state governments as a whole to determine the outcome for an "average" state over one year.

Subsequent research and the experience of Moody's Analytics working with individual states and local governments have highlighted the fact that the "average" state does not exist, and that a wide degree of variation can exist from one to another, especially in terms of revenue impacts. Also, a recession typically affects state budgets for at least two years. To address those variations, in 2017 Moody's Analytics performed a full fiscal stress test on all 50 states individually over two fiscal years for a more accurate representation of their potential recessionary needs. This paper provides an update to those stress tests and expands the scope slightly to include a look at how economic stress translates to public pensions as well.

The mechanics of stress-testing are relatively simple and depend on the use of alternative economic scenarios. As part of its monthly forecasting process, Moody's Analytics generates 10 alternative economic scenarios to accompany the U.S. and regional baseline forecasts. These scenarios are designed to capture the most pressing forecast risks facing the economy today, varying widely from an oil price shock all the way to another major recession. These monthly scenarios are estimated at the national, state and metro-area level, and custom scenarios can be generated at the county level, giving policymakers the ability to stress-test fiscal assumptions with increasing granularity.

For this year's exercise we again selected two recession scenarios, one moderate and one severe, to give us as broad a range of downside options as possible. Before describing these scenarios, it should be made clear that Moody's Analytics does not project a recession to begin this year in its baseline forecast. Though another recession is inevitable, the odds of it beginning within the current fiscal year are low. Nevertheless, each of the

recession scenarios used in this stress test are assumed to begin almost immediately. The moderate recession scenario is roughly in line with what economists would characterize as a "normal" recession, if such a thing exists, while the severe scenario would be more in line with the losses experienced during the

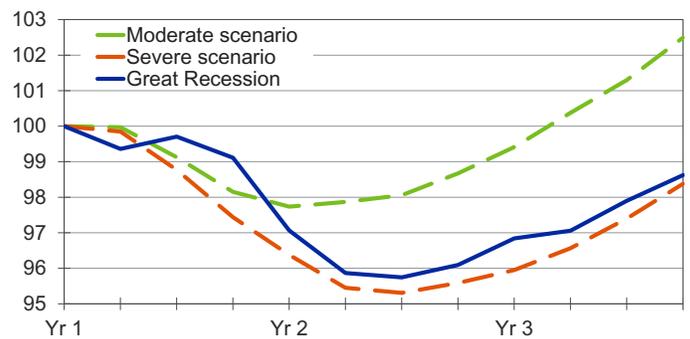
Great Recession (see Chart 5). To perform the stress tests, we had to make certain simplifying assumptions.

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 were 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 services

Chart 5: Alternative Scenarios

U.S. Real GDP, prerecession peak=100



Sources: BEA, Moody's Analytics

programs and discretionary needs such as education, by injecting more detailed spending data into the process.

Third, pension contributions are stressed as part of this exercise, but they are not included in the final measure of fiscal shock for purposes of determining a state's overall preparedness. They are excluded from the fiscal shock measure because pension contributions are not strictly mandatory in the same sense as Medicaid. States can, and often do, forgo making full contributions to their pension funds during times of economic stress. However, following last year's stress-testing exercise, significant interest about the potential impact on public pensions convinced us that their inclusion as an add-on to this exercise was important. What is more, not fully funding pension contributions is a dangerous practice that can lead to out-of-control unfunded pension and other post-employment liabilities and has been an important contributor to many of the country's worst fiscal situations.

Fourth, the baselines with which these alternative estimates are compared differ slightly from our previous work. In 2017, Medicaid spending was compared with its dynamic baseline forecast. However, because the Moody's Analytics baseline in 2018 already includes a significant slowdown in economic growth toward the end of the two-year stress-testing window, it proved inadequate for true stress-testing purposes. As a result, the alternative forecasts for Medicaid and pensions in this paper will be compared with the "optimistic"

³ Dan White, "Stress-Testing State and Local Reserves," Moody's Analytics Regional Financial Review (August 2014).

Moody's Analytics scenario. The "optimistic" scenario assumes stable economic growth through the entire two-year stress-testing window, putting it more in line with the 2017 baseline used for comparison purposes and making it a more effective baseline to judge overall levels of fiscal stress. As in 2017, alternative scenarios for revenues will be judged compared with the underlying rate of inflation. However, the forecast for inflation over the next two years has increased from 2017. Instead of a flat 2% forecast, prices are expected to increase at a rate of 2.4% in 2019 and 2.6% in 2020, respectively. All else being equal, this produces marginally more stress in terms of state revenues compared with 2017. Though state policymakers may have originally included more revenue growth in their fiscal 2019 and fiscal 2020 budgets, 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 funds would be necessary to strictly avoid disruptive fiscal corrections during and after a recession.

General fund revenues were forecast using 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 Moody's Analytics proprietary Medicaid models.⁴ This is accomplished through OLS regression techniques tying forecasts for

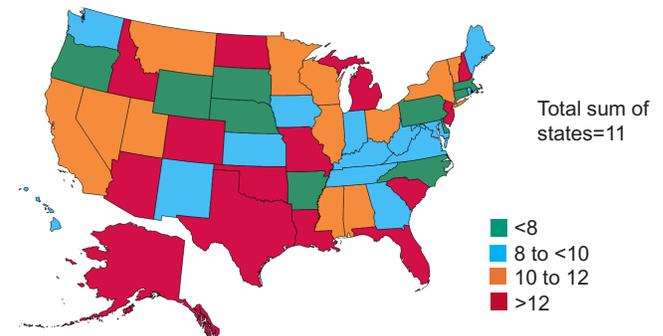
measures of underlying economic growth, specifically the number of unemployed people in the economy, to future levels of Medicaid enrollment. Those enrollment numbers are then augmented by estimates from the Centers for Medicaid & Medicare Services as to the number of additional people expected to enroll in Medicaid for noneconomic reasons associated with the Affordable Care Act. As part of the ACA, 32 states have voluntarily expanded their Medicaid programs to include new enrollees funded in large part by the federal government. The Medicaid model assumes a current law baseline as of September 2018, meaning that no new states are assumed to expand their Medicaid programs during the forecast period. Last, 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 CMS *Annual Actuarial Report on the Future of Medicaid*, and individual state costs are assumed to maintain their current relationship to the national average throughout the forecast.

