State Government Saving Over the Business Cycle

Matthew Wilson[1]
Congressional Budget Office
matthew.wilson@cbo.gov

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Abstract

State governments in the United States use savings funds to smooth public finances over the business cycle, and these funds respond to federal policy. State savings are positive and precautionary, insuring against adverse shocks. Federal transfers to states react to national business cycles, leaving states exposed to idiosyncratic risk. State governments faced with idiosyncratic and volatile business cycles save more than less risky states. Results suggest that federal fiscal policy is an influential determinant of state fiscal policy, but does not represent a fiscal union of perfect risk sharing.

Keywords: fiscal policy, rainy day funds, fiscal federalism, fiscal union, business cycles, precautionary savings.

JEL codes: E21, E32, E62, F45, H3, H7

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1 Introduction

Fiscal policy at the state level is an important component of the economic environment in the U.S. Spending by state and local governments totaled 3.3 trillion dollars in 2019, representing almost 14 percent of GDP; state government spending alone made up almost half that figure.[2] The makeup of state government spending is fundamentally different than that of the federal government. While federal government spending primarily constitutes defense, social security, and interest payments, state governments tend to spend primarily on education and public welfare. Constraints faced by state governments differ substantially from the federal government, as well; state governments interact with different tax bases, and most face deficit limits of varying strengths. Policy analysts should not expect state-level fiscal policy to behave like federal policy over the business cycle and they should expect these policies to interact with each other in significant ways.

This paper examines one key way in which U.S. state fiscal policy differs from federal fiscal policy, and evaluates the extent to which federal policy influences state fiscal policy. In the absence of unlimited access to debt finance, all fifty states make use of Budget Stabilization Funds, or "Rainy Day Funds", to improve funding for public programs in times of fiscal distress. In 2017, Montana became the fiftieth state to establish such a fund.[3] The median balance of these funds in 2019 was 725 million dollars, having built up significantly since their depletion after the Great Recession. The presence and size of these funds indicates that fiscal savings is an important way in which U.S. states can enact fiscal policy over the business cycle, even in the presence of (sometimes strict) deficit limits. The savings motive for states motivates the question of this paper: *How do U.S. states' savings respond to business cycles and federal fiscal policy?*

I answer this question in the form of three stylized facts about state public finances

[2]Urban Institute, 2021.
[3]Rocewicz, Moody, and Newman, 2018.

over the business cycle: state governments engage in precautionary savings behavior, transfers from the federal government respond less to local shocks than national shocks, and states with more idiosyncratic risk tend to save more. I obtain these facts using data on state government finances from two different sources, under four possible definitions of state government savings; the results are robust to the choice of definition for state government savings.

The first observation of this paper is the precautionary role of state government savings. U.S. states build up positive savings levels, with rainy day funds totalling more than 2% of expenditures and financial (non-insurance) assets equalling around 10% of gross state product. State savings measures are generally procyclical, building up during expansions and spending down during recessions.

The second observation of the paper deals with a key source of state revenues over the business cycle: transfers from the federal government. Models of fiscal unionization suggest that under optimal policy, subnational governments are insured against adverse idiosyncratic shocks (Farhi and Werning, 2017). I find that the federal government in the U.S. insures against national shocks more strongly than it does against idiosyncratic, state-level shocks. State government receipts from the federal government are countercyclical, but respond to national cycles rather than local cycles. This unbalanced response provides suggests that idiosyncratic shocks are not insured by the federal government, which incentivizes precautionary savings by the budget-constrained state governments.

The third observation confirms this intuition: states exposed to more idiosyncratic risk engage in higher levels of savings. For multiple measures of government savings, a lower correlation with the national business cycle and a higher variance of local cyclical gross state product results in higher savings levels. This finding corroborates the suggestion of the second observation, that the federal government does not insure against idiosyncratic shocks at the state level. This lack of insurance for idiosyncratic shocks could arise from political economy or information frictions relative to a simple model of fiscal unionization.

Related Literature. This paper connects to a number of other which study state

and local fiscal policy and the business cycle. Hines Jr (2010) characterizes the behavior of state-level spending over the business cycle, arguing that small and large states behave differently in response to macroeconomic conditions. (Seegert, 2017) points out that revenue streams for state governments have become more risky over time. Nakamura and Steinsson (2014) estimate government spending multipliers for U.S. states, using military spending shocks from the central government. Owyang and Zubairy (2008) find heterogeneous effects of fiscal stimulus in different states and regions of the union, depending on regional makeup. In addition to these, Chodorow-Reich (2017) summarizes findings from empirical literature on the effects of fiscal policy at subnational levels.

