How Prepared Are US States for a Recession: An Update

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Rainy day funds are a common tool that most US states use to help mitigate the fiscal stress caused by economic slowdowns that reduce state government revenue. Except for a very brief (but very severe) recession in 2020 caused by the pandemic, most states have generally experienced an economic expansion since the end of the Great Recession in 2009 giving them well over a decade to accumulate savings in a Rainy-Day Fund (RDF) to help weather an economic downturn. This paper examines how state RDF's have changed over the past decade and how these changes have affected each state's ability to weather an economic downturn.

Keywords: fiscal stress, rainy day fund, business cycles, regime-switching

INTRODUCTION

An economic slowdown generally reduces the revenue that state governments collect.[1] Since most states have some form of balanced budget requirement, when government revenues decline during an economic slowdown, states may have to enact spending cuts or tax rate increases. Rainy day funds (RDF)[2] are a common tool that most US states use to accumulate savings and help mitigate the fiscal stress caused by economic slowdowns that reduce state government revenue. One important question for state legislatures is how large of a buffer should they establish in their RDF. To help answer this question, Wagner and Elder (2007) develop a methodology to estimate the distribution of potential budget or revenue shortfalls each state may experience. The necessary information to form these distributions are the cyclical characteristics for each state including the average growth rate during expansions (high-growth regime), the average growth rate during contractions (low-growth regime), and the transition probabilities describing the likelihood of moving between high and low-growth periods. These estimates are obtained from estimating a Markov switching-regression.[3] Using this methodology, Elder (2016) updates the distribution of potential shortfalls using data through 2014, and then compares each state's accumulated savings (measured either as the size of just their RDF or as the sum of their RDF and their general fund (GF) balance) to estimate the ability of each state to use their savings to mitigate the fiscal stress caused by an economic downturn. The analysis is of particular interest to state legislators because it allows them to understand how choices they make concerning the accumulation of savings will affect their states in terms of their ability to manage the fiscal stress caused by economic downturns of varying degrees without significant changes in tax or spending policies.

While the recession in 2020 was very severe in terms of magnitude,[4] it was the shortest recession in the previous 150 years according to the NBER.[5] Therefore, except for an incredibly short recession in 2020, states have had approximately a decade since the recovery from the 2007-2009 recession allowing them to

significantly increase the size of their RDF. The purpose of this essay is to use updated data (as of 2023) on each state's accumulated savings to analyze the recent ability of states to weather economic downturns.

In 2015, the median RDF size (relative to state revenue collections) was 4.8% of their 2015 revenue collections, or using a more general measure of savings, calculated by adding the general fund balances to the balance in the RDF, the median savings level was 8.2% of their 2015 revenue collections. Comparing each state's savings to their estimated distribution of revenue shortfalls Elder (2016) found that the median state could weather approximately 63% (RDF only) to 73% (RDF plus general fund balance) of potential shortfalls each state may experience. While these figures are medians across all the states, there is a great deal of variability among states when it comes to accumulated savings. The median level of savings for the lowest savings quintile in 2015 was 0% (or 2.5% using the RDF plus general fund balance) while the median level of savings for the highest savings quintile in 2015 was 15.6% (or 30.4% using the RDF plus general fund balance). With these balances, the lowest saving quintile states in 2015 could weather 0% (using just the RDF) or 52% (using the RDF plus the general fund balance) of potential economic downturns while the highest saving quintile states in 2015 could weather 92% (using just the RDF) to 97% (using the RDF plus general fund balance) of potential economic downturns.

The median size of an RDF has increased from 4.8% in 2015 to 12.7% by 2023, and the median size of an RDF plus the general fund balance has increased from 8.2% in 2015 to 32.7% in 2023 which means that states in general have increased their savings by between 165% and 299%. Since the savings that states have accumulated has increased, their ability to weather economic downturns will obviously be higher in now than in 2015. As discussed below though, the distribution of potential revenue shortfalls is skewed to the right (with the median less than the expected value) so just because the median RDF size has increased by from 4.8% to 12.7% does not mean that the resulting ability to weather an economic downturn has had a commensurate increase.

