Where Did Pandemic-Era Fiscal Aid to States Land?*

Jeffrey Clemens Oliver Giesecke Joshua Rauh Stan Veuger

December 7, 2023

Abstract

Using variation in pandemic-era fiscal aid to states driven by the strength of political representation, we find that incremental pandemic-era fiscal aid to states was most likely to end up in the category of general administrative service spending and employee benefit funding. Spending on categories that motivated the aid in the first place, such as healthcare, education, and infrastructure, may also have increased but does not show robust patterns. Total state government revenues and expenditures had increased by around 70 cents per dollar of committed federal funds by 2022. Of this, the statistically significant categorical spending effects are 38 cents to general government expenditures (the residual that excludes healthcare, education, infrastructure, and other functional categories) and 7 cents to pension funding, even though the fiscal legislation that sent money to states in 2021 specified that those funds were not to be used for pension funding. States with tighter fiscal rules such as total expenditure limits were somewhat more likely to adhere to the intended use of funds.

Keywords: Pandemic fiscal aid, COVID-19, state and local governments, fiscal fundamentals, debt burden, pension funding, debt structure.
JEL codes: H55, H75, J26, J45

*We thank Seamus Duffy for excellent research assistance.

1 Introduction

In 2020 and 2021, federal lawmakers enacted nearly $1 trillion in financial aid for state and local governments. While to some extent legislated under uncertainty about the effects of COVID-19 on state and local government budgets (Clemens and Veuger (2020)), ultimately states found themselves with substantial surpluses after revenues far surpassed enacted budgets in 2021 and 2022 (NASBO (2022)). Furthermore, Clemens and Veuger (2021) show that stronger political representation at the state level increased per capita federal aid payments substantially across the four major relief packages: the CARES Act, the Families First Coronavirus Response Act (FFCRA), the Response and Relief Act (RRA), and the American Rescue Plan Act (ARPA).

Each of the main pieces of legislation carried restrictions on how states were permitted to use the funds. The CARES Act stipulated that funds could not be used for expenses that were planned for in the budget most recently approved before the passage date of the act. RRA required that the money be used for purposes directly related to pandemic impacts, including public health measures or economic relief. ARPA also required that funds be used to respond to the public health emergency or its negative economic impacts, and clarified additional conditions. Funds could be used to provide premium pay to essential workers and investments in infrastructure (such as water, sewer, and broadband). Funds could not be used to offset tax reductions or as contributions to pension funds.

This paper is the first comprehensive analysis of what states actually did with the resulting windfall funds. We draw on a unique data set that combines data from annual comprehensive financial reports (ACFRs) with pension and employee benefit funding and expenditures, and use the variation in federal aid generated by each state's number of congressional representations per million residents (as in Clemens and Veuger (2021)), we document the following facts. First, for every $1000 of committed federal aid per capita, $655 appears as increased intergovernmental grant revenue in states over the years 2020-2022, from which we infer that approximately $0.655 of every dollar of committed federal aid to state and local governments was disbursed to state governments by the end of fiscal year 2022. Second, total revenues of states increased by approximately as much, indicating that states did not offset the federal revenue windfall with other revenue sources. Third, total expenditures of states increased by $770 per capita for every $1000 of federal aid

committed, statistically indistinguishable from the revenue estimate. Fourth, the spending categories in which expenditures increase most strongly and significantly are General Government Expenditures ($379 per $1000 of federal aid) and state and local pension contributions ($74 per $1000 of federal aid). General government expenditures consists of the non-healthcare, non-educational functions of government, and include expenditures on administrative services and various departments. This category accounted for nearly half of the $770 spending increase we document while accounting for less than 10 percent of total expenditures. We do not find any statistically significant evidence that aid increased expenditures in any one of the functional categories of healthcare, education, or infrastructure, nor are there statistically significant increases in these aggregated functional categories, although we cannot reject the hypothesis that they also increased.