This paper also contributes to a literature on rainy day funds and state government savings specifically. Pollock and Suyderhoud (1986) develop a framework for analyzing the contribution of such funds to fiscal stability. Knight and Levinson (1999) find that the adoption of an official rainy day fund leads to higher levels of savings. Wagner and Elder (2005) show that budget stabilization funds indeed stabilize the budget, reducing the volatility of expenditures. Two papers, Sobel and Holcombe (1996) and Douglas and Gaddie (2002), study how rainy day funds alleviated fiscal stress during the recession of the early 1990s.

Finally, this paper sheds light on intergovernmental relations with respect to fiscal policy. Farhi and Werning (2017) outlines optimal fiscal policy for a fiscal union. Ferrero (2009) and Beetsma and Jensen (2005) describe local fiscal policy in a monetary union. Wilson (2022) examines the effects of U.S. monetary policy on local fiscal policy. Fiscal federalism and its effects on local finances has a long history in the public finance literature, beginning with the seminal work of Oates (1972) and being exemplified by papers such as Besley and Coate (2003) and Lockwood (2002).

2 State Government Savings: Three Stylized Facts

This paper lays out three stylized facts apparent in the data on U.S. state government savings. First, state governments overwhelmingly engage in precautionary savings: savings

are positive and procyclical. Second, transfer receipts from the federal government are countercyclical, but depend on the aggregate U.S. economy rather than on a state's business cycle. Finally, states whose business cycles are more exposed to idiosyncratic risk tend to save more than states experiencing small fluctuations or fluctuations correlated with aggregate fluctuations. This section first describes the data sources and definitions; the second subsection presents the three facts.

2.1 Data and Descriptions

2.1.1 Data Sources

Several sources are used to assemble the data. Data on rainy day funds and end-period balances for state governments are obtained from the National Association of State Budget Officers' - hereafter, NASBO - "Fiscal Survey of the States." I use the spring edition of this semiannual report from 1979 to 2017 to obtain data from previous years which is self-reported by states and collected by NASBO. Due to heterogeneity in the structure of BSFs, some state governments do not report BSF balances separately from end-year balances, rendering analysis of rainy day funds alone a bit hairy; I discuss this below when considering all possible definitions of "savings."[4]

Data on state government revenues, spending, and debt holdings comes from the U.S. Census Bureau's *Census of Governments*. While the full sample of local governments is only administered every five years, all state governments are included in the limited survey taken every year, such that annual observations are available for every state. I download the aggregated Census of Governments data at the state level from the Urban Institute's website, on which state-year observations are available from 1980 to 2019. Other state variables of interest are provided at the yearly level on the website of the University of Kentucky's Center for Poverty Research. National annual price level indices and GDP are obtained from BEA's

[4] An appendix containing a full explanation of the data collection from NASBO reports is available upon request.

national accounts via FRED.

2.1.2 Definition of Savings

In order to study the cyclical behavior of state government savings, some definition of "savings" is naturally required. Four potential definitions are available in the data; I choose to focus on two of them for ease of exposition. The first obvious definition of state government savings is the balance of the state's rainy day fund as reported to NASBO. While some amount of heterogeneity exists across funds, and not all states report their RDF balance separately from their general fund, budget stabilization funds are a useful metric due to their explicit purpose of preparation for adverse shocks. A second, and slightly more expansive, definition includes all end-year balances in a state's general fund; while such a measure will include unplanned revenue and spending shocks, it captures all rainy day fund activity and provides a consistent measure across states.

While the first two potential measures are taken from the NASBO reports, the other two are found in the U.S. Census Bureau's annual Census of Governments dataset. The third potential measure of state government savings is a state's net assets–cash and securities less debt outstanding–not including assets set aside for insurance purposes (pensions, etc.). The fourth measure is all of a state's net assets, including those in insurance-type funds.

My preferred measures of state government savings are measures two and three, though I report figures for all four. These measures, total balances in general funds (including rainy day funds) and net non-insurance assets, provide a nice balance between the ideal features of a savings measurement. They are consistent across states, relatively general, and include a good deal of long-term savings components. Importantly, however, the qualitative results are not altered by the choice of savings measure.

