Understanding State and Local Government Spending over the Business Cycle

By Huixin Bi, Chaitri Gulati, and Nora Traum

State and local (S&L) governments are central to providing public services and infrastructure. As S&L government spending accounts for more than 10 percent of GDP, how this sector responds during a recession can play an important role in shaping the overall economic recovery. After the recession in 2001, changes in S&L spending were relatively muted and had a small effect on the overall recovery. After the 2008 financial crisis, however, S&L government spending and investment declined steeply and slowed the economic recovery, with the level of S&L spending not returning to its pre-crisis level in real terms until 2018. Understanding how S&L government spending might change during and following a recession is thus crucial for understanding economic recoveries overall.

In this article, we document how S&L government expenditures have evolved over the business cycle since the 1950s. We find that from 1950 to the mid-1980s, S&L spending followed no uniform pattern after recessions: spending was sometimes procyclical (declining during recessions) and sometimes countercyclical (rising during recessions). However, since the mid-1980s, S&L spending has followed a consistently procyclical pattern, beginning to recover three years, on average, after the start of a recession.

Huixin Bi is a research and policy officer at the Federal Reserve Bank of Kansas City. Chaitri Gulati is an assistant economist at the bank. Nora Traum is an associate professor at HEC Montreal. *This article is on the bank's website at* ***www.KansasCityFed.org***

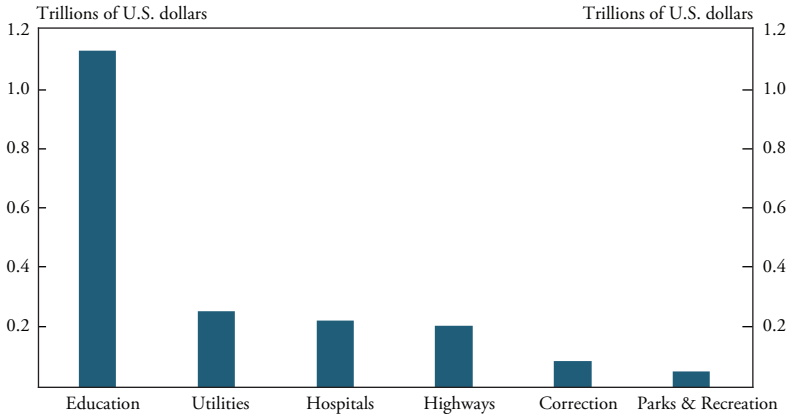
In exploring potential explanations for this change in the cyclicality of S&L spending, we find that the shift seems consistent with changes in the cyclicality of income tax revenues. In other words, income tax revenues showed no clear post-recession pattern until the mid-1980s, when they became consistently procyclical. Moreover, income tax revenues have become a larger share of total tax revenues over time, suggesting total tax revenues are now more sensitive to the cyclicality of income tax revenues. Although increasing intergovernmental transfers and S&L debt financing patterns have been suggested as potential reasons for why S&L spending has become procyclical, we find little evidence to support either of these explanations. Altogether, our results suggest that income tax revenue adjustments are particularly important in accounting for recoveries in the S&L public sector.

Section I provides a brief overview of S&L government spending and financing. Section II provides empirical evidence on the cyclicality of changes in S&L government spending over time. Section III explores potential explanations for the changes and finds that changes in the cyclicality of income tax revenues have played an important role.

I. Overview of State and Local Government Expenditures

S&L government expenditures comprise three broad categories: consumption expenditures, gross investment, and transfer payments to households and businesses. Consumption expenditures consist of spending by S&L governments to produce and provide services to the public, such as education, law enforcement, and transportation; this category has historically been the largest contributor to GDP. Gross investment consists of spending on fixed assets, such as the construction of roads, bridges, and waterways. And transfer payments to households and businesses are subsidies and assistance payments that S&L governments provide to the public such as the Temporary Assistance for Needy Families (TANF) program and Medicaid. In line with understanding how goods and services produced by the S&L government sector directly affect the macroeconomy over the business cycle, we limit our analysis to consumption expenditures and gross investment.[1]

Chart 1
S&L Governments Spent the Most on Education in Fiscal Year 2020



Source: U.S. Census Bureau (Haver Analytics).