The results demonstrate that federal government money was more likely to end up in the general administrative services categories and employee benefit funding than in categories that motivated the aid in the first place. This paper therefore contributes to literature that considers what state and local governments do with money directed to them for specific, earmarked purposes (see for example Bundorf and Kessler (2022); Leung (2022) in the context of Medicaid matching grants and Baicker and Gordon (2006) in the context of state education spending). It also contributes the general effects of federal grants to states on state spending (Bradford and Oates (1971), Hines and Thaler (1995), Knight (2002)), and how intergovernmental grants are generally deployed (Clemens and Veuger (2023)), albeit in a context where specific restrictions were placed on the ability of states of return money directly to taxpayers. While it is documented that 43 states adopted some form of tax relief in 2021 or 2022 (Walczak (2023)), 21 of which cut state income tax rates, we do not find evidence consistent with these tax cuts being larger for states that received larger amounts of pandemic federal aid. We do find that the programs were largely successful in their goals to induce state governments to spend additional money. However, there was considerable leakage into general governmental administrative services and pension contributions also increased, despite explicit prohibitions on using the aid funds for the latter.

Our paper also relates to the corporate finance literature on what firms do with cash windfalls (Blanchard, de Silanes, and Shleifer (1994), Kaplan and Zingales (1997), Lamont (1997), Rauh (2006), Almeida, Campello, and Weisbach (2004), Riddick and Whited (2009)). Since funds were directly prohibited from being returned to taxpayers in the form of tax

cuts, one expects an even stronger effect on expenditures than without such constraints. Our finding that in fact states that received more federal aid also increased funding to pension plans suggests that the fungibility of public funds also limited the impact of the restrictions on what the windfalls could actually be used for. Furthermore, we find no measurable significant effect on infrastructure spending, highlighting the difficulties faced by the federal government if it wishes to induce state spending on specific purposes.

The finding that federal aid increased pension funding builds on the research that shows that decisions about the management and funding of pension liabilities generally take place in the context of considering the sponsoring entity and the pension program a consolidated entity (Bodie (1990), Jin, Merton, and Bodie (2006), Shivdasani and Stefanescu (2009), Cocco (2014)). Much of the associated research has focused on how shocks to pension funds affect investment or spending decisions by the sponsoring firms or governments (Rauh (2006), Shoag (2010)), or how the management of pension risk responds to financial conditions of the sponsoring entity (Rauh (2009), Love, Smith, and Wilcox (2011)), with some research on how the use of financial slack affects corporate pension funding (Bartram (2018)). Our findings show that despite legislative stipulations against using certain federal aid funding for pension contributions, states that received more aid in fact increased contributions to their pension funds.

In addition, we also study heterogeneous treatment effects of federal aid with respect to tax and expenditure limits (TELs), the fiscal rules that states have adopted to varying extents to tie their hands when it comes to imbalanced budgets (Poterba and Rueben (1995), Mullins and Cox (1995), Clemens and Miran (2012)). States with tighter fiscal rules such as total expenditure limits were somewhat more likely to adhere to the intended use of funds. Looser states make greater pension contributions in response to the aid and spend somewhat less of the aid money. These findings support the hypothesis that fiscal rules matter for the allocation of slack state financial resources.

This paper proceeds as follows. Section 2 describes the data, institutional setting, and summary statistics. Section 3 describes the empirical strategy. Section 4 presents the results. Section 5 concludes.

2 Data and Summary Statistics

2.1 Data Sources

Relief Measures We analyze federal aid resulting from the CARES Act, the Families First Coronavirus Response Act (FFCRA), the Response and Relief Act (RRA), and the American Rescue Plan Act (ARPA), which were the four major pieces of relief legislation enacted during the COVID-19 pandemic. Note that this section's description of COVID-19 relief legislation draws heavily on the description from Clemens and Veuger (2021). Readers interested in detailed legislative histories should look to the more expansive discussion there.

Taken together, the CARES Act, FFCRA, RRA, and ARPA provided as much as $6 trillion in income support to households, a combination of loans, grants, and tax relief to firms and non-profits, funding for (public) health efforts, and intragovernmental grants to sub-national governments. Our analysis focuses on this final category, which includes roughly $900 billion in aid to state and local government entities. Following Clemens and Veuger (2021), we use data from Committee for a Responsible Federal Budget (2021) as the primary source for constructing our fiscal assistance variables. More specifically, we use data from the Committee for a Responsible Federal Budget's (CRFB's) COVID-19 Money Tracker as of August 19th, 2021. Also as in Clemens and Veuger (2021), we supplement the CRFB data with information from several sources. Our main independent variable is the grand total of aid distributed to each state per resident in millions of dollars.