Table 1: Measures of State Government Savings: Summary Statistics

Savings measure	Mean	Variance	Percentiles			Cyclicality
			10th	50th	90th	
BSF over GSP	0.004	0.000344	0	0.00128	0.00444	0.0124
Gen. fund balance over GSP	0.00536	0.000297	0.000235	0.00274	0.00864	0.0903
Net noninsurance assets over GSP	0.0976	0.0208	0.0324	0.0654	0.155	-0.228
Net total assets over GSP	0.239	0.0307	0.112	0.208	0.357	-0.148
BSF over expenditures	0.0247	0.00726	0	0.0108	0.0379	0.0795
Gen. fund balance over expenditures	0.0386	0.00718	0.00191	0.0237	0.0768	0.199
Net noninsurance assets over expenditures	0.724	0.465	0.315	0.556	1.17	0.13
Net total assets over expenditures	1.88	0.677	1.11	1.72	2.72	0.271

Note: *Moments reported here are over all state-year observations. Data on budget stabilization funds and general fund balance come from the NASBO fiscal survey of the states, data on net assets come from the Census of Governments, and gross state products are obtained from UKCPR. Sample periods are as follows: BSFs from 1985-2016, balances from 1979-2016, both net assets series from 1981-2012. "Cyclicality" denotes the correlation of the cyclical components of* $log(Savings)$ *and* $log(GSP)$*, identified with the HP-100 filter.*

2.2 Three Stylized Facts

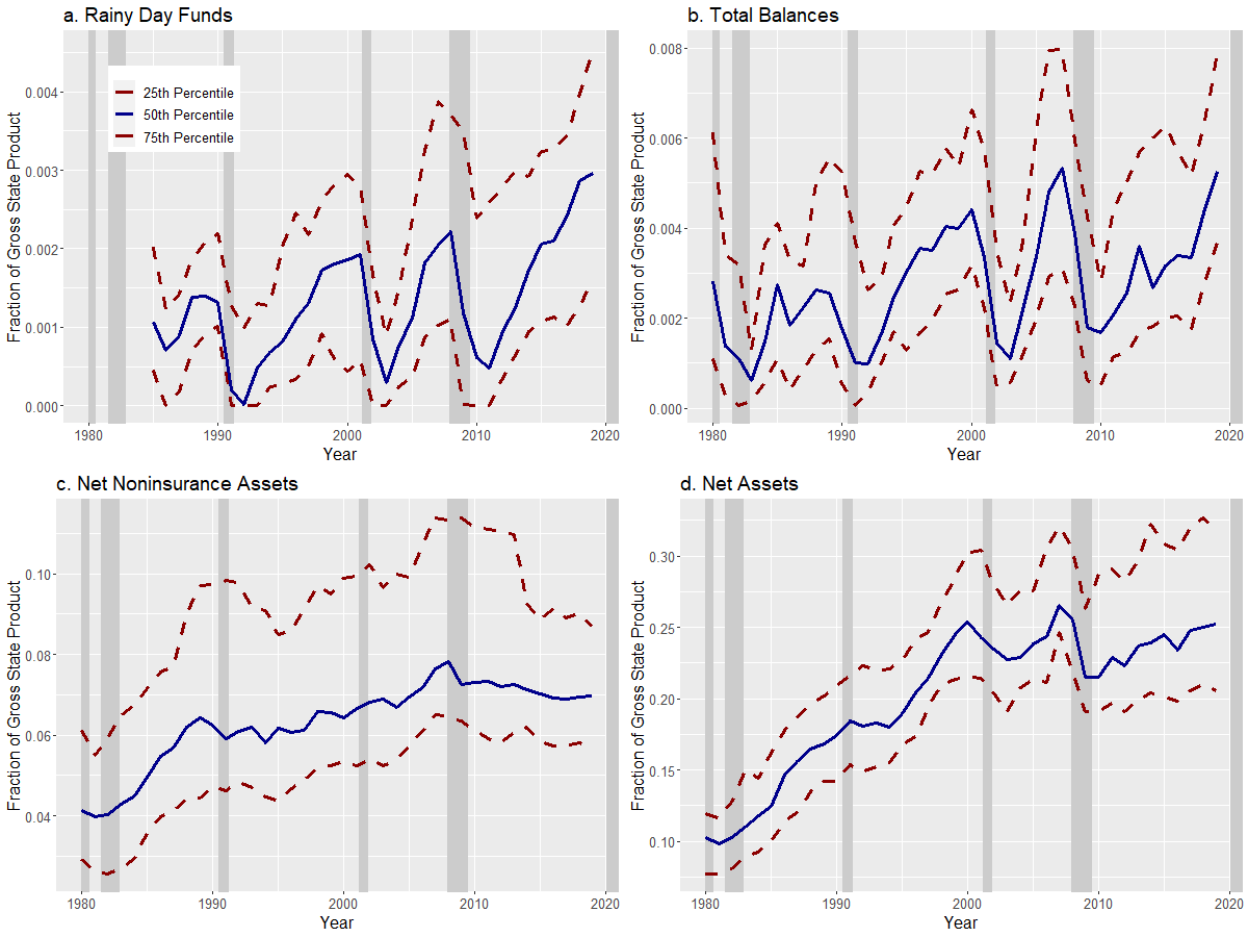
2.2.1 Fact 1: State Savings Are Positive and Procyclical