In 2022, S&L governments' consumption expenditures and gross investment equaled $2.8 trillion. The blue bars in Chart 1 show S&L governments' combined consumption expenditures and gross investment by category. Education was the largest spending category for S&L governments, comprising $1.13 trillion in fiscal year 2020; the second and third largest spending categories were for utilities and hospitals.[2] With expenditures accounting for more than 10 percent of GDP, S&L governments are crucial to the provision of public services and infrastructure investment, and changes in the cyclicality of this sector's spending may have significant effects on the larger economy.

II. Changes in the Cyclicality of S&L Government Spending over Time

S&L government spending is conventionally viewed as procyclical, meaning it declines during recessions (Clemens and Miran 2012; Bohn and Inman 1996; Porterba 1994). Most studies, however, focus on trends since the 1980s, and thus may miss changes or patterns in the cyclicality of S&L government expenditures over a longer period.

We take a longer view of S&L government spending over the business cycle and consider all recessionary periods after 1950 as defined by the National Bureau of Economic Research (NBER). Since our goal is

to understand the cyclical contribution of S&L government expenditures to GDP, we apply the method from Hamilton (2017) to remove the time trend in real S&L government consumption and investment expenditures and instead focus on the cyclical component of the detrended time series.

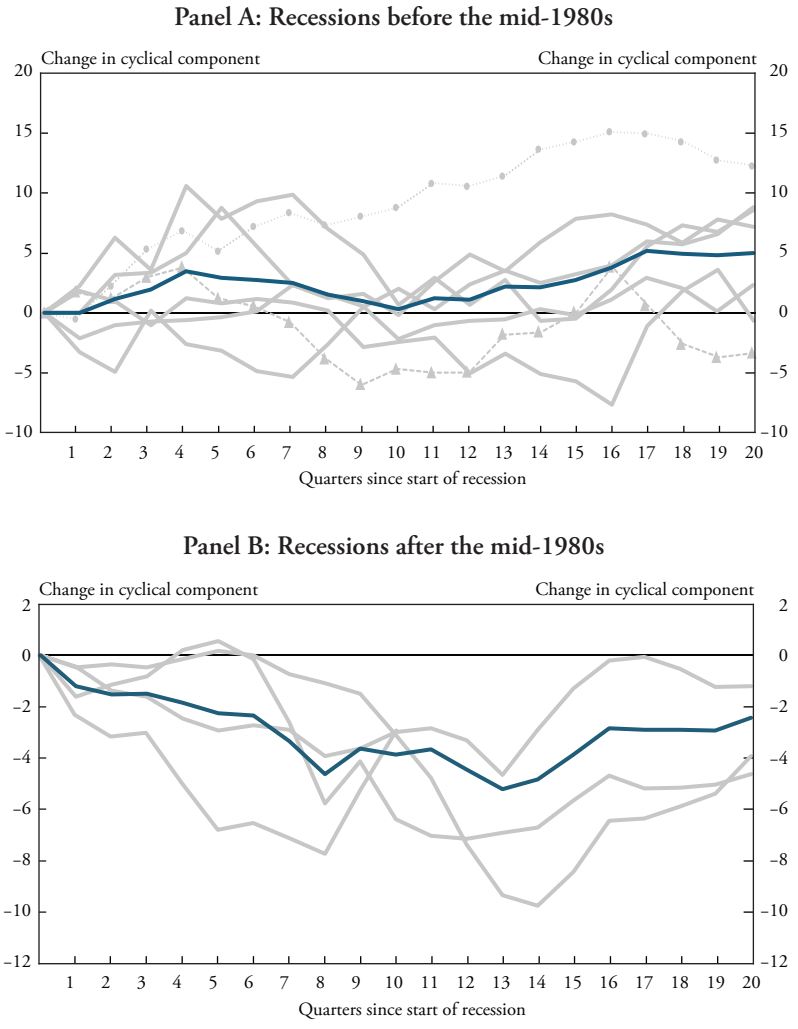
Our analysis suggests that the cyclicality of S&L government spending shifted in the mid-1980s. In Chart 2, Panels A and B split the data for recessions before and after the mid-1980s, respectively.[3] The horizontal axes show the number of quarters since the start of a recession, while the vertical axes show the cyclical components of S&L government consumption and investment expenditures relative to their values at the start of each recession.