Figure 1 provides an initial look at the distribution of funds across states, separately for the four major pieces of pandemic relief legislation. The shading in the figure illustrates that the distribution of money across states has not been equal, with low-population states receiving relatively more per person than larger states. The magnitude and correlates of variations in aid across states will become more evidence as we anlalyze the first-stage relationship between aid and political representation.

Political Representation Instrument We use a state's number of congressional representatives per million residents to instrument for federal aid per capita. Clemens and Veuger (2021) establish a relationship between the relative representation of states in Congress and the amount of aid they were allocated during the pandemic. Smaller states receive

relatively more representation per capita due to the structure of the Senate, in which states have two senators regardless of population. We measure Congressional representation using rosters from the House of Representatives and Senate during the 116th and 117th Congresses from Lewis and Sonnet (2021). Because Congressional representation in 2020 was allocated according to state population in the 2010 census, it cannot have been influenced by the effects of the COVID-19 pandemic on population.

Fiscal Outcome Data State governments publish an annual report, the so-called annual comprehensive financial report ("ACFR"), similar to corporations. We collect total revenue and expenditure data, including their breakdown into major revenue and expenditure categories, and balance sheet items, such as cash and total debt, from these annual reports. In addition we use the aggregate financial strength score of Giesecke and Duffy (2023). Giesecke and Duffy construct their aggregate financial strength score from 10 fiscal dimensions, which include the liquidity and reserve position, leverage, as well as, pension and other post-employment benefit obligations, and funding pressure related to pension and other post-employment benefits.[1]

Pension Data We collect pension data from disclosures under Governmental Accounting Standards Board statement number 67 (GASB 67) from all state pension systems, plus a sample of local and other municipal plans, following Giesecke and Rauh (2022). The local plans consist of all municipal plans in the top 170 cities by population according to the US Census and the top 100 counties by population. Additionally, we collect associated school district and transportation authority pension systems where applicable. The result are 648 state and local funds: 271 state funds and 377 local funds. The sample covers approximately 90% of all assets of public pension funds in the United States. The GASB 67 disclosures contain information about employer and employee contributions, assets, and net pension liability. We classify pension plans as teacher plans based on information about their member composition. Concretely, we classify 43 state plans and 10 local plans as teachers' pension funds.

[1]The interactive version of the states' financial fundamentals is accessible via Stanford public finance dashboard, which is available at https://municipalfinance.stanford.edu/apps/page_state_fund_comp.

Government Credit Spreads An important market based indicator of the fiscal strength of an issuer is the credit spread. The credit spreads measure the compensation that investors receive for the risk taken when investing into the debt of an issuer. We use option-adjusted credit spreads for tax-exempt general obligation bonds of state governments from the Stanford Municipal Finance Dashboard.[2] The credit spreads are based on secondary market transactions of all debt securities of a state obligor in the municipal bond market.[3]

2.2 Summary Statistics

Table 1 shows the summary statistics of the instrument, the relief measure and other control variables and Table 2 shows the summary statistics of the outcome variables.

3 Empirical Strategy

3.1 Empirical Specification

We use an instrumental-variable approach to estimate the effect of federal relief to state and local governments on the revenue and expenditure decisions of state governments following the empirical strategy of Clemens, Veuger, and Hoxie (2022) and Clemens, Hoxie, Kearns, and Veuger (2023). The validity of the our empirical strategy is discussed in Subsection 3.2. Specifically, we estimate the following first stage:

$$Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i \tag{1}$$

where Aid_i is the allocated relief per capita to state and local governments and Repr. p.c.$_i$ is a state's number of congressional representatives per million residents as described in Subsection 2.1. X_i is a vector of pre-pandemic controls. The second stage of our instrumental-variable approach is:

$$\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i \tag{2}$$

[2]The Stanford Municipal Finance Dashboard is available at https://municipalfinance.stanford.edu.

[3]The linkage between debt securities and the obligor uses the universe of debt security disclosures under the U.S. Securities and Exchange Commission (SEC) Rule 15c2-12. More details can be found in Giesecke, Mateen, and Jardim Sena (2022).

where $\Delta Y_{i,t,t+1}$ is the change of the outcome variables between fiscal year 2019 and 2022. $\widehat{Aid_i}$ is the predicted value of relief from the first stage.