Measuring fiscal shock

The results of our 2018 state stress tests reveal that a typical state would need to have approximately 11% of its general fund revenues put into a reserve fund to weather the next recession without having to raise taxes or cut spending. To weather an even larger downturn, akin to the Great Recession, a typical state would need almost 18% (see Tables 1 and 2). This is only a marginally larger shock than last year, owing to higher inflation expectations over the forecast period relative to a year ago. Because revenue shocks are measured versus the expected rate of inflation, the size of the shock should have increased slightly all else being equal. Other than this factor, the level of shock

Chart 6: All States Affected Differently

Fiscal shock from moderate recession, % of est. 2018 revenues



Sources: National Assn. of State Budget Officers, Moody's Analytics

expected to arise from the next downturn has remained relatively unchanged from one year to the next.

The makeup of the fiscal shock is relatively unchanged as well. About 80% of the fiscal shock that states would experience under a moderate recession would come by way of lower general fund revenues. The remaining 20% would be a result of higher mandatory spending needs. Each state's tax and industrial structure again provides for a relatively wide distribution of revenue shocks across the country. This underlines the need for individual states and local governments to stress-test themselves internally based on the most readily available data. A one-size-fits-all, cookie-cutter approach is not possible.

The biggest extreme this year was once again Alaska, which, owing in large part to its reliance on energy prices for tax revenue, has the largest potential fiscal shock, at more than 46% of its budget during a moderate recession (see Chart 6). In general, those states relying the least on commodities and very progressive income taxes saw the least amount of potential revenue stress. Differentiation among states can also be seen as a result of their economic profiles. Both Pennsylvania and Florida, for example, have relatively stable tax structures. Pennsylvania has a flat personal income tax rate structure, and Florida collects no personal income tax. However, the level of potential fiscal shock in Florida is much larger than in Pennsylvania because of its high reliance on tourism and housing versus Pennsylvania's reliance on

⁴ Dan White and Michael Brisson, "Moody's Analytics State Medicaid Forecast Model," Moody's Analytics Regional Financial Review (June 2015).

Table 1: Stress-Test Results - Moderate Recession Scenario

	Tax revenue shortfall		Medicaid spending increase		Combined fiscal shock	
	%	\$ mil	%	\$ mil	%	\$ mil
Sum of states	-9.0%	\$(75,057.40)	2.1%	\$17,492.11	-11.1%	\$(92,549.51)
Alabama	-9.5%	\$(801.82)	2.0%	\$172.17	-11.6%	\$(973.98)
Alaska	-45.6%	\$(1,065.61)	0.7%	\$17.29	-46.3%	\$(1,082.91)
Arizona	-10.9%	\$(1,062.51)	2.2%	\$210.55	-13.1%	\$(1,273.05)
Arkansas	-6.3%	\$(342.55)	1.3%	\$69.29	-7.6%	\$(411.84)
California	-8.9%	\$(11,319.31)	2.5%	\$3,159.27	-11.4%	\$(14,478.59)
Colorado	-8.9%	\$(1,028.79)	4.1%	\$479.26	-13.0%	\$(1,508.04)
Connecticut	-6.3%	\$(1,168.64)	0.9%	\$165.62	-7.2%	\$(1,334.26)
Delaware	-6.0%	\$(253.44)	1.3%	\$55.25	-7.3%	\$(308.69)
Florida	-9.1%	\$(2,905.20)	4.0%	\$1,265.08	-13.1%	\$(4,170.28)
Georgia	-9.0%	\$(2,145.84)	0.9%	\$210.57	-9.9%	\$(2,356.41)
Hawaii	-8.9%	\$(666.38)	1.1%	\$78.86	-9.9%	\$(745.24)
Idaho	-12.5%	\$(453.27)	1.6%	\$59.37	-14.2%	\$(512.64)
Illinois	-9.3%	\$(3,350.62)	2.0%	\$731.61	-11.4%	\$(4,082.22)
Indiana	-6.8%	\$(1,059.77)	2.0%	\$305.00	-8.7%	\$(1,364.78)
Iowa	-7.6%	\$(549.88)	1.6%	\$112.74	-9.1%	\$(662.63)
Kansas	-8.3%	\$(562.83)	1.5%	\$104.45	-9.8%	\$(667.28)
Kentucky	-7.2%	\$(778.29)	1.6%	\$174.53	-8.8%	\$(952.82)
Louisiana	-20.4%	\$(1,954.35)	1.3%	\$128.47	-21.7%	\$(2,082.82)
Maine	-7.7%	\$(271.15)	2.2%	\$78.49	-10.0%	\$(349.64)
Maryland	-7.1%	\$(1,212.29)	1.6%	\$280.74	-8.8%	\$(1,493.03)
Massachusetts	-5.7%	\$(2,441.00)	1.1%	\$487.22	-6.8%	\$(2,928.22)
Michigan	-10.8%	\$(1,054.72)	4.7%	\$458.14	-15.4%	\$(1,512.86)
Minnesota	-8.7%	\$(1,891.00)	2.1%	\$457.81	-10.8%	\$(2,348.81)
Mississippi	-9.1%	\$(508.73)	1.3%	\$70.72	-10.3%	\$(579.46)
Missouri	-9.6%	\$(886.47)	4.3%	\$394.49	-13.9%	\$(1,280.96)
Montana	-11.1%	\$(255.42)	0.6%	\$13.96	-11.7%	\$(269.38)
Nebraska	-6.4%	\$(286.07)	1.3%	\$57.87	-7.6%	\$(343.94)
Nevada	-9.2%	\$(360.90)	2.0%	\$78.24	-11.2%	\$(439.13)
New Hampshire	-8.7%	\$(132.74)	3.6%	\$54.85	-12.3%	\$(187.59)
New Jersey	-11.9%	\$(4,174.24)	0.9%	\$323.73	-12.8%	\$(4,497.98)
New Mexico	-7.6%	\$(482.25)	0.8%	\$48.76	-8.4%	\$(531.00)
New York	-10.2%	\$(7,301.52)	1.8%	\$1,263.31	-12.0%	\$(8,564.83)
North Carolina	-5.1%	\$(1,170.64)	2.0%	\$473.47	-7.1%	\$(1,644.11)
North Dakota	-22.0%	\$(392.31)	1.0%	\$17.15	-23.0%	\$(409.46)
Ohio	-7.5%	\$(2,406.44)	4.4%	\$1,434.01	-11.9%	\$(3,840.45)
Oklahoma	-15.2%	\$(992.05)	2.8%	\$182.96	-18.1%	\$(1,175.02)
Oregon	-5.1%	\$(496.68)	2.3%	\$218.97	-7.4%	\$(715.65)
Pennsylvania	-5.4%	\$(1,892.19)	1.9%	\$658.60	-7.3%	\$(2,550.79)
Rhode Island	-6.5%	\$(251.03)	1.8%	\$67.51	-8.3%	\$(318.54)
South Carolina	-11.3%	\$(899.38)	2.4%	\$192.67	-13.7%	\$(1,092.05)
South Dakota	-5.6%	\$(87.23)	1.6%	\$24.79	-7.1%	\$(112.01)
Tennessee	-6.6%	\$(940.20)	2.3%	\$328.51	-8.9%	\$(1,268.72)
Texas	-12.9%	\$(7,065.61)	1.5%	\$814.90	-14.4%	\$(7,880.51)
Utah	-9.9%	\$(663.71)	1.9%	\$124.78	-11.7%	\$(788.49)
Vermont	-9.2%	\$(144.90)	2.6%	\$40.70	-11.8%	\$(185.60)
Virginia	-7.4%	\$(1,507.15)	2.5%	\$511.89	-10.0%	\$(2,019.03)
Washington	-7.4%	\$(1,581.26)	1.6%	\$346.12	-9.0%	\$(1,927.39)
West Virginia	-6.8%	\$(289.23)	1.2%	\$50.00	-8.0%	\$(339.22)
Wisconsin	-9.2%	\$(1,485.51)	2.6%	\$415.13	-11.8%	\$(1,900.64)
Wyoming	-5.7%	\$(64.28)	2.0%	\$22.24	-7.7%	\$(86.52)