One issue this essay addresses is describing how the savings of states have changed from 2015 to 2023. Savings is measured in two ways: in terms of just their RDF as well as a more general metric of savings measured as the amount in their RDF plus their general fund balance. The increase in savings is generally only interesting to the extent that it gives states a larger cushion against revenue declines in response to an economic contraction. Therefore, the primary issue addressed in this essay is how much the increased savings has increased states' abilities to weather economic downturns.

The following sections contain a brief discussion of how the distribution of potential revenue shortfalls is calculated as well as an explanation of the data and methodology used to estimate the distribution of revenue shortfalls, a discussion of the empirical results, and concluding remarks.

Calculation of Revenue Shortfalls, Methodology, and Data

The main contribution of this paper is to update the results of Elder (2016) so only a very brief explanation of the methodology and data is discussed here; readers with an interest in a more detailed explanation are referred to either Wagner and Elder (2007) or Elder (2016).

The distribution of possible revenue shortfalls for a specific state relates the probability of an economic slowdown lasting 1, 2, …, T periods along with the revenue shortfall that will result if the economic contraction lasts a specific number of periods. It is assumed that each period (month) the economic activity within a state can either be in a high-growth regime (where the growth rate is μ_H) or a low-growth regime (where the growth rate is μ_L, which is generally a negative number). Government revenue collections are positively related to economic activity by the parameter φ measuring the sensitivity of revenue collections to changes in economic activity. Therefore, each period, government revenue collections are either in a high-growth regime (where the growth rate is $g_H = \varphi * \mu_H$) or a low-growth regime (where the growth rate is $g_L = \varphi * \mu_L$). If a state is in an economic contraction in period *t*, there is some probability, denoted by P_{LL}, that the economic contraction will persist into period *t+1*. If this probability is independent of the number of periods the contraction has been going on, then the probability that a contraction lasts exactly t_L periods is given by $P_L(t_L) = P_{LL}^{t_L-1} - P_{LL}^{t_L}$. Therefore, it is possible to calculate the probability an economic contraction will last for exactly one period, exactly two periods, or for any (and every) possible duration.[6]

It is assumed that during an economic contraction, the minimum objective of a state legislature is to maintain a constant amount of revenue available to finance government spending so as to avoid spending cuts or tax rate increases. Therefore, if R_0 denotes the pre-contraction level of revenue available to finance spending then revenue collections during the first period following the start of an economic contraction will be $R_0(1 + g_L)$ and the shortfall (relative to a constant level of revenue, R_0) is $R_0 – R_0(1 + g_L)$; relative to pre-contraction revenue, the shortfall is $1 – (1 + g_L)$. If the contraction lasts two periods, then the shortfall in just the second period (relative to pre-contraction revenue of R_0) is $1 – (1 + g_L)^2$ and the total shortfall for the first two periods is $2 – (1 + g_L) – (1 + g_L)^2$. In general, for a contraction lasting t_L periods, the total shortfall relative to pre-contraction revenue is $t_L - \sum_{i=1}^{t_L}(1 + g_L)^i$. Therefore, to calculate the complete probability distribution of shortfalls it is necessary to estimate φ, μ_L, and P_{LL}.