Panel A illustrates that recessions prior to the mid-1980s do not display a clear pattern of cyclicality. The blue line in Panel A, which represents an average across the recessions during this period, shows both upward and downward patterns. Comparing the gray lines, which correspond to individual recessions, shows that S&L government spending has been procyclical during some recessions and countercyclical in others; in some cases, spending has varied within the same recession. For example, after the 1957 recession (gray triangles), S&L government spending increased in the first year and then began to decline for two years before rising again. Meanwhile, S&L government spending increased (that is, was countercyclical) after the recession that began in 1981 (gray dots) and remained elevated for four years before beginning to decline.

However, Panel B illustrates that since the mid-1980s, S&L government expenditures have shown a much more consistent pattern and been largely procyclical. The blue line highlights that *on average*, S&L government expenditures dropped in the quarter immediately following the start of a recession and only began to recover more than three years after the start of a recession. Comparing the gray lines in Panel B confirms that all recessions after the mid-1980s display this pattern, with expenditures decreasing immediately after the start of the recession as well as again after a couple of years. Overall, the contrast between Panels A and B highlights that the pattern of cyclicality for S&L spending changed after the mid-1980s.

Chart 2

S&L Government Expenditures Became Procyclical after the Mid-1980s



Note: Chart is constructed using the seasonally adjusted annual rate in billions of chained 2012 U.S. dollars.
Sources: U.S. Bureau of Economic Analysis (BEA) and NBER (both accessed through Haver Analytics); authors' calculations.

III. Potential Explanations for the Changing Cyclicality of S&L Government Expenditures

To understand why the cyclicality of S&L government expenditures changed after the mid-1980s, we examine the sources of S&L government funding. Almost all states have balanced budget requirements, which can dictate a tight relationship between S&L government expenditures and revenues. The two major revenue sources for S&L governments are receipts from tax collection and transfers from the federal government. Tax receipts account for 78 percent of general revenues, making them the primary source of revenue. Although federal transfers account for only about 22 percent of general revenues, they have been rising steadily over time and play an increasingly important role in S&L budgets.[4] In addition to these revenue sources, S&L governments also have the ability to borrow or drawdown their savings. We examine each of these possible funding sources in turn.

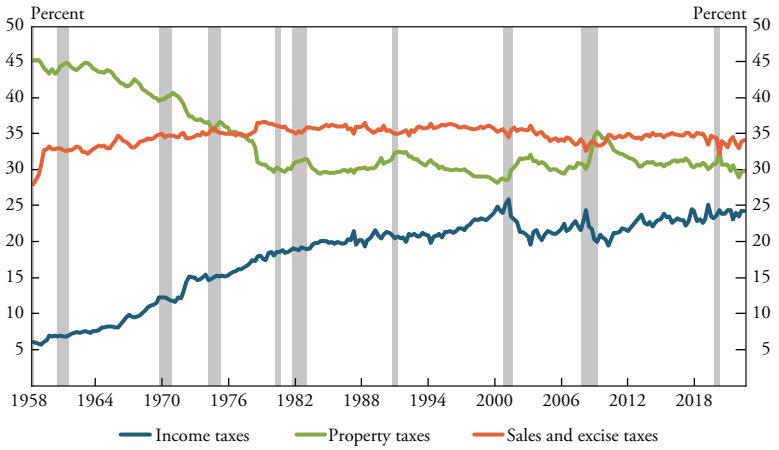
Tax revenues

During recessions, governments may be forced to cut expenditures due to tax revenue shortfalls (Clemens and Miran 2012). Because tax revenues make up the lion's share of S&L government receipts, changes in the cyclicality of tax revenues may be a key driver of changes in the cyclicality of S&L government spending after the mid-1980s.