Source: Moody's Analytics

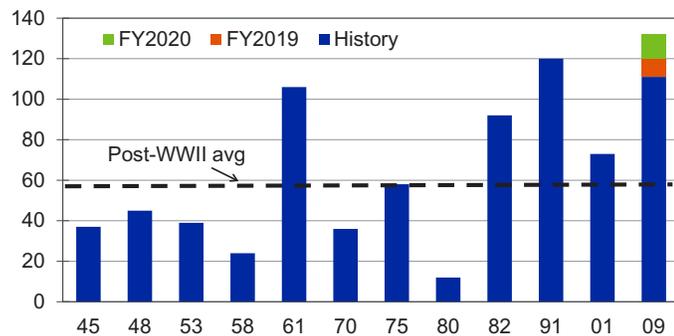
Table 2: Stress-Test Results - Severe Recession Scenario

	Tax revenue shortfall		Medicaid spending increase		Combined fiscal shock	
	%	\$ mil	%	\$ mil	%	\$ mil
Sum of states	-15.0%	\$(125,874.77)	2.8%	\$23,245.80	-17.8%	\$(149,120.57)
Alabama	-14.6%	\$(1,232.82)	2.7%	\$226.16	-17.3%	\$(1,458.98)
Alaska	-64.0%	\$(1,495.51)	1.0%	\$24.42	-65.0%	\$(1,519.94)
Arizona	-16.1%	\$(1,563.36)	2.9%	\$282.86	-19.0%	\$(1,846.22)
Arkansas	-7.7%	\$(417.28)	1.8%	\$96.91	-9.4%	\$(514.19)
California	-15.1%	\$(19,268.30)	3.3%	\$4,199.17	-18.4%	\$(23,467.48)
Colorado	-15.7%	\$(1,822.04)	5.3%	\$618.97	-21.0%	\$(2,441.01)
Connecticut	-12.0%	\$(2,224.71)	1.2%	\$227.93	-13.3%	\$(2,452.64)
Delaware	-12.6%	\$(534.99)	1.7%	\$74.13	-14.4%	\$(609.12)
Florida	-16.6%	\$(5,277.78)	5.1%	\$1,629.68	-21.7%	\$(6,907.45)
Georgia	-14.8%	\$(3,511.69)	1.2%	\$285.07	-16.0%	\$(3,796.77)
Hawaii	-14.7%	\$(1,100.33)	1.4%	\$104.10	-16.0%	\$(1,204.43)
Idaho	-20.7%	\$(747.16)	2.2%	\$79.21	-22.9%	\$(826.38)
Illinois	-16.2%	\$(5,805.01)	2.7%	\$976.79	-18.9%	\$(6,781.80)
Indiana	-13.6%	\$(2,126.58)	2.5%	\$398.04	-16.1%	\$(2,524.62)
Iowa	-13.6%	\$(987.58)	2.1%	\$152.00	-15.7%	\$(1,139.59)
Kansas	-14.9%	\$(1,018.21)	2.0%	\$139.63	-17.0%	\$(1,157.85)
Kentucky	-13.3%	\$(1,436.71)	2.1%	\$232.68	-15.4%	\$(1,669.39)
Louisiana	-31.8%	\$(3,049.96)	1.8%	\$175.58	-33.6%	\$(3,225.54)
Maine	-12.6%	\$(441.26)	3.1%	\$107.07	-15.6%	\$(548.33)
Maryland	-11.9%	\$(2,038.14)	2.2%	\$380.58	-14.2%	\$(2,418.73)
Massachusetts	-10.7%	\$(4,591.13)	1.5%	\$655.85	-12.2%	\$(5,246.97)
Michigan	-16.2%	\$(1,588.11)	6.1%	\$599.87	-22.3%	\$(2,187.99)
Minnesota	-14.6%	\$(3,185.15)	2.7%	\$596.99	-17.4%	\$(3,782.14)
Mississippi	-13.8%	\$(771.41)	1.7%	\$97.26	-15.5%	\$(868.67)
Missouri	-16.2%	\$(1,488.21)	5.7%	\$522.94	-21.9%	\$(2,011.15)
Montana	-17.7%	\$(405.50)	0.9%	\$19.63	-18.5%	\$(425.13)
Nebraska	-11.5%	\$(516.35)	1.7%	\$78.47	-13.2%	\$(594.82)
Nevada	-16.7%	\$(655.48)	2.7%	\$103.80	-19.4%	\$(759.28)
New Hampshire	-14.1%	\$(214.70)	4.9%	\$73.92	-19.0%	\$(288.62)
New Jersey	-16.9%	\$(5,951.46)	1.2%	\$436.95	-18.1%	\$(6,388.41)
New Mexico	-12.6%	\$(797.50)	1.1%	\$67.50	-13.7%	\$(865.00)
New York	-14.7%	\$(10,519.43)	2.4%	\$1,716.06	-17.1%	\$(12,235.49)
North Carolina	-9.6%	\$(2,226.98)	2.7%	\$615.49	-12.3%	\$(2,842.47)
North Dakota	-32.3%	\$(575.72)	1.4%	\$24.05	-33.7%	\$(599.77)
Ohio	-14.6%	\$(4,704.49)	5.9%	\$1,893.33	-20.4%	\$(6,597.82)
Oklahoma	-21.4%	\$(1,394.60)	3.7%	\$242.34	-25.1%	\$(1,636.95)
Oregon	-11.7%	\$(1,133.01)	3.0%	\$287.65	-14.7%	\$(1,420.66)
Pennsylvania	-10.5%	\$(3,660.93)	2.6%	\$897.36	-13.1%	\$(4,558.29)
Rhode Island	-10.8%	\$(415.04)	2.4%	\$91.42	-13.1%	\$(506.45)
South Carolina	-17.2%	\$(1,364.26)	3.2%	\$252.77	-20.3%	\$(1,617.03)
South Dakota	-9.6%	\$(150.23)	2.1%	\$33.12	-11.7%	\$(183.35)
Tennessee	-12.1%	\$(1,735.78)	3.0%	\$433.33	-15.2%	\$(2,169.11)
Texas	-21.5%	\$(11,759.14)	2.0%	\$1,099.05	-23.6%	\$(12,858.18)
Utah	-15.5%	\$(1,043.20)	2.4%	\$159.26	-17.9%	\$(1,202.46)
Vermont	-13.4%	\$(211.12)	3.5%	\$54.79	-16.9%	\$(265.91)
Virginia	-12.0%	\$(2,435.52)	3.4%	\$679.19	-15.4%	\$(3,114.71)
Washington	-14.4%	\$(3,087.96)	2.1%	\$459.82	-16.5%	\$(3,547.78)
West Virginia	-14.8%	\$(625.41)	1.6%	\$68.06	-16.4%	\$(693.47)
Wisconsin	-14.7%	\$(2,375.15)	3.4%	\$544.95	-18.1%	\$(2,920.10)
Wyoming	-17.2%	\$(192.39)	2.6%	\$29.57	-19.8%	\$(221.97)