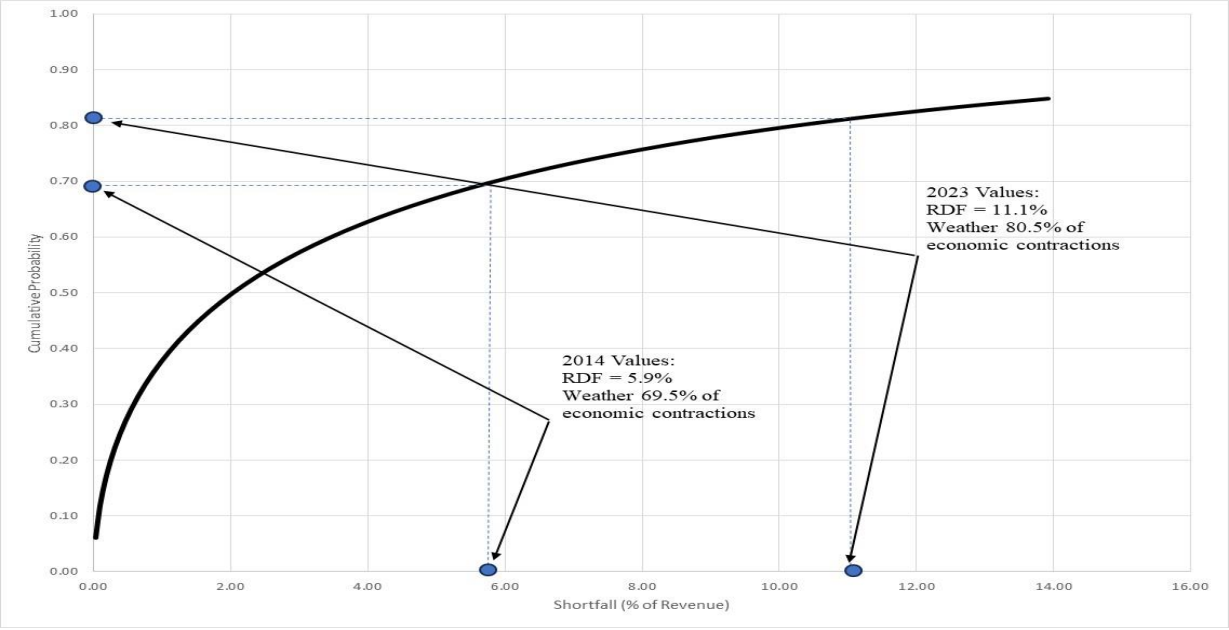
The parameters μ_L, and P_{LL} are estimated using a Markov switching model. The state-level measure of economic activity is the monthly coincident index (1979:09–2015:12) described by Crone and Clayton-Matthews (2005) and published by the Philadelphia Federal Reserve.[7] As mentioned above, each state's economic activity is modeled as a two-state Markov switching model which is a statistical technique where the data-generating process of a data series is assumed to undergo unknown, periodic changes between two regimes. Specifically, a Markov switching model assumes the growth rate of a series can either be in high-growth-rate regime μ_H or a low-growth-rate regime, μ_L. Additionally, it assumes there is a matrix of transition probabilities that describes the likelihood of staying in the same regime or transitioning to the other regime in the following period, P_{HH} and P_{LL}.

Empirical Results and Rankings

Since the main contribution of this paper is to update the results of Elder (2016), I use the same switching regression estimates and elasticities as presented in Elder (2016); only updating the accumulated savings of each state to 2023. The switching regression parameter estimates and the elasticities are shown in Appendix A.

As mentioned above, just because states have significantly increased their savings does not necessarily mean there is a commensurate increase in the ability to weather a recession because of the skewness of the distribution. As an example, below is the estimated distribution of revenue shortfalls for Colorado.

FIGURE 1
CUMULATIVE DISTRIBUTION FOR A REVENUE SHORTFALL: COLORADO



The distribution is initially very steep because the estimated transition probability is so high (0.939). The expected shortfall is 8.0% which is just slightly lower than the 75th percentile shortfall of 8.3% meaning that approximately seventy-five percent of all possible economic slowdowns are shorter than the average slowdown. In 2015 Colorado had accumulated savings in their RDF equal to 5.9% of their 2015 annual revenue which was estimated to be sufficient to cover 69.5% of all possible shortfalls caused by an economic slowdown. By 2023, Colorado had accumulated savings of equivalent to 11.1% of their 2023 annual revenue which was sufficient to cover 80.5% of all possible shortfalls so even though their savings almost doubled between 2015 and 2023, it only increased their ability to weather an economic downturn by just over 10%. The estimated distribution of revenue shortfalls for all the states is shown below in Table 1.