The first stylized fact I identify is the presence of positive and procyclical savings behavior on the part of state governments. Regardless of which measure of savings measure is observed, U.S. states mostly run positive balances. This is not in itself a surprising result; in fact, it is exactly what one might expect given the balanced budget requirement imposed on 49 of the 50 U.S. states.[5] Table 1 presents summary statistics for the savings measures of interest, both as a fraction of gross state product and as a fraction of general current state government expenditures. The vast majority of states run positive levels of savings, although a small number of observations do report negative savings levels.

In addition to being overwhelmingly positive, state government savings also move with the business cycle. Figure 1 shows how various percentiles of the distribution of savings across states move over the business cycle for the four measures of state savings, where the shaded regions indicate NBER recession dates. Clearly, savings balances build up in economic expansions and spend down in recessions; this is consistent with the stated purpose of RDFs,

[5]National Conference of State Legislatures, 2010.

Figure 1: State Government Savings Over the Business Cycle



Note: *Annual figure on four measures of state government savings in the U.S. Panels a. and b. use data from NASBO's yearly "Fiscal Survey of the States," spring editions. Panels c. and d. use data from the Census Bureau's Census of Governments, downloaded from the Urban Institute. Gross State Product taken from the UKCPR annual data. Gray bars denote NBER recession dates.*

which are included in these measures. Additionally, Table 1 reports "Cyclicality" as the correlation of the cyclical component[6] of the savings measure with the cyclical component of Gross State Product, which tends to be positive.[7] I interpret this behavior as being indicative of a precautionary savings motive on the part of state governments, induced by the presence of balanced budget rules and the desire of policy makers to smooth expenditures over the cycle.

[6]Throughout the paper, "cyclical component" refers to a detrended series of the natural log of a variable using the HP filter with $\lambda = 100$.

[7]Additionally, Table 3 confirms that these savings measures move procyclically when controlling for other determinants.

2.2.2 Fact 2: Transfer Receipts Respond to National Cycle

The second stylized fact describes the behavior of state governments' transfer receipts from the federal government. These transfer payments are countercyclical, as one might expect, but respond quite differently to aggregate and idiosyncratic fluctuations. Specifically, a state government's transfer receipts from the federal government respond more strongly to the condition of the U.S. economy as a whole than to economic conditions within a state, running counter to the idea that fiscal unions serve to smooth idiosyncratic risk across members. In other words, Michigan might expect an increase in transfers when the rest of the country goes into recession, even if Michigan is expanding; conversely, Michigan may not expect as much revenue from the federal government when it is contracting, if the rest of the country is doing well.

In order to observe the relationship between business cycles and transfers from the federal government to state governments, I estimate the following equation:

$$\log(T_{it}) = 1 + \beta_1 y_{it} + \beta_2 y_{-i,t} + \Gamma X_{it} + \varepsilon_{it}. \tag{1}$$

In this equation, T_{it} represents the amount of transfers state i receives from the federal government in year t. y_{it} and $y_{-i,t}$ represent the cyclical components of state i's output and the sum of the other states' outputs, respectively. X_{it} is a vector of controls, including population and state fixed effects. There is, of course, a potential source of endogeneity in this regression: transfers from the federal government to state government i may have an effect on the local business cycle in state i, biasing the estimate of β_1 toward zero.