Source: Moody's Analytics

Chart 7: Pushing the Envelope

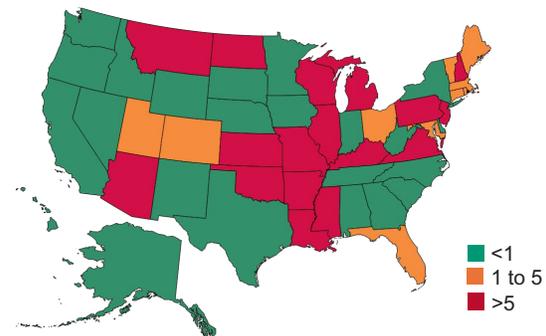
Duration of business cycle expansion, mo, state fiscal yr



Sources: NBER, Moody's Analytics

Chart 8: More States Ready for Recession

Difference between actual and necessary total balances, pts



Sources: National Assn. of State Budget Officers, Moody's Analytics

the more noncyclical industries of healthcare and education.

Variations in state fiscal stress from higher Medicaid spending were also significant, though some general patterns did again emerge similar to those observed in 2017. The simulated Medicaid shock to states was again less than generally experienced during the Great Recession at least in part because of changes stemming from the Affordable Care Act. As of the publishing of this paper, 32 states and the District of Columbia had opted in to the Medicaid expansion provisions of the ACA. By taking on these additional enrollees, these states have increased their long-term liabilities, and as a result Medicaid will continue to make up an even larger share of their general fund budgets. However, an interesting side effect of these increased liabilities is less volatility as it relates to the business cycle.

Because a larger proportion of their populations are already enrolled in Medicaid, states have fewer citizens left over to be caught up in the ebb and flow of enrollment changes from the business cycle. This is evident when comparing the forecasts for states that have opted into the Medicaid expansion and those that have not. Opt-in states are likely to see baseline Medicaid spending grow faster over the long run, but they also see less volatility during changes in the business cycle. This will keep Medicaid growing as a share of overall state spending for the foreseeable future but also keep recessionary shocks muted compared with the Great Recession.

Measuring preparedness

With the amount of potential fiscal shock remaining relatively unchanged from last year's stress-testing exercise, the real question to be answered by the 2018 update is: Are states any more prepared than they were a year ago? A year on from last year's exercise the U.S. economy is nearing a high note (see Chart 7). The national unemployment rate is at a 20-year low, and GDP is growing at its fastest pace in years. The bad news is that this means we are likely one year closer to the next recession. The Moody's Analytics baseline forecast puts the highest odds of the next recession in mid-2020, which would have the biggest impact on most states' fiscal 2021 budgets. The fiscal 2021 budget season is not all that far away, and for some biennial states is already here, making recession preparations all the more urgent.

Fortunately, this year's exercise was not all doom and gloom. The overall results of this test relative to 2017 were unmistakably positive, but like all good economic stories there is always some bad news to go with the good.

First the good. State governments as a whole are much better prepared for a recession in 2018 than they were in 2008. Indeed, overall state balances have risen to all-time highs, meaning that states are better prepared than ever for a downturn. A full 23 states are within 1 percentage point of the reserves they need to weather a moderate recession this fiscal year (see Tables 3 and 4). That represents marked improvement from a year ago, when only 16 states were prepared

for a moderate downturn. Leading the way once again are commodity states Wyoming, Alaska and West Virginia, which are used to budgeting under uncertain circumstances (see Chart 8). What was most encouraging, however, was the improvement of several states not traditionally dependent on commodities, including South Carolina, Iowa and especially California, which has almost doubled its preparedness level from last year.

The bad news is that this improvement is not uniform. While the number of states fully prepared for a moderate recession has increased from 2017, so has the number of states that are significantly unprepared. At least 17 are more than 5 percentage points away from the reserves they need to survive even a moderate recession, up from 15 in 2017. What is worse, the difference between the states that are fully prepared and those that are not is growing wider. Of the approximately \$78 billion in total balances that states were estimated to have on hand at the end of fiscal 2018, more than \$60 billion, or 77%, were concentrated in those top 23 states. Some among those least-prepared would need to either raise taxes or cut spending by upward of 10% of their entire budget if a recession were to impact their state this fiscal year. Such a necessity would carry major economic implications for their respective recoveries, likely creating enough fiscal drag to cause those state economies to underperform for some time. The typical state will emerge from the next recession with a fiscal drag of as much as 0.25% of gross state product, but Chart 9

Table 3: State Preparedness - Moderate Recession Scenario*% of estimated fiscal 2018 revenues*