TABLE 1
REVENUE SHORTFALL DISTRIBUTIONS OF STATE REVENUE CONTRACTIONS
(% OF ANNUAL REVENUE)

State	Expected	25%	50%	75%	90%
Alabama	9.2	0.6	2.7	9.4	25.0
Alaska	30.8	2.3	12.6	38.0	84.0
Arizona	3.8	0.2	1.0	3.7	10.0
Arkansas	2.7	0.2	0.7	2.6	7.1
California	4.1	0.2	1.2	4.2	10.8
Colorado	8.0	0.5	2.4	8.3	20.8
Connecticut	8.4	0.5	2.4	8.4	22.7
Delaware	3.7	0.2	0.9	3.6	10.0
Florida	6.7	0.5	2.2	7.3	17.7
Georgia	7.0	0.5	2.0	6.9	18.4
Hawaii	13.2	0.7	3.5	13.0	34.8
Idaho	12.0	0.8	3.7	12.2	31.1
Illinois	16.2	0.8	4.7	16.6	43.5
Indiana	5.4	0.5	1.7	5.4	14.5
Iowa	4.7	0.3	1.5	4.9	12.1
Kansas	5.6	0.4	1.6	5.4	15.0
Kentucky	7.0	0.6	2.1	7.0	18.6
Louisiana	16.2	1.2	5.2	17.1	43.0
Maine	6.6	0.3	1.6	6.5	17.5
Maryland	9.4	0.6	2.5	9.2	24.4
Massachusetts	10.3	0.7	2.9	10.2	27.8
Michigan	13.3	1.0	4.6	14.4	34.8
Minnesota	5.0	0.3	1.3	5.1	12.9
Mississippi	5.8	0.3	1.5	5.7	15.3
Missouri	10.4	0.6	2.7	10.2	27.5
Montana	21.1	1.3	7.1	23.5	57.6
Nebraska	4.3	0.2	1.2	4.2	11.6
Nevada	13.4	0.7	3.9	14.4	35.1
New Hampshire	2.2	0.1	0.6	2.3	5.7
New Jersey	5.8	0.4	1.5	5.8	15.4
New Mexico	4.9	0.3	1.4	5.0	12.9
New York	5.8	0.3	1.5	5.7	15.4
North Carolina	6.2	0.4	1.8	6.3	16.1

North Dakota	0.0	0.0	0.0	0.0	0.0
Ohio	14.2	1.0	4.7	14.7	38.4
Oklahoma	13.5	1.0	3.7	13.6	35.2
Oregon	15.7	1.1	4.8	17.2	42.5
Pennsylvania	4.6	0.3	1.3	4.6	12.0
Rhode Island	10.5	0.7	3.0	11.1	28.6
South Carolina	8.2	0.5	2.2	8.1	21.6
South Dakota	1.8	0.1	0.5	1.9	4.8
Tennessee	4.9	0.4	1.5	4.8	12.8
Texas	5.8	0.4	1.5	5.8	15.3
Utah	4.3	0.2	1.1	4.4	11.2
Vermont	4.6	0.2	1.4	4.6	12.0
Virginia	6.4	0.4	1.6	6.3	17.1
Washington	2.3	0.2	0.6	2.2	5.9
West Virginia	3.4	0.2	1.1	3.6	8.9
Wisconsin	8.0	0.8	2.9	8.8	22.0
Wyoming	19.5	1.6	7.2	22.0	51.6
Mean	**8.3**	**0.6**	**2.5**	**8.7**	**22.2**
Median	**6.5**	**0.4**	**1.7**	**6.4**	**17.3**
Maximum	**30.8**	**2.3**	**12.6**	**38.0**	**84.0**
Minimum	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

The size of each state's RDF in 2015 and 2023 are shown below in Table 2 and are measured relative to the state's revenue in 2015 and 2023. While the RDF is generally the primary source of savings which can be used to buffer any revenue shortfalls that may occur due to an economic downturn, states could also access any surplus in their general fund as well. Therefore, Table 2 also contains data describing each states total amount of savings, measured as the sum of the amount in their RDF and general fund (GF) in 2015 and 2023, again, relative to their revenue in the respective years.