The degree to which S&L government tax revenues are cyclical may be influenced by their composition, which has changed markedly since the 1950s. S&L governments collect tax revenues from three primary sources: property taxes, income taxes, and sales and excise taxes.[5] The orange line in Chart 3 shows that the share of tax revenues from sales and excise receipts has remained largely unchanged over time. In contrast, the shares of tax revenues from property taxes and income taxes have changed substantially. The share of total tax revenue from personal income taxes (blue line) increased from 6 percent in 1958 to 20 percent in the early 1980s and continued to increase into the early 2000s.[6] However, the share from property taxes (green line) declined from 45 percent in 1958 to about 30 percent in 1980; since then, the share has remained stable, fluctuating at around 30 percent.

Chart 3

The Share of Income Tax Revenues in Total Taxes Has Increased over Time



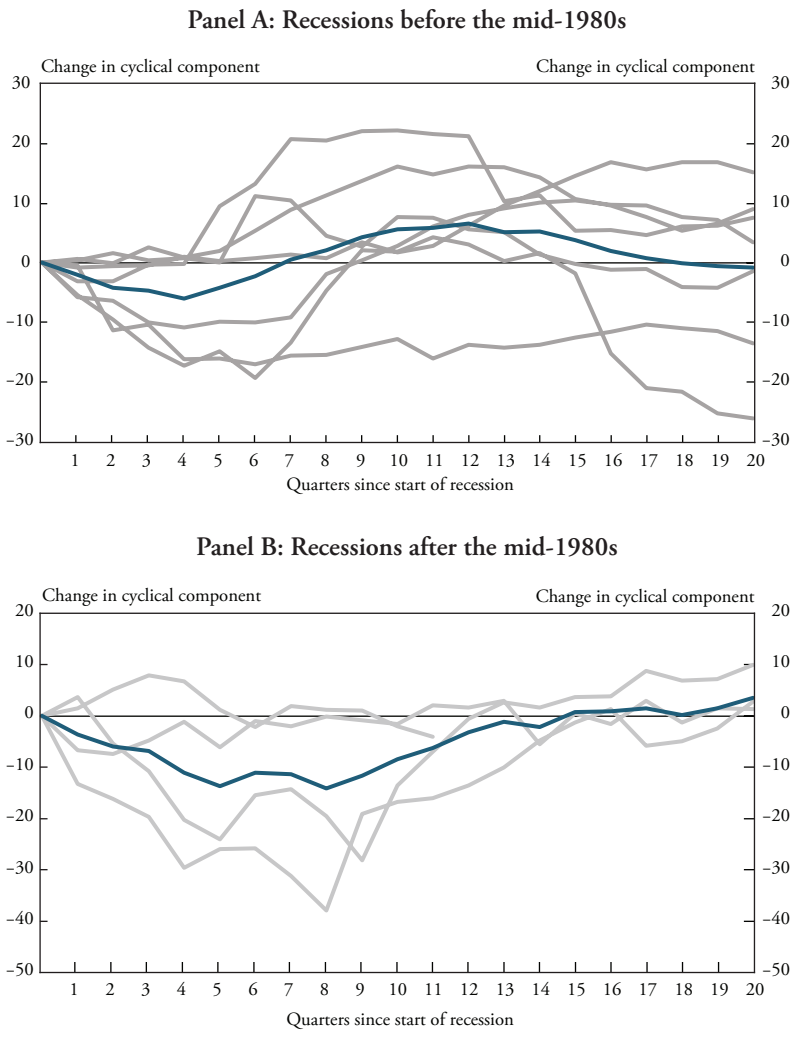
Note: Gray bars denote NBER-defined recessions.
Sources: BEA and NBER (both accessed through Haver Analytics); authors' calculations.