	Rainy-day balances*	Total balances*	Fiscal shock moderate recession	Rainy-day surplus/shortfall**	Total surplus/shortfall**
Wyoming	137.2%	137.2%	-7.7%	129.5%	129.5%
Alaska	101.0%	101.0%	-46.3%	54.6%	54.6%
West Virginia	17.0%	23.8%	-8.0%	9.0%	15.8%
Oregon	9.7%	16.8%	-7.4%	2.3%	9.4%
Hawaii	4.3%	17.7%	-9.9%	-5.7%	7.7%
Delaware	5.5%	12.8%	-7.3%	-1.8%	5.5%
Washington	6.3%	14.1%	-9.0%	-2.6%	5.2%
Texas	19.2%	19.4%	-14.4%	4.7%	5.0%
Nebraska	7.4%	10.7%	-7.6%	-0.3%	3.1%
North Carolina	7.9%	10.1%	-7.1%	0.8%	3.0%
South Dakota	10.1%	10.1%	-7.1%	2.9%	2.9%
Idaho	10.9%	16.8%	-14.2%	-3.3%	2.6%
Indiana	9.2%	11.0%	-8.7%	0.4%	2.3%
New Mexico	9.8%	9.8%	-8.4%	1.4%	1.4%
Nevada	4.3%	12.4%	-11.2%	-6.9%	1.2%
New York	2.5%	12.8%	-12.0%	-9.5%	0.8%
Georgia	9.7%	10.4%	-9.9%	-0.2%	0.5%
Alabama	9.4%	11.7%	-11.6%	-2.2%	0.1%
South Carolina	6.4%	13.6%	-13.7%	-7.3%	-0.1%
Tennessee	5.6%	8.7%	-8.9%	-3.3%	-0.2%
Minnesota	9.2%	10.6%	-10.8%	-1.6%	-0.2%
Iowa	8.6%	8.7%	-9.1%	-0.5%	-0.5%
California	9.9%	10.8%	-11.4%	-1.5%	-0.6%
Sum of states	6.7%	9.3%	-11.1%	-4.3%	-1.7%
Maine	6.0%	8.2%	-10.0%	-4.0%	-1.8%
Connecticut	4.7%	4.7%	-7.2%	-2.5%	-2.5%
Maryland	5.0%	6.2%	-8.8%	-3.7%	-2.5%
Colorado	10.1%	10.1%	-13.0%	-2.9%	-2.9%
Rhode Island	5.1%	5.1%	-8.3%	-3.2%	-3.2%
Utah	7.6%	8.4%	-11.7%	-4.2%	-3.3%
Massachusetts	3.2%	3.4%	-6.8%	-3.6%	-3.5%
Vermont	7.9%	7.9%	-11.8%	-3.8%	-3.8%
Ohio	6.3%	7.9%	-11.9%	-5.6%	-4.0%
Florida	4.5%	8.8%	-13.1%	-8.7%	-4.4%
Arkansas	2.3%	2.3%	-7.6%	-5.2%	-5.2%
Michigan	9.1%	10.2%	-15.4%	-6.4%	-5.3%
Mississippi	4.9%	4.9%	-10.3%	-5.4%	-5.4%
New Hampshire	6.6%	6.6%	-12.3%	-5.8%	-5.7%
Kansas	0.0%	3.9%	-9.8%	-9.8%	-5.9%
Wisconsin	1.8%	5.2%	-11.8%	-10.0%	-6.6%
Pennsylvania	0.0%	0.1%	-7.3%	-7.3%	-7.2%
Illinois	0.0%	3.8%	-11.4%	-11.3%	-7.6%
Arizona	4.8%	5.2%	-13.1%	-8.3%	-7.9%
Missouri	3.3%	6.0%	-13.9%	-10.6%	-8.0%
Virginia	1.4%	1.4%	-10.0%	-8.6%	-8.5%
Kentucky	0.1%	0.1%	-8.8%	-8.7%	-8.7%
Montana	0.0%	2.5%	-11.7%	-11.7%	-9.2%
New Jersey	0.0%	2.1%	-12.8%	-12.8%	-10.7%
North Dakota	4.1%	7.9%	-23.0%	-18.9%	-15.1%
Oklahoma	1.4%	2.7%	-18.1%	-16.6%	-15.3%
Louisiana	3.3%	6.1%	-21.7%	-18.4%	-15.6%

* Rainy-day and total balances are estimated as of the end of fiscal 2018 by NASBO members. All numbers are shown as a % of fiscal 2018 general fund revenues also estimated by NASBO members.

** The estimated shortfalls refer to the amount of fiscal shock that would not be covered by actual reserves under a moderate recession scenario. A negative percentage means a state would not be able to make up for the entire fiscal shock associated with a moderate recession.