TABLE 2
STATES' 2015 AND 2023 RDF AND RDF+GF BALANCES

	RDF only %		**(RDF+GF)%**	
State	**2015**	**2023**	**2015**	**2023**
Alabama	5.3	14.6	8	33.3
Alaska	455.1	67.8	332.4	47.1
Arizona	5.1	10.8	8.4	30.9
Arkansas	0.0	21.7	0	36.3
California	2.7	26.3	4.9	39.0
Colorado	5.9	11.1	7.7	13.0
Connecticut	2.6	14.5	2.2	17.1
Delaware	5.4	5.0	13.9	48.3
Florida	4.1	6.6	12.5	47.9
Georgia	6.1	15.0	9	44.8
Hawaii	1.4	9.3	14	30.2
Idaho	6.4	18.7	7.8	25.8
Illinois	0.9	3.8	1.1	7.6
Indiana	8.3	9.7	14.1	13.6

Iowa	10.3	9.2	15.7	27.8
Kansas	0.0	17.3	1.3	43.3
Kentucky	0.8	24.3	3	26.7
Louisiana	5.5	7.9	5.5	8.0
Maine	3.8	17.2	4.6	20.4
Maryland	4.8	12.5	6.8	23.4
Massachusetts	3.1	17.3	3.7	27.9
Michigan	4.8	13.5	6.4	37.4
Minnesota	5.0	10.5	8.8	53.5
Mississippi	7.1	8.3	8.3	8.3
Missouri	3.1	6.7	6.3	50.3
Montana	0.0	12.9	20.7	35.6
Nebraska	16.9	24.3	33.9	53.4
Nevada	0.0	20.7	4.5	31.4
New Hampshire	0.6	14.2	5.9	14.2
New Jersey	0.0	0.4	1.9	19.9
New Mexico	10.0	39.6	10	39.6
New York	2.6	6.1	11.2	42.2
North Carolina	2.9	14.2	6.8	28.6
North Dakota	24.3	31.0	55.4	93.5
Ohio	4.7	11.8	10.1	42.2
Oklahoma	6.0	16.6	6.7	46.7
Oregon	4.6	12.9	10.2	60.8
Pennsylvania	0.0	11.4	0	31.4
Rhode Island	5.1	5.2	9.6	13.1
South Carolina	6.4	6.4	17.5	52.3
South Dakota	10.8	10.4	12.4	14.6
Tennessee	3.8	7.9	10.1	32.1
Texas	14.3	17.1	30.1	64.5
Utah	8.1	10.3	14.8	37.2
Vermont	5.3	12.4	5.3	26.8
Virginia	2.6	13.4	4	18.5
Washington	3.0	2.1	8	13.7
West Virginia	20.7	14.5	30.7	59.0
Wisconsin	1.9	8.6	2.9	42.3
Wyoming	54.1	111.2	54.1	111.2
Mean	**15.3**	**16.3**	**17.7**	**35.7**
Median	**4.8**	**12.7**	**8.2**	**32.7**

Source: National Association of State Budget Officers, The Fiscal Survey of States, Fall 2015 (Washington, DC, 2015) and National Association of State Budget Officers, The Fiscal Survey of States, Fall 2023 (Washington, DC, 2015)

From 2015 to 2023, the median size of RDF's increased from 4.8% to 8.2% while the mean only increased from 15.3% to 16.3%, but the small increase in the mean is primarily due to Alaska's RDF decreasing from 455.1% in 2015 to "only" 67.8% by 2023. When the general fund balance is included as a measure of savings, the median amount of savings increased from 8.2% to 32.7% representing an almost fourfold increase in the savings percentage. By 2023, all but 6 states had accumulated more savings in their RDF than they had in 2015, and all but 2 states had accumulated more total savings in their combined RDF and GF in 2023 than they had access to in 2015 indicating that the vast majority of states had increased

their savings from 2015 to 2023. Not only had most states increased their savings during this time period, but most states increased their savings by a substantial amount. Of the 44 states that had a larger RDF in 2023 than in 2015, the average increase was 10.1 percentage points, and of the 48 states that had a larger RDF+GF in 2023 than in 2015, the average increase was 24.8 percentage points.