The declining share of property taxes in total tax revenue may have contributed to the change in the cyclicality of S&L government expenditures in the 1980s. Because property values are reassessed every few years, changes in property taxes generally lag the economic cycle. For most recessions since the 1960s, property taxes do not decline immediately after the start of a recession; instead, they decline only after a couple of years. Because property taxes are less procyclical than income taxes, the shift from property taxes to income taxes likely contributed to the change in S&L expenditure cyclicality since the 1980s.

However, we find that changes in the cyclicality of income tax revenues may play a more important role in explaining the changing cyclicality of government expenditures. Using the same methodology employed in Chart 2, Chart 4 suggests that changes in the cyclicality of real personal income tax receipts could explain the increased procyclicality of S&L expenditures. Panel A shows that S&L income tax receipts did not display clear cyclical patterns in recessions prior to the mid-1980s. However, Panel B shows that after the mid-1980s, S&L income tax receipts declined on average in the quarters following the start of a recession and only began to recover after nearly three years (blue line).[7]

Chart 4

Income Tax Revenues Have Become Procyclical since the Mid-1980s



Note: Chart is constructed using the seasonally adjusted annual rate in billions of chained 2012 U.S. dollars.
Sources: BEA and NBER (both accessed through Haver Analytics); authors' calculations.

Together, Charts 3 and 4 offer a potential explanation for the changing cyclicality of S&L government spending: after the mid-1980s, income tax revenues became both more cyclical and more important to total S&L government tax revenues. However, they do not explain what may have driven changes in the cyclicality of S&L income tax revenues.

Changes in the cyclicality of income tax revenue after the mid-1980s could arise from variations in the sensitivity of tax revenues to the state of the economy, changes in underlying tax laws, or both. Thus, a natural question is whether the income tax base became more procyclical after 1985 (that is, began decreasing more during recessions), or tax rates became more cyclical (that is, began increasing less or even declining during recessions).

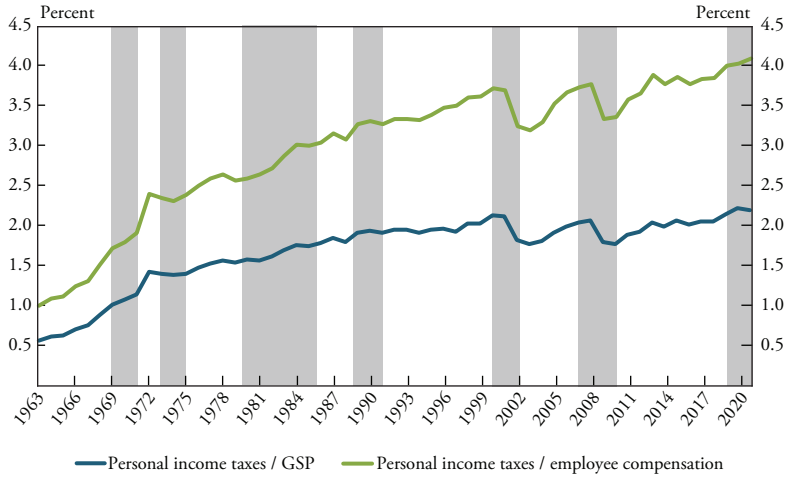
Previous research on this question offers a range of views. Sjoquist and Wallace (2003) show that capital gains increased as a share of taxable income in the mid and late 1990s, indicating the tax base may be more procyclical. However, McGranaham and Mattoon (2012) show that the average marginal tax rate on wages increased during the 1981 and 1990 recessions but remained largely unchanged following the 2001 and 2008 recessions, suggesting tax rates may have previously been countercyclical and become procyclical. Similarly, Maag and Merriman (2003) compare state tax policy responses to the 1990 and the 2001 recessions. They argue that states quickly enacted tax policy changes to raise revenue in the early 1990s but made few tax policy changes and relied more on expenditure cuts in 2001.