Source: Moody's Analytics

Table 4: State Preparedness - Severe Recession Scenario

% of estimated fiscal 2018 revenues

	Rainy-day balances*	Total balances*	Fiscal shock moderate recession	Rainy-day surplus/shortfall**	Total surplus/shortfall**
Wyoming	137.2%	137.2%	-19.8%	117.4%	117.4%
Alaska	101.0%	101.0%	-65.0%	35.9%	35.9%
West Virginia	17.0%	23.8%	-16.4%	0.6%	7.4%
Oregon	9.7%	16.8%	-14.7%	-5.0%	2.1%
Hawaii	4.3%	17.7%	-16.0%	-11.8%	1.6%
Delaware	5.5%	12.8%	-14.4%	-8.9%	-1.6%
South Dakota	10.1%	10.1%	-11.7%	-1.6%	-1.6%
North Carolina	7.9%	10.1%	-12.3%	-4.3%	-2.2%
Washington	6.3%	14.1%	-16.5%	-10.2%	-2.4%
Nebraska	7.4%	10.7%	-13.2%	-5.8%	-2.5%
New Mexico	9.8%	9.8%	-13.7%	-3.9%	-3.9%
Texas	19.2%	19.4%	-23.6%	-4.4%	-4.1%
New York	2.5%	12.8%	-17.1%	-14.6%	-4.3%
Indiana	9.2%	11.0%	-16.1%	-7.0%	-5.1%
Georgia	9.7%	10.4%	-16.0%	-6.3%	-5.6%
Alabama	9.4%	11.7%	-17.3%	-8.0%	-5.7%
Idaho	10.9%	16.8%	-22.9%	-12.0%	-6.0%
Tennessee	5.6%	8.7%	-15.2%	-9.6%	-6.5%
South Carolina	6.4%	13.6%	-20.3%	-13.9%	-6.7%
Minnesota	9.2%	10.6%	-17.4%	-8.2%	-6.8%
Nevada	4.3%	12.4%	-19.4%	-15.1%	-7.0%
Iowa	8.6%	8.7%	-15.7%	-7.1%	-7.1%
Arkansas	2.3%	2.3%	-9.4%	-7.1%	-7.1%
Maine	6.0%	8.2%	-15.6%	-9.6%	-7.5%
California	9.9%	10.8%	-18.4%	-8.5%	-7.6%
Maryland	5.0%	6.2%	-14.2%	-9.1%	-7.9%
Rhode Island	5.1%	5.1%	-13.1%	-8.1%	-8.1%
Sum of states	6.7%	9.3%	-17.8%	-11.1%	-8.5%
Connecticut	4.7%	4.7%	-13.3%	-8.5%	-8.5%
Massachusetts	3.2%	3.4%	-12.2%	-9.0%	-8.8%
Vermont	7.9%	7.9%	-16.9%	-8.9%	-8.9%
Utah	7.6%	8.4%	-17.9%	-10.4%	-9.5%
Mississippi	4.9%	4.9%	-15.5%	-10.6%	-10.6%
Colorado	10.1%	10.1%	-21.0%	-11.0%	-11.0%
Michigan	9.1%	10.2%	-22.3%	-13.3%	-12.2%
New Hampshire	6.6%	6.6%	-19.0%	-12.4%	-12.3%
Ohio	6.3%	7.9%	-20.4%	-14.1%	-12.6%
Wisconsin	1.8%	5.2%	-18.1%	-16.3%	-12.9%
Florida	4.5%	8.8%	-21.7%	-17.3%	-13.0%
Pennsylvania	0.0%	0.1%	-13.1%	-13.1%	-13.0%
Kansas	0.0%	3.9%	-17.0%	-17.0%	-13.1%
Arizona	4.8%	5.2%	-19.0%	-14.2%	-13.8%
Virginia	1.4%	1.4%	-15.4%	-14.0%	-14.0%
Illinois	0.0%	3.8%	-18.9%	-18.9%	-15.1%
Kentucky	0.1%	0.1%	-15.4%	-15.3%	-15.3%
Missouri	3.3%	6.0%	-21.9%	-18.6%	-15.9%
Montana	0.0%	2.5%	-18.5%	-18.5%	-16.0%
New Jersey	0.0%	2.1%	-18.1%	-18.1%	-16.1%
Oklahoma	1.4%	2.7%	-25.1%	-23.7%	-22.4%
North Dakota	4.1%	7.9%	-33.7%	-29.6%	-25.8%
Louisiana	3.3%	6.1%	-33.6%	-30.3%	-27.5%

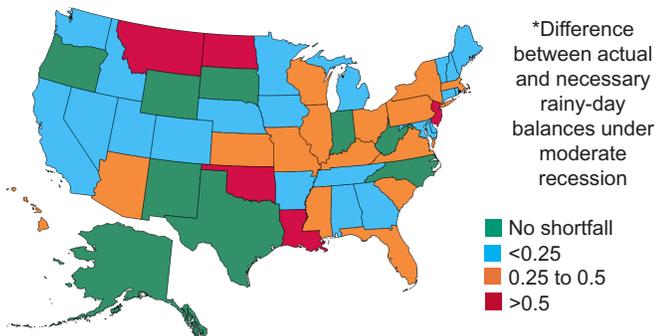
* Rainy-day and total balances are estimated as of the end of fiscal 2018 by NASBO members. All numbers are shown as a % of fiscal 2018 general fund revenues also estimated by NASBO members.

** The estimated shortfalls refer to the amount of fiscal shock that would not be covered by actual reserves under a moderate recession scenario. A negative percentage means a state would not be able to make up for the entire fiscal shock associated with a moderate recession.

Source: Moody's Analytics

Chart 9: Material Economic Implications

Rainy-day fund shortfall* as a % of GSP



Sources: BEA, National Assn. of State Budget Officers, Moody's Analytics

shows that some individual states may face substantially more.

Beyond preparedness

Before jumping too quickly to conclusions about certain states, it is important to qualify some of these results to provide the clearest picture possible of state preparedness levels. Though there are clearly some standouts, both good and bad, in these results, many of the laggards are not in nearly as bad a shape as these numbers might lead one to believe. Similarly, some of the top performers are not nearly as well off as they might seem by looking strictly at these results.

At the bottom of the list, several natural resources states stand out as curiosities, given that they have traditionally been among the best prepared for a downturn. However, it is important to remember that not every state is simultaneously in the same part of the business cycle. North Dakota, for example, has historically been a standout for its levels of preparedness, especially following the historic oil boom that took place during and after the Great Recession. In 2014, North Dakota had some of the healthiest reserve levels of any state, a fortunate thing, given that oil prices cratered that year. The state has been using those reserves to battle its recession with great relative success for almost four years now. Few states could have survived such a downturn with so few spending cuts and revenue enhancements as North Dakota has over the past few years. As a result, however, the state is in a situation very different from other states. Instead

of topping off its reserves from the peak of the business cycle as many states are in a position to do today, North Dakota is rebuilding its reserves from the ground up as economic recovery begins to set in. At the top of the list, several states stand out for the manner in which they have built up their reserves. Though total state balances are enough in 23 states to weather a moderate recession, things look considerably less rosy when we look strictly at those balances that are explicitly designated as "rainy-day" reserves. This is a designation that can carry a big distinction. Fund balances are not always equivalent to available reserves, as they can often be obligated for other uses and are not explicitly set aside for fiscal emergencies. NASBO estimates in its most recent *Fiscal Survey of the States* that less than three-quarters of total state balances are actually designated as reserves.

The rest are simply excess fund balances that have accumulated either because of revenues exceeding budgeted targets or spending coming in below expectations on a onetime basis. This difference is even more stark in a handful of states, including those that might show up as being among the most prepared. Hawaii, for example, is projected to finish fiscal 2018 with the largest total balances of any non-natural resource state. With cash on hand at more than 17% of its revenues, the state has almost twice as much to get through a moderate recession as it would need. However, if you limit those balances only to what has been explicitly set aside for a rainy day, Hawaii's reserve levels fall to just more than 4% of its budget, not nearly enough to weather the next downturn. This indicates that Hawaii was not so much prepared going into fiscal 2019 as it was fortunate to have had a onetime windfall in revenue.