In our baseline specification we exclude Alaska, North Dakota, and Wyoming due to the degree of their reliance on severance taxes. Over the course of the pandemic, fossil fuel prices exhibited substantial variation unrelated to economic fundamentals or pandemic relief. We show in additional specifications that including the three states and controlling for the severance tax share yields quantitatively and qualitatively similar results.

We conduct additional robustness checks with respect to the control vector. Omitting pre-pandemic controls has a limited effect on the size and statistical significance of our estimate. Similarly, our estimates are little affected by including additional controls for trends in the pre-pandemic labor market and eligibility for the Municipal Liquidity Facility.

3.2 Instrument Relevance and Exogeneity

A valid instrument must satisfy both the relevance and exogeneity (or exclusion) restrictions. To serve as a good instrument, congressional representation first needs to be statistically related, or relevant, to the amount of aid disbursed by the federal government. As established by Clemens and Veuger (2021), Congressional representation per million residents has a strong relationship with per capita distributions of federal aid to state and local governments. As can be seen in Figure 2, states with high levels of representation received far more aid per resident than did the less populous and thus less intensively represented states. Indeed, an additional representative per million residents predicts just under $1,000 in additional aid per resident, with several of the more intensively represented states receiving more than $2,000 per capita more in federal aid than did the less highly represented states.

As shown in previous work (Clemens, Veuger, and Hoxie, 2022; Clemens, Hoxie, Kearns, and Veuger, 2023), the relationship between congressional representation and allocations of fiscal assistance emerged strongly with the March 2020 passage of the CARES Act and was strengthened further with the March 2021 passage of the ARP Act. In all months after March 2020, the relationship between the instrumental variable is both economically substantial and statistically significant at the 1 percent level, with estimates for months extending from April 2020 through March 2021 being around $650 per capita and

rising to roughly $1,000 beginning in April 2021.

Our baseline first-stage F-statistic of 64.58 (see column 1 of Table 3) substantially exceeds the traditional rule-of-thumb threshold value of 10 used to reject a null hypothesis of weak instruments (Stock and Yogo, 2002). Our first-stage is also robust to the combination of pre-pandemic controls included in the regression, as shown in Table 3. The estimated F-statistic remains large whether we use our baseline covariate set, an augmented covariate set, or estimate the first stage without a supplemental covariate set. The point estimate describing the relationship between the instrument and federal aid is little changed across specifications, ranging from 0.850 to 0.865 across the four columns of Table 3. Additionally, the point estimates from specifications with covariates differ little from the bivariate regression coefficient of 0.84, as shown in Figure 2.

The exogeneity (or exclusion) restriction requires that, conditional on the variables included in the covariate set, congressional representation must be structurally unrelated to other factors that influenced state and local government budgets during the pandemic. Here it becomes relevant to more fully discuss both our sample inclusion criteria and the variables we include in the vector X_i. In our baseline specification, X_i includes growth of state s's real GDP per capita in the year preceding the pandemic. In a more extensively controlled specification, X_i further includes the share of population in state s that lives in a local jurisdiction eligible for financing through the Federal Reserve's Municipal Liquidity Facility, as well as the pre-pandemic changes in state and local government employment per capita and separately, in private employment per capita.

Importantly, the data support the general argument that the degree of a state's over- or under-representation was largely unrelated to the needs it faced as a consequence of the pandemic. The Clemens and Veuger (2021) analysis of the small-state advantage shows that it is more or less orthogonal to an extensive set of proxies for dimensions of state and local government funding needs, including forecasted revenue shocks, economic shocks, the size of their public sector, and acreage of federal land. Controlling for these dimensions of perceived or actual need does not qualitatively affect the relationship between our instrument and the amount of federal funds allocated.