To account for this endogeneity, I include regressions which instrument for y_{it} and $y_{-i,t}$ using monetary shocks which are plausibly exogeneous to state-level transfers. I use the updated Romer-Romer monetary policy shocks at the annual level provided by Johannes Weiland.[8] I use both the shocks using the original regression from (Romer and Romer, 2004) and using the regression from Weiland and Yang (2019). These shocks are only available

[8] Weiland, 2021.

Table 2: Determinants of State Government Receipts from Federal Government

Dependent Variable	log($Transfers$), cyclical					
	(1)	(2)	(3)	(4)	(5)	(6)
log(pop)	0.0000275	0.00142	0.00142	-0.11	1.13*	1.13*
	(0.00166)	(0.00161)	(0.00161)	(0.373)	(0.622)	(0.621)
log(GSP_i), cyclical	0.138**	0.138	0.138	59.8	-7.68	-7.68
	(0.0685)	(0.0951)	(0.0951)	(196)	(6.14)	(6.13)
log(GSP_{-i}), cyclical	-0.78***	-0.78***	-0.78***	8.52	-15.7**	-15.7**
	(0.0949)	(0.107)	(0.107)	(42.2)	(6.85)	(6.84)
Fixed Effects	N	Y	Y	N	Y	Y
Clustered S.E.	N	N	Y	N	N	Y
IV	N	N	N	Y	Y	Y
Number of Obs.	2000	2000	2000	1400	1400	1400

Note: *Results from regressions estimating Equation 1, which investigates determinants of transfer receipts from the federal government at the state level. Observations include all 50 states in the Census of Governments data from 1980 to 2019, or 1980 to 2007 when monetary shocks are used as instruments in regressions (4) - (6). Heteroskedasticity-robust standard errors are reported in parentheses; regressions (3) and (6) include standard errors clustered at the state level.* * $p \leq 0.10$, ** $p \leq 0.05$, *** $p \leq 0.01$.

until 2007, so they limit the sample considerably. While the baseline regression contains the main results, the IV results are a helpful robustness check.

Table 2 presents the output from regressions of state receipts from the federal government on population, cyclical GSP, and the cyclical component of the sum of the GSP of the other states. The columns correspond to estimations of Equation 1 with a population control and various combinations of fixed effects, standard error clustering, and the monetary instruments mentioned above. Federal transfers to an individual state respond strongly to the cyclical component of the *aggregate* economy (less GSP of the state itself), but not to the *idiosyncratic* cycle of the individual state. The only significantly negative coefficients, corresponding to countercyclical fiscal smoothing, appear on the aggregate cycle.

The failure of federal transfers to respond to local, idiosyncratic shocks may be surprising given the makeup of these transfers, which consist in large part of formulaic spending on public welfare such as Medicaid. Formulaic spending on these claims-based programs should respond to local economic conditions. However, while the business-as-usual

operations of these transfers involve responses to demand, the federal government has also shown that it is willing to step in and increase these transfers in a *discretionary* way in response to large business cycle shocks.

Two recent examples of discretionary increases in federal transfers across the board exemplify this phenomenon. The American Reinvestment and Recovery Act (ARRA) of early 2009, which was the largest fiscal stimulus response to the Great Recession in the U.S., included an increase in Medicaid payments amounting to about $87 billion dollars to be paid to states[9], over and above what would normally have been paid, for the years 2009 and 2010. The CARES Act of 2020, which was the first major federal response to the COVID-19 pandemic, provided for the significant expansion of unemployment insurance, which relies on federal transfers to state governments. Such a discretionary increase in these payments is exactly in line with the results found in this section; the federal government only responded with large increases in Medicaid or unemployment transfers when *the whole country* was in crisis, rather than in response to idiosyncratic state-level downturns.

If states' business cycles differ substantially from the U.S. business cycle, then the transfer responses identified here will have significant implications for risk in state government budgets. Notably, a state whose business cycle moves more independently from the rest of the country might be exposed to more risk because of the federal transfer system than an otherwise equal state whose cycle moved more in step with the U.S. cycle. Having already identified possible precautionary savings behavior by state governments, one might expect these independent states' governments to save more relative to other states. Indeed, Section 2.2.3 confirms that state business cycles differ substantially, and their governments save more in response to increased idiosyncratic risk.