Putting money away for a rainy day is a great accomplishment, but it is also only part of the battle. Fund balances alone are not enough to ward off the effects of a recession. Research shows that in addition to having adequate balances, among other things, the purpose of the funds being used for reserves should be explicit to prevent some of the indecision that can cost states valuable time during a recession.⁵ During the Great Recession, several states with sizable reserves used those funds late, if at all, while policymakers debated the funds' true purpose. As a result, several state rainy-day funds were marginalized during one of the largest downpours in American history.

Last, during a recession it is unlikely that state policymakers will wish to rely entirely on reserves, and they will seek to implement at least some spending cuts, if not revenue increases as well. Therefore, at least some of the recessionary liabilities calculated in this stress-testing exercise will be covered by minor fiscal changes from policymakers. Thus, a state need not have its entire liability covered within its reserves to be able to reasonably weather a recession's effects on its budget and economy. This ultimately boils down to a policy choice and risk assessment from the appropriate policymakers in each state, which again underlines the need for individual states to perform these types of evaluations on their own and design the best recession plan for their needs and risk appetites.

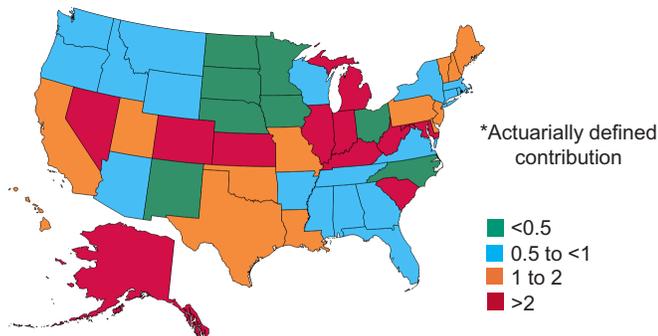
What about pensions?

Among the questions that we receive most often with respect to state budgets and recessions is how changes in the business cycle can affect state pension funds. Given the troubling situations to be found in too many state pension funds today, this is an important question to ask. However, the answer is not necessarily pertinent to the idea of recessionary preparedness for two main reasons. First, because of the way that pension accounting works, any stress arising from a downturn in the economy is generally borne out over a number of years. This helps to prevent large

⁵ Emily Raimes, et al., "Fiscal Stress Test: Ability to Withstand Next Recession Depends on Reserves, Flexibility," Moody's Investors Service: Sector In-Depth (April 21, 2016).

Chart 10: Pensions Matter for Some States

Increased ADC* due to moderate recession, % of FY2018 revenue



Sources: NASBO, MIS, Moody's Analytics

spikes in necessary pension contributions even if a fund takes a short-term hit.

Second, contributions from a state government to its pension fund are generally not "mandatory" in the same sense that Medicaid payments are. If someone loses his or her job, qualifies for Medicaid, and obtains medical treatment, the state government has to cover that cost whether it thinks it can afford it or not. Policymakers cannot forgo payments to Medicaid providers just because they do not think they have the money, at least not for long without incurring some serious legal costs.

However, pension contributions are a much different story. So long as a pension fund is solvent enough to make payments to its beneficiaries, state policymakers can, and quite often do, put off payments to the funds if money is tight. In fact, during the Great Recession this was quite a politically popular alternative to raising taxes or cutting other spending programs because it pushed the politically difficult questions down the road into future fiscal years.

Nevertheless, putting off pension payments is a recipe for long-term fiscal disaster. Doing so regularly is the closest thing that states have to accumulating long-term debt, and some states have already seen those debts climb to tens of billions of dollars. Almost every state that is struggling today, from Illinois to Kentucky to New Jersey, can trace its problems back to decisions not to fully fund their pension plans. Thus, even though the immediate impacts of a recession on state pension plans are not cause for im-

mediate economic alarm, their implications for the long-term fiscal health of a state, especially those whose pension plans are already stressed, are still important to contemplate.

This is difficult, given the scarce data available on public pension funds over time. It is difficult,

if not impossible, to perform a large-scale survey of how state pension funding was affected by the Great Recession, as most governments were not reporting enough comprehensive information at the time to come up with a fully representative sample. However, thanks to Governmental Accounting Standards Board reporting changes following the Great Recession, Moody's Investors Service has been able to more regularly collect state pension data since 2011.⁶ To get a better idea of exactly how pension contribution rates might be affected during the next recession, Moody's Analytics put together forecasts for state-level actuarially determined contribution rates and stressed them along the same lines as our Medicaid scenarios.

The forecasting exercise revealed that the amount of stress a recession imparted on state pension ADCs was relatively small over the two-year forecast window we typically use for our stress-testing exercises. However, the impacts were not immaterial. Under a moderate recession scenario, state ADCs would increase in the aggregate by approximately \$11 billion, or just more than 1% of overall state revenues (see Chart 10). Under a more severe recession scenario, the impacts would be only marginally larger at just more than \$14 billion. The severe scenario would be only slightly more stressful than the moderate scenario, owing in large part to the way that pension accounting bears those potential investment losses out over

a longer time, limiting their impact on the near-term ADC.

However, though the impact on most states was relatively small, a handful of states did see significant stress on their ADC as a result of even a moderate recession. Illinois and Kentucky would incur the largest effects because of their already-sizeable pension debts and large baseline ADCs as a share of their overall budget. Nebraska and South Dakota, those states with the most fully funded pension plans, would see the least amount of stress as a result of a recession. This further underlines how important preparing for economic downturns can be, not only in terms of the near-term economic impact but also because of the long-term structural damage that can be done relying on onetime accounting measures.

Takeaways

The results of this year's state stress-testing exercise are an encouraging sign as we reach the peak of the current business cycle. At least 23 states are prepared for at least a moderate recession, with 10 more within striking distance. This means that the amount of fiscal drag from states and local governments should be considerably less during the next recession and ensuing recovery than the U.S. experienced during and after the Great Recession. This will result, all else being equal, in a faster recovery, particularly in those states that are most prepared. However, a troubling number of states are still not ready and, even in those that are, continued improvement must be made in two key areas.

First, states must continue to focus on the distinction between rainy-day funds and total balances. Several states that performed well on this year's stress tests did so because they had significant amounts of cash from budget surpluses, though they were not necessarily designated as actual reserves. This is a dangerous policy that can prevent those funds from being properly used during the next recession. What is more, if they are not specifically designated as reserves, there is also risk that policymakers may appropriate some of those balances for other purposes before the next recession comes along, leav-

⁶ These data can be found publically in the Moody's Analytics Municipal Financial Ratio Analysis database at www.Moody's.com

ing them unavailable in an emergency. Anecdotally, we have evidence that at least some states with larger than expected fiscal 2018 surpluses have begun to explicitly designate more of that money as rainy-day reserves. Therefore, we are hopeful that when NASBO next releases fund balance estimates this fall, states will look even better than they do today.