Although an in-depth review of these explanations is beyond the scope of this article, Chart 5 sheds some light on whether changes in the cyclicality of tax revenues after the mid-1980s are a result of changes in the tax base or tax policy following recessions. We scale sources of S&L tax revenues by a measure of the corresponding tax base to arrive at an implied average tax rate. A decrease in this ratio during recessionary periods implies that tax revenues are decreasing at a faster rate than changes in total income available to tax.

Chart 5 provides evidence that the increasing cyclicality of income tax rates may account for changes in the cyclicality of S&L government expenditures.[8] The blue line shows personal income taxes divided by gross state product (GSP). During the 2001 and 2008 recessions, personal income tax collections declined as a percentage of total income,

Chart 5

Implied Average Tax Rates May Have Become Procyclical



Note: Gray bars denote NBER-defined recessions.
Sources: BEA and NBER (both accessed through Haver Analytics); authors' calculations.

or GSP. As a check, we also consider an alternative approach using total employee compensation as a proxy for the tax base. The implied tax rate in this case (green line) yields a similar conclusion as our calculation using GSP, but the declines in recent recessions are steeper. Overall, these results suggest that after the mid-1980s, implied income tax rates began to decline after recessions.[9]

Although an in-depth investigation into the drivers of the decline in implied income tax rates in recent recessions is beyond the scope of this article, we note some possible explanations. S&L governments could have legislated tax cuts in recessions, lowering statutory tax rates. Alternatively, deteriorating economic conditions during recessions—such as job losses, lower wages, and lower capital gains—could have shifted individuals into lower marginal tax brackets, reducing the effective tax rate. This channel may be more pronounced in a deep recession. For instance, following the stock market crash of 2001, capital gains, wages for top executives, taxable stock options, bonuses, and other kinds of income related to investment sharply declined. These reductions led to significant declines in income tax revenues.

Intergovernmental transfers

Federal transfers and grants to S&L governments have been increasing over the years, rising from less than 10 percent of total S&L receipts in 1950 to more than 20 percent in 2019. Thus, cyclicality changes in federal transfers could be a potential contributing factor to changes in S&L government expenditures. However, Chart 6, which uses the same methodology employed in Chart 2, suggests otherwise. The blue line in Panel A shows that before the mid-1980s, real federal grants-in-aid to S&L governments showed no clear pattern. The blue line in Panel B shows that after the mid-1980s, federal grants on average increased following a recession, only beginning to consistently decline after three years. In other words, federal grants became countercyclical, in accordance with their purpose to provide monetary assistance to S&L governments following recessions. These increases in transfers should have helped stabilize expenditures; however, S&L expenditures declined more in these recessions (see Chart 2).