The important question though is what these increases in savings mean in terms of increasing each state's ability to weather an economic contraction. To assess the effect that the increase in savings has on the ability to weather an economic downturn, it is necessary to compare each state's savings to the distribution of potential shortfalls. As an example, Alabama had savings in their RDF in 2015 equivalent to 5.3% of their revenue. As can be seen from Table 1, the 50%th percentile shortfall for Alabama is 2.7% and the 75th percentile shortfall is 9.4% so Alabama's ability to weather an economic contraction is between their 50th and 75th percentile. Specifically, Alabama's ability to weather an economic contraction with savings in their RDF of 5.3% is 63.6%. By 2023, Alabama had accumulated savings in their RDF equivalent to 14.6% of their revenue which would enable them to cover the reduction in revenue caused by 82.6% of possible economic contractions. The ability to weather an economic contraction using either just the savings in a state's RDF in 2015 and 2023 a, or using the combined resources in the RDF and general fund re shown in Table 3.

TABLE 3
STATES' ABILITY TO WEATHER AN ECONOMIC CONTRACTION
(USING ONLY THE STATES' RAINY DAY FUNDS)

	RDF only		RDF+GF	
State	**2015**	**2023**	**2015**	**2023**
Alabama	63.6	82.6	72.2	93.2
Alaska	99.9	87.1	99.7	81.0
Arizona	80.5	90.5	88	98.2
Arkansas	0	98.3	0	99.5
California	67.1	97.5	78.4	98.9
Colorado	69.5	80.5	74.7	82.8
Connecticut	51.8	84.0	49.2	86.3
Delaware	81.4	80.5	93.6	99.4
Florida	64.6	75.0	85.1	98.0
Georgia	71.6	87.1	79.6	97.4
Hawaii	33.4	68.0	75.9	87.9
Idaho	62.9	82.2	65.8	87.2
Illinois	25.3	46.5	25.3	59.9
Indiana	81.9	84.8	89.7	89.6
Iowa	87.2	86.0	92.3	97.0
Kansas	0	91.9	43.5	98.3
Kentucky	31.4	92.9	57.1	94.1
Louisiana	52.6	60.0	52.6	60.0
Maine	65.2	90.2	68.8	92.0
Maryland	60.4	80.1	68.6	89.2
Massachusetts	51.6	83.1	54.2	90.3
Michigan	53.9	73.6	58.7	90.3
Minnesota	75	87.1	84.2	99.2
Mississippi	78.9	80.5	80.5	80.5
Missouri	52.3	66.9	65.5	95.6
Montana	0	62.7	72.4	82.5

Nebraska	94	96.6	98.3	99.4
Nevada	0	82.5	51.4	88.7
New Hampshire	51.6	97.5	90.3	97.5
New Jersey	0	27.9	53.2	93.1
New Mexico	86.5	98.3	86.5	98.3
New York	60.9	75.4	85.8	98.0
North Caroline	61.4	88.0	76.1	95.4
North Dakota	98.8	98.7	98.8	98.7
Ohio	47.6	69.4	65.9	91.6
Oklahoma	56.7	78.3	59.7	92.8
Oregon	46.1	67.8	64.3	94.4
Pennsylvania	0	89.1	0	97.8
Rhode Island	60.1	60.4	73.1	78.2
South Carolina	68.7	68.9	86.7	97.4
South Dakota	97	96.7	97.7	98.2
Tennessee	70.2	83.0	87.1	97.6
Texas	88.8	90.9	96.1	99.2
Utah	86	89.0	92.8	98.6
Vermont	77.6	90.1	77.6	96.8
Virginia	59	86.7	66.1	90.6
Washington	80.1	73.8	93.1	97.0
West Virginia	97.3	94.7	98.8	99.8
Wisconsin	41.5	73.7	48.8	96.5
Wyoming	90.2	97.1	90.2	97.1
Mean	**59.6**	**81.5**	**72.3**	**92.4**
Median	**63.3**	**83.5**	**76.0**	**96.0**