Second, having a plan is just as important as having a fund. Many states have adequate reserve funds for the first time in years; however, most have not yet put together a plan for what to do with them when the business cycle does eventually turn. The importance of being purposeful with rainy-day reserves and developing a plan before it starts to rain cannot be overstressed. It is encouraging to see more state governments such as Utah implementing their own stress-testing exercises as a part of their normal budget procedures. Over the long run these types of practices allow policymakers to better maximize their state's long-term economic outlook by focusing more on forward-looking policy and

investment decisions as opposed to day-to-day funding challenges and therefore should be viewed as best practices among states.

For those states that performed poorly in this year's test, one takeaway is most clear. Every little bit helps. Although it may be too late to get reserves up to the level necessary to fully weather the effects of the next recession, every dollar that can be put away in the meantime is a dollar that will not have to be raised via taxes or spending cuts in a few years. What is more, the economic impact of putting that dollar aside today when the economy is red hot will be much less painful than trying to pull it out of the economy at the height of the next recession. It is never too late to provide your state at least some cushion from the difficult decisions set to take place during the next downturn.

How policymakers prepare for these eventualities matters a great deal in the pace of economic recovery. Unpreparedness can lead to disruptive decisions to drastically cut spending or raise revenues just at the time the economy can least afford it. Prepared-

ness, on the other hand, can lend stability to a struggling economy and help conditions recover more quickly. These preparations can be a difficult balancing act, however, necessitating as much objective care and precision as possible in such an imprecise discipline as budget forecasting.

To sufficiently protect their budgets and their economies from increased volatility and fiscal drag, state and local government policymakers should be investing in their budget processes and making stress-testing a higher priority. At the very least, states and local governments should be reviewing their reserve policies and checking on their adequacy following such a tumultuous fiscal period as the past decade. At best, policymakers should be diligently implementing statutory reserve guidelines based on such reviews and working to expand reserve levels while budget conditions are still improving. Continuation of current policies in a number of states risks a repeat of the lackluster recovery that followed the Great Recession and is not conducive to long-term economic growth.

About the Authors

Dan White is the director of government consulting and public finance research at Moody's Analytics in West Chester PA.

In this role he oversees economic research with an emphasis on fiscal policy and municipal market impacts. In addition to public finance and fiscal policy, Dan has performed research on a broad range of other subjects including healthcare, energy economics, and regional economic development. Dan regularly presents to clients, conferences, and policymakers of all levels. He has been featured in a number of print, radio and televised media outlets ranging from Bloomberg Television to the Wall Street Journal, and also writes regular editorial pieces for a number of online and print publications.

His most recent research has focused on public policy responses to the Great Recession and ways to better prepare federal and subnational fiscal conditions for changes in the business cycle. This has included developing new ways to incorporate the use of stress testing and alternative economic scenarios into the public budgeting process in order to better protect governments against cyclical economic risk.

Dan also works directly with a number of governments and policymakers in an advisory role and teaches classes in economics and public finance as an adjunct professor at Villanova University.

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.

Todd Metcalfe is an economist at Moody's Analytics. He performs data analysis for forecasting municipal bond performance and works on state and local government fiscal issues. Before joining Moody's Analytics, Todd worked for the Regional Economic Studies Institute at Towson University as a senior economist. There he analyzed the impact of various policies on Maryland's economy. Todd holds a PhD in Social Science from Syracuse University, where his dissertation focused on analyzing the impacts of state level environmental policy. He also earned an MS in Agricultural and Applied Economics from Virginia Tech, and a BA in Economics from the University of Maryland.

Sarah Crane is an economist at Moody's Analytics. She covers several state and regional economies, including Illinois and its major metro areas, in addition to editing the Midwest Regional Financial Review and numerous other publications. Sarah also works on state and local government fiscal issues and works closely with a number of governments and other organizations in a consulting role. She earned a master's degree in economics from American University and has a bachelor's degree in communications from Boston University.

About Moody's Analytics

Moody's Analytics provides financial intelligence and analytical tools supporting our clients' growth, efficiency and risk management objectives. The combination of our unparalleled expertise in risk, expansive information resources, and innovative application of technology helps today's business leaders confidently navigate an evolving marketplace. We are recognized for our industry-leading solutions, comprising research, data, software and professional services, assembled to deliver a seamless customer experience. Thousands of organizations worldwide have made us their trusted partner because of our uncompromising commitment to quality, client service, and integrity.

Concise and timely economic research by Moody's Analytics supports firms and policymakers in strategic planning, product and sales forecasting, credit risk and sensitivity management, and investment research. Our economic research publications provide in-depth analysis of the global economy, including the U.S. and all of its state and metropolitan areas, all European countries and their subnational areas, Asia, and the Americas. We track and forecast economic growth and cover specialized topics such as labor markets, housing, consumer spending and credit, output and income, mortgage activity, demographics, central bank behavior, and prices. We also provide real-time monitoring of macroeconomic indicators and analysis on timely topics such as monetary policy and sovereign risk. Our clients include multinational corporations, governments at all levels, central banks, financial regulators, retailers, mutual funds, financial institutions, utilities, residential and commercial real estate firms, insurance companies, and professional investors.

Moody's Analytics added the economic forecasting firm Economy.com to its portfolio in 2005. This unit is based in West Chester PA, a suburb of Philadelphia, with offices in London, Prague and Sydney. More information is available at www.economy.com.

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). Further information is available at www.moodyanalytics.com.

DISCLAIMER: Moody's Analytics, a unit of Moody's Corporation, provides economic analysis, credit risk data and insight, as well as risk management solutions. Research authored by Moody's Analytics does not reflect the opinions of Moody's Investors Service, the credit rating agency. To avoid confusion, please use the full company name "Moody's Analytics", when citing views from Moody's Analytics.

About Moody's Corporation

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). MCO reported revenue of \$4.2 billion in 2017, employs approximately 11,900 people worldwide and maintains a presence in 41 countries. Further information about Moody's Analytics is available at www.moodyanalytics.com.

© 2018 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MOODY'S PUBLICATIONS MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL, FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,500,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody's.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors. It would be reckless and inappropriate for retail investors to use MOODY'S credit ratings or publications when making an investment decision. If in doubt you should contact your financial or other professional adviser.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any rating, agreed to pay to MJKK or MSFJ (as applicable) for appraisal and rating services rendered by it fees ranging from JPY200,000 to approximately JPY350,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.