2.2.3 Fact 3: Less Correlated States Save More

If the transfer policy of the U.S. federal government to U.S. state governments doesn't respond significantly to idiosyncratic fluctuations, then states whose cycles are less correlated

[9] https://www.healthaffairs.org/do/10.1377/hpb20100715.109669/full/

with the rest of the country might be expected to run higher balances of government savings. To evaluate this prediction, I develop a measure of a state's correlation with the business cycle of the rest of the country; call this statistic ρ_i. For each state, I apply an HP-100 filter to two annual time series for each state i: state i's annual real GSP series and real U.S. GDP less state i's GSP. The long-run correlation of the cyclical component of each of these time series yields ρ_i, the correlation of a state's business cycle with that of the other 49 states. The value of this correlation from 1980 to 2019 ranges from -0.38 in North Dakota to 0.91 in Illinois, with a wide distribution in between.[10] Close to one third of states have $\rho_i < 0.5$. In this section, I show that this measure is negatively associated with precautionary savings behavior on the part of U.S. state governments, and the variance of cyclical GSP is positively associated with precautionary savings.

Figure 2 shows the time path of average state government savings for the U.S. states with the highest and lowest values of ρ_i. Clearly, states whose business cycles are least correlated with the U.S. business cycle run higher levels of government savings as a percentage of GSP than those which are most correlated. The most stark example is Panel c., in which the most correlated states on average run net noninsurance assets close to 0 over the entire sample, while the least correlated states run high and growing net assets.

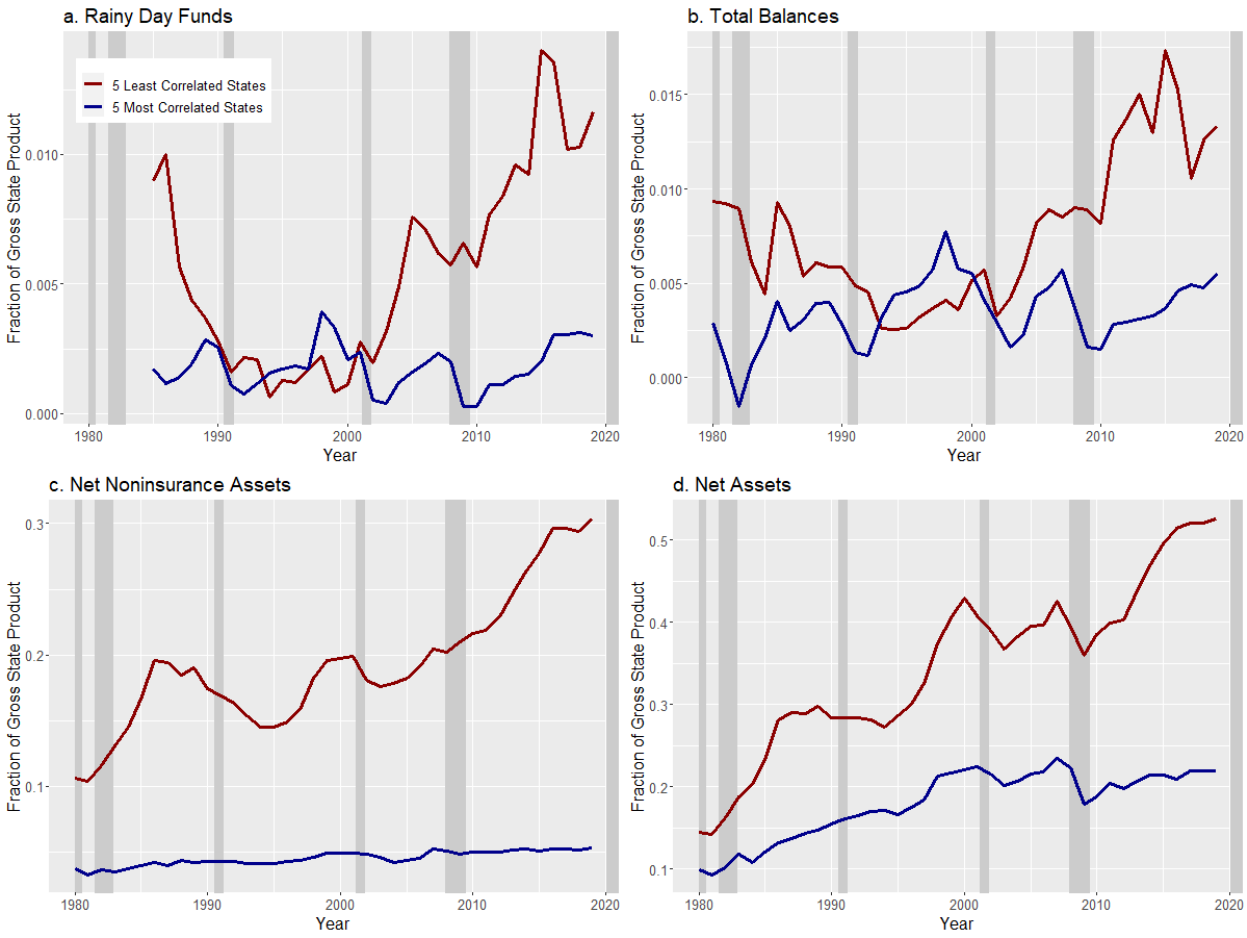
Of course, there are a multitude of factors determining how correlated a state is with the rest of the country, some of which may also affect a state government's level of savings. To further demonstrate the relationship between the correlation measure and a state's government savings, I estimate the equation