On average in 2015, states could weather 59.6% of all possible revenue shortfalls by using just the savings in their RDF. Recalling that due to the skewness of the distribution shortfall, the average shortfall is approximately equal to their 75th percentile shortfall so only 16 states had enough savings in their RDF to weather the reduction in revenue caused by even an average economic contraction. By 2023, states could on average weather 81.5% of revenue shortfalls caused by all possible economic contractions, and there were 38 states that had sufficient savings to weather the reduction in revenue caused by an average economic contraction. If the general fund balance is added to the RDF balance, which is a broader measure of the pool of savings that states have access to in order to buffer against revenue shortfalls, the average buffer that states had in 2015 was sufficient to cover 72.3% of all possible revenue shortfalls; 26 states had sufficient savings to buffer against a revenue shortfall caused by an average economic contraction. By 2023, this percentage increased to 92.4% with 48 states (Louisiana and Indiana are the exceptions) having sufficient savings to buffer against the revenue shortfall caused by an average economic contraction.

In terms of having enough savings to buffer against a significant economic contraction, defined as the 90th percentile, in 2015 only 6 (12) states had a sufficient amount of savings in the RDF (RDF+GF) to buffer against the revenue shortfall caused by a significant economic contraction. By 2023, the number of states that had increased their savings by enough to cover a significant economic contraction had increased to 14 (37) using savings in their RDF (RDF+GF).

CONCLUSION

Rainy day funds are commonly used by state governments to reduce, or possibly eliminate, the need to lower spending or increase taxes during periods of fiscal stress caused by economic contractions. Except

for a very short recession during 2020, state have experienced about a decade of expansion since most states recovered from the Great Recession. Economic expansion is generally associated with increases in revenue for state governments. In response to this expanded revenue, states could have reduced tax rates or eliminated some taxes altogether, or they could have expanded spending programs. An additional option state governments have in response to expanding economies is to add to their pool of savings that they could tap into to cover revenue shortfalls when an economic contraction occurs. Since 2015, most states have taken this option at least to some degree because the median size of an RDF increased from 4.8% of revenue to 12.7% of revenue. This has given most states a significant increase in the buffer they have in response to revenue declines that occur during economic contractions. The results presented in this paper indicate how prepared states currently are in response to any fiscal distress they may experience due to an economic contraction and compares their state of readiness for any fiscal distress to where they were in 2015. With this information, legislatures can make more informed decisions concerning future tax, spending, and savings policies going forward.

ENDNOTES

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2. Additionally, government spending increases during an economic downturn adding to the fiscal stress that state governments experience but Holcombe and Sobel (1997), as well as crone (2003), find that the primary cause of fiscal stress is the cyclical variability of revenue.
3. These funds are sometimes referred to as budget-stabilization funds (BSF)
4. As discussed by Hamilton (1989)
5. April 2020, the average decline in economic activity as measured by the Philadelphia Federal Reserve's coincident indicator was 19.2%
6. Most states (36) had positive growth in their level of economic activity the very next month and all states had positive growth by June 2020
7. The probability that a contraction lasts for exactly t_L periods declines as t_L increases, $P_L(t_L) > P_L(t_{L-1})$ for any t_L, and so $P_L(t_L)$ becomes infinitesimally small for very large t_L. Therefore, the maximum t_L considered is 360; since monthly data is used in the estimation process, this corresponds to a contraction lasting 20 years.
8. For an expanded explanation of the construction of the coincident index, interested readers should see Wagner and Elder (2007). The coincident index is the result of a dynamic factor model combining four labor market variables: the unemployment rate, payroll employment, average weekly manufacturing hours, and real wage and salary disbursements.