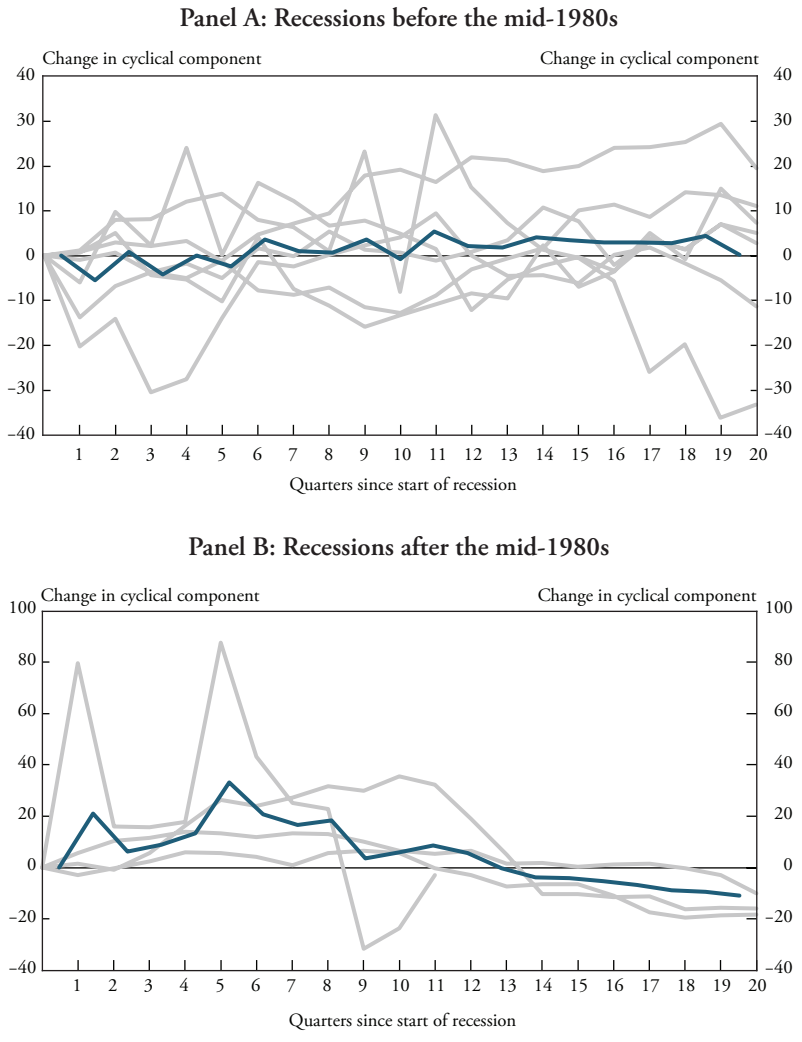
Alternative sources of financing

In addition to tax revenues and intergovernmental transfers, we might expect municipal bonds to contribute to the cyclicality of S&L spending, as they are another avenue for S&L financing, particularly for investment. However, a graph of only real S&L consumption expenditures would look virtually identical to the patterns of real S&L consumption and investment expenditures shown in Chart 2, suggesting the change in cyclicality stems from a change in the cyclicality of consumption, rather than investment, expenditures. Because governments face stringent restrictions on short-term borrowing to finance consumption expenditures, only a small portion of short-term municipal notes are used to bridge the gap between the time when expenses occur and revenues become available, while the majority of municipal bonds finance long-term investment. With these institutional constraints, it is hard to account for changes in the cyclicality of S&L government expenditures by movements in the municipal bond market.[10]

As an alternative to debt financing, S&L governments could withdraw from their savings to finance expenditures. Rainy day funds, or budget stabilization funds, are an institutionalized form of saving, such that states can save funds during an economic boom and withdraw

Chart 6

Federal Grants-in-Aid Have Been Largely Countercyclical since the Mid-1980s



Note: Chart is constructed using the seasonally adjusted annual rate in billions of chained 2012 U.S. dollars.
Sources: BEA and NBER (both accessed through Haver Analytics); authors' calculations.

from them during a recession. The funds are intended to help stabilize expenditures and reduce their procyclicality; however, many states did not adopt these funds until the 1980s. Given that expenditures were less procyclical before rainy day funds were introduced, rainy day funds cannot explain the change in expenditure cyclicality.[11] Furthermore, rainy day funds tend to be very small and would have been insufficient to cover budget shortfalls in recent recessions for most state and local governments (McNichol and Boadi 2011).

Conclusion

S&L government expenditures represent a significant portion of aggregate GDP and fulfill an essential role in the provision of public goods and services. S&L government spending is often thought to be procyclical and recover only sluggishly following recessions. We document that this pattern did not systematically emerge until the mid-1980s. In discussing possible explanations for the increased procyclicality, we suggest that changes in the cyclicality of income tax revenues may have played an important role. In particular, a growing reliance on income tax revenues coupled with an increase in the procyclicality of these revenues may account for the change in expenditure cyclicality.

Endnotes

[1]Depending on the context of policy discussions, S&L government expenditures can be considered from either a S&L government budgeting perspective or a national income accounting view related to the measurement of GDP. The national income and product accounting (NIPA) view of S&L government expenditures includes only consumption expenditures and gross investment, while the budgeting view covers all outlays including transfer payments to households and businesses.