$$s_{it} = 1 + \beta_1 y_{it} + \beta_2 y_{it}^{cycle} + \beta_3 \rho_i + \beta_4 \rho_i y_{it}^{cycle} + \Gamma X_{it} + \varepsilon_{it}. \tag{2}$$

Here s_{it} is some measure of state government savings, y_{it} is gross state product, y_{it}^{cycle} is its cyclical component, and ρ_i is the main explanatory variable of interest, namely, a state's correlation with the business cycle of the rest of the country. Because ρ_i is a time-invariant

[10] For the remainder of the paper, I disregard Alaska. Alaska's reserve funds are massive in comparison to the other states, and it is the least correlated with the rest of the U.S. The case of Alaska certainly supports my conclusions, but I want to prevent it from driving the results entirely.

Figure 2: State Government Savings Over GSP, by Correlation Parameter ρ_i



Note: *Annual figure on four measures of state government savings in the U.S. Panels a. and b. use data from NASBO's yearly "Fiscal Survey of the States," spring editions. Panels c. and d. use data from the Census Bureau's Census of Governments, downloaded from the Urban Institute. Gross State Product taken from the UKCPR annual data. "Correlation" is the correlation of the cyclical component (HP-100) of a state's GSP with the cyclical component of the sum of GSPs of the other 49 states, at the annual frequency. Gray bars denote NBER recession dates.*

Table 3: Determinants of State Government Savings

Real State Government Balances									
Dependent variable	log(∼ Real balances)			Real balances / GSP			Real balances / Expenditures		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Business cycle correlation (ρ_i)	-1.24***	-0.418*	-0.435*	-0.00831***	-0.00355***	-0.00357***	-0.0539***	-0.0318***	-0.0319***
	(0.244)	(0.226)	(0.225)	(0.00216)	(0.00136)	(0.00133)	(0.0152)	(0.0122)	(0.0121)
Log(GSP), cyclical	6.45***	6.64***	3.98***	0.0193***	0.0205***	0.0198	0.22***	0.222***	0.227*
	(1.49)	(1.43)	(1.38)	(0.00695)	(0.00777)	(0.0193)	(0.0473)	(0.0536)	(0.134)
Log(GSP), cyclical * ρ_i	-	-	5.56**	-	-	0.00135	-	-	-0.00993
			(2.73)			(0.0249)			(0.174)
Log(GSP)	0.99***	0.635***	0.648***	0.00193***	0.000226	0.000237	0.0126***	0.00776	0.00784
	(0.091)	(0.097)	(0.0981)	(0.000495)	(0.000627)	(0.000677)	(0.00387)	(0.00533)	(0.00567)
variance(Log(GSP), cyclical)	-	85.2	84.8	-	1.25**	1.24**	-	9.26**	9.26**
		(88.7)	(88.9)		(0.51)	(0.509)		(3.85)	(3.84)
Controls	N	Y	Y	N	Y	Y	N	Y	Y
Number of Obs.	1957	1957	1957	1957	1957	1957	1957	1957	1957
Real State Government Net Assets (Not Incl. Insurance Funds)									
Dependent variable	log(∼ Real net assets)			Real net assets / GSP			Real net assets / Expenditures		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Business cycle correlation (ρ_i)	-1.64***	-0.241	-0.248	-0.152***	-0.0328	-0.0344	-0.819***	-0.347**	-0.353**
	(0.299)	(0.226)	(0.227)	(0.0407)	(0.0241)	(0.0239)	(0.257)	(0.167)	(0.169)
Log(GSP), cyclical	-0.855***	-0.0489	-0.343	-0.126***	-0.0712*	-0.158***	0.221	0.354	0.0486
	(0.219)	(0.216)	(0.219)	(0.0448)	(0.0382)	(0.0549)	(0.184)	(0.15)	(0.133)
Log(GSP), cyclical * ρ_i	-	-	0.605**	-	-	0.18***	-	-	0.631***
			(0.297)			(0.0635)			(0.171)
Log(GSP)	1.42***	0.672***	0.677***	0.0303***	-0.022***	-0.0209***	0.116	-0.019	-0.0152
	(0.0871)	(0.113)	(0.113)	(0.00948)	(0.00745)	(0.00743)	(0.0714)	(0.0493)	(0.0499)
variance(Log(GSP), cyclical)	-	127	126	-	25.5***	25.5***	-	199***	198***
		(77.3)	(77.2)		(9.56)	(9.53)		(70.5)	(70.6)
Controls	N	Y	Y	N	Y	Y	N	Y	Y
Number of Obs.	1960	1960	1960	1960	1960	1960	1960	1960	1960