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APPENDIX

TABLE A1
MARKOV SWITCHING PARAMETER ESTIMATES FOR EACH STATE[8]

	Low growth	$\hat{P}_{LL}$
Alabama	−0.249	0.935
Alaska	−1.085	0.907
Arizona	−0.017	0.975
Arkansas	−0.075	0.955
California	−0.059	0.948
Colorado	−0.195	0.939
Connecticut	−0.189	0.949
Delaware	−0.074	0.960
Florida	−0.399	0.917
Georgia	−0.153	0.936
Hawaii	−0.144	0.967
Idaho	−0.489	0.921
Illinois	−0.269	0.953
Indiana	−0.564	0.910
Iowa	−0.377	0.918
Kansas	−0.396	0.922
Kentucky	−0.406	0.910
Louisiana	−0.637	0.920
Maine	−0.043	0.982
Maryland	−0.309	0.926
Massachusetts	−0.204	0.946
Michigan	−0.937	0.895
Minnesota	−0.097	0.950
Mississippi	−0.226	0.925
Missouri	−0.202	0.955
Montana	−0.484	0.927

Nebraska	−0.177	0.929
Nevada	−0.556	0.930
New Hampshire	−0.223	0.923
New Jersey	−0.130	0.947
New Mexico	−0.078	0.949
New York	−0.187	0.925
North Carolina	−0.211	0.934
North Dakota	0.134	0.988
Ohio	−0.768	0.898
Oklahoma	−0.413	0.933
Oregon	−0.631	0.902
Pennsylvania	−0.349	0.904
Rhode Island	−0.404	0.936
South Carolina	−0.278	0.925
South Dakota	−0.174	0.934
Tennessee	−0.256	0.911
Texas	−0.225	0.932
Utah	−0.101	0.942
Vermont	−0.266	0.928
Virginia	−0.032	0.969
Washington	−0.166	0.932
West Virginia	−0.387	0.907
Wisconsin	−1.636	0.875
Wyoming	−1.505	0.895
Mean	**−0.346**	**0.932**
Median	**−0.237**	**0.931**
Maximum	**0.134**	**0.988**
Minimum	**−1.636**	**0.875**

The parameters of the model are estimated using the Bayesian Gibbs-sampling approach for Markov switching models developed by Kim and Nelson (1998). I acknowledge the use of the computer routines described in Chang-Kim and Nelson (1999).

TABLE A2
STATES' ELASTICITY OF REVENUE TO ECONOMIC CONDITIONS

State	Elasticity	State	Elasticity
Alabama	2.026	Montana	3.369
Alaska	4.317	Nebraska	1.532
Arizona	1.736	Nevada	1.568
Arkansas	0.891	New Hampshire	0.718
California	2.256	New Jersey	1.542
Colorado	1.909	New Mexico	2.033
Connecticut	1.452	New York	2.205
Delaware	0.992	North Carolina	1.595
Florida	1.483	North Dakota	1.992
Georgia	2.388	Ohio	2.732
Hawaii	1.290	Oklahoma	1.986
Idaho	2.056	Oregon	3.414
Illinois	1.775	Pennsylvania	1.555
Indiana	0.991	Rhode Island	1.358
Iowa	1.051	South Carolina	2.126
Kansas	1.091	South Dakota	0.563
Kentucky	1.793	Tennessee	1.915
Louisiana	2.265	Texas	1.509
Maine	0.588	Utah	1.745
Maryland	2.172	Vermont	1.123
Massachusetts	1.909	Virginia	2.448
Michigan	2.207	Washington	0.771
Minnesota	1.579	West Virginia	0.943
Mississippi	1.818	Wisconsin	1.036
Missouri	1.340	Wyoming	2.195

Source: Yolanda K. Kodrzycki, "Smoothing State Tax Revenues over the Business Cycle: Gauging Fiscal Needs and Opportunities" (Working Paper No. 14-11, Federal Reserve Bank of Boston, 2015)