[2]The expenditures for each category in Chart 1 include both consumption and investment spending, albeit to varying degrees. For instance, about 10 percent of education expenditures are on capital outlays, while close to 50 percent of highway expenditures are for investment. In addition, the relative comparison in Chart 1 remains unchanged for the pre-COVID period, such as in fiscal year 2019.

[3]In Chart 2, Panel A covers recessions in 1953, 1957, 1960, 1970, 1974, 1980, and 1981, while Panel B includes recessions in 1990, 2001, 2008, and 2020.

[4]Besides general revenues from intergovernmental transfers and tax receipts, S&L government total revenues also include other miscellaneous receipts, such as insurance trust revenues.

[5]Royalties and severance taxes are not a major revenue source for most states. Although they are important for some states that rely on certain energy resources (such as coal, oil, and gas), these states have seen similar changes in the cyclicality of their S&L expenditures.

[6]For S&L governments, personal income taxes are much more important than corporate income taxes. For instance, corporate income taxes accounted for 3.3 percent of total S&L tax revenues in 2020, while personal income taxes accounted for 23 percent.

[7]We use personal current income tax receipts and convert from nominal to real terms using the S&L consumption and gross investment price index, chained to 2012 U.S. dollars.

[8]We note that federal tax receipts do not exhibit the same change in cyclicality since the mid-1980s, further suggesting that the change in cyclicality at the S&L level is due to changes in S&L government tax policy, as opposed to changes in the sensitivity of the tax base to recessionary episodes.

[9]Property taxes as a share of total income also declined after the 1980s. Since property tax rates tend to be more countercyclical, the declining importance of property taxes may have partially contributed to the change in the cyclicality of S&L expenditures.

[10]In addition, total municipal debt increased substantially following most recent recessionary episodes. For instance, total outstanding municipal bonds rose from $1.5 trillion at the start of the 2001 recession to $2 trillion by 2004. These debt increases should have helped stabilize expenditures, the opposite of what we have observed.

[11]By fiscal year 1988, only half of the states had a positive balance in rainy day funds (White 2022).

References

Bohn, Henning, and Robert P. Inman. 1996. "Balanced-Budget Rules and Public Deficits: Evidence from U.S. States." *Carnegie-Rochester Conference Series on Public Policy*, vol. 45, pp. 13–76. Available at https://doi.org/10.1016/S0167-2231(96)00017-6

Clemens, Jeffrey, and Stephen Miran. 2012. "Fiscal Policy Multipliers on Subnational Government Spending." *American Economic Journal: Economic Policy*, vol. 4, no. 2, pp. 46–68. Available at https://doi.org/10.1257/pol.4.2.46

Hamilton, James D. 2017. "Why You Should Never Use the Hodrick-Prescott Filter." National Bureau of Economic Research, working paper no. 23429, May. Available at https://doi.org/10.3386/w23429

Maag, Elaine, and David Merriman. 2003. "Tax Policy Response to Revenue Shortfalls." Prepared for "State Fiscal Crises: Causes, Consequences, and Solutions," Urban Institute, Washington, DC, April 3.

McGranaham, Leslie, and Rick Mattoon. 2012. "State Tax Revenues over the Business Cycle: Patterns and Policy Responses." Federal Reserve Bank of Chicago, *Chicago Fed Letter*, no. 299, June.

McNichol, Elizabeth, and Kwame Boadi. 2011. "Why and How States Should Strengthen Their Rainy Day Funds." Center on Budget and Policy Priorities, February 3.

Porterba, James, M. 1994. "State Responses to Fiscal Crises: The Effects of Budgetary Institutions and Politics." *Journal of Political Economy*, vol. 102, no. 4, pp. 799–821. Available at https://doi.org/10.1086/261955

Sjoquist, David L., and Sally Wallace. 2003. "Capital Gains: Its Recent, Varied, and Growing (?) Impact on State Revenues." *State Tax Notes*, August 18, pp. 497–506.

White, Kathryn. 2022. "Data Analysis: State Rainy Day Fund Balances over Time." National Association of State Budget Officers, *Budget Blog*, February 22.