Note: *This table reports results estimating Equation 2 for balances and non-insurance assets. The sample for these regressions is 49 U.S. states (Alaska not included) for the years 1980-2019, with a small number of missing observations for the savings variables. The regressions are according to a random effects model. Control variables include U.S. GDP, state government net debt, political party of state's governor, variance of state's business cycle, and strictness of budget balance rules. Standard errors are clustered at the state level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$*

object at the state level, I estimate a random-effects model[11] and cluster standard errors at the state level. Table 3 give the output from a selection of these regressions for the two preferred definitions of state government savings.

The relationship between ρ_i and state government savings is negative in all specifications of the estimation model, and significant in most. The interpretation is exactly the stylized fact highlighted in this section: states whose business cycles are less correlated with the rest of the U.S. run higher levels of government savings. Evidence of the procyclicality of these savings balances is also seen in most specifications, and high correlation states are more likely to spend down their savings. Qualitatively, these results are robust to any of the aforementioned measures of state government savings.

[11] Wooldridge, 2010.

Among the controls, the variance of a state's cyclical GSP is frequently positively related with savings levels, lending more evidence to the idea that these savings measures capture precautionary savings behavior.[12] Regarding other control variables of interest, the governor's political party, the strictness of budget balance rules, and the state's debt level do not seem to influence savings levels in systematic ways.

3 Conclusion and Discussion

This paper identified three key facts about the public finances of U.S. state governments over the business cycle, in the context of the role of the U.S. as a strong fiscal union. First, state governments engage in precautionary savings across the board. Second, transfer payments from the federal government tend to respond to the aggregate business cycle rather than to idiosyncratic cycles. Third, states whose business cycles are more "idiosyncratic" tend to save more relative to other states. In light of the first two facts, I interpret the third fact as an indication that federal transfers (or lack thereof) influence state government savings behavior.

These features of state savings hint at an important feature of the effect of the federalist structure of the U.S. on state-level fiscal policy. By exposing more idiosyncratic state governments to more risk by not insuring them against downturns as much as the states with high ρ_i, the federal government creates stronger incentives for these state governments to engage in precautionary savings behavior. One interpretation of this behavior by the federal government is the presence of political economy or information frictions, which Oates (2005) identifies as dominating the fiscal federalism discussion in contemporary models. In such models, the federal government might like to smooth idiosyncratic risk but might have noisy information about local conditions or a need to balance local preferences for all states. It is also possible that the federal government seeks to prevent moral hazard on the part of states. For example, sizeable support for U.S. states during an unanticipated global shock

[12] Seegert (2017) documents the rise in volatility of state tax revenues over time; this may also explain some of the rise in the savings measure over time for many states.

such as COVID-19 might be less likely to encourage future risky behavior by states, relative to support during normal local cycles. In any event, federal fiscal policy affects incentives for state governments to save and spend, affecting their ability to smooth local fiscal policy over the business cycle.

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