One factor that does emerge as a correlate of both aid and state revenues during the pandemic's initial months is the reliance of states on natural resource related severance taxes. In particular, large flows of aid went to resource rich Alaska, North Dakota, and Wyoming,

each of which are also states at the top of the distribution of severance tax reliance. This is relevant because severance tax revenues were hit particularly hard by the decline in oil prices as well as in the initiation of new resource extraction efforts. We take two approaches to accounting for this issue. Our first approach is to remove the three outlier states from the sample. Our second approach is to leave these states in the sample while controlling directly for the severance tax share and potentially related macroeconomic factors. Because the former approach is econometrically cleaner than the latter, it is our preferred approach.

4 Results

The federal government delivered unprecedented amounts of aid to state and local governments during the pandemic. We assess where those dollars ended up by analyzing five sets of outcomes, related to revenues, expenditures, pension contributions, and balance sheets.

4.1 Revenue Outcomes

Table 4 presents estimates of Equation 2 for outcomes related to state revenues. Columns 1 through 3 show the impact of an additional $1,000 per capita on three types of state revenue: revenue from intergovernmental grants, tax revenue, and other own-source revenue.

As one might expect, additional federal aid to state and local governments translates into an increase in intergovernmental grant revenue for the state, at a rate of about 65%. There are at least two straightforward reasons why we might expect this number to smaller than 100%: not all monies had been disbursed yet by the end of 2022, and some it went directly to local and other subnational governments.

The other two categories of state revenue do not show an impact from federal aid that is significantly different from zero at conventional confidence levels. This is in line with the small impact of the aid on macroeconomic activity estimated by Clemens, Veuger, and Hoxie (2022). The overall effect on revenue, in Column 4, is close to $700 for an additional $1,000 in federal aid, and indistinguishable from the effect on intergovernmental grant revenue.

4.2 Expenditure Outcomes

In Table 5 we study the consequences of federal aid for various expenditure outcomes. An additional $1,000 in federal aid leads to over $770 in additional expenditure overall, split, in terms of point estimates, almost evenly between a precisely estimated $379 increase in general government expenditures and an imprecisely estimated increase in all other expenditures. General government includes the legislative branch, the staff of the state's executive, and the budget of various general purpose governmental departments like the finance division, the department of revenue, and other miscellaneous administrative divisions. Notably, general government expenditures accounts less than 10 percent of state spending, but accounted for nearly half ($379 out of $770) of the spending increases we link to federal aid. All other expenditures represents healthcare, educational, public safety, and miscellaneous expenses. Table A.7 breaks down other expenditures into these finer subcategories.

4.3 Pension Outcomes

Table 6 delves into a particular type of expenditures: pension contributions. Looking at 271 state pensions and 377 local plans, Column 1 shows that for each $1,000 in federal aid, an additional $74 made its way into pension funds. Looking at the type of pensions plans into which these contributions were made, Column 4 highlights that teacher pension plans played a particularly important role, seeing contributions increase by close to $73 for each $1,000 in federal aid. This amount is estimated with sufficient precision that we can rule out amounts below $36. Columns 2 and 3, on the other hand, suggest that our estimates of additional contributions to state and local funds–there are teacher plans in both categories–are not precise enough to distinguish them from zero.

4.4 Balance Sheet Outcomes

Turning from flows to stocks, Table 7 assesses the impact of federal aid on state balance sheets. Perhaps unsurprisingly given the in- and outflows documented above, we do not observe a statistically impact on financial strength scores, liquid assets, cash holdings, or debt. Figure 3 documents a similar lack of consequences for general obligation bond spreads.

4.5 Fiscal Rules

Finally, w study heterogeneous treatment effects of federal aid with respect to tax and expenditure limits (TELs), rules that states have adopted to varying extents to tie their hands when it comes to imbalanced budgets (Poterba and Rueben (1995), Mullins and Cox (1995), Clemens and Miran (2012)). Table A.11 shows that states with looser rules make greater pension contributions in response to the aid.

4.6 Robustness Tests

We present results for a battery of robustness tests in various appendix tables and figures. Table A.1 presents our main results for the full sample of states, adding back in the three states with large severance tax shares (Alaska, North Dakota, and Wyoming). While the estimates are less precise, and the revenue results in particular are affected by the role severance tax plays in these over-represented states, the broad picture stands unchanged: additional federal grants raise revenue and spending, especially general government expenditures. Tables A.2, A.3, A.4, and A.5 illustrate that these central results are not qualitatively affected by varying the set of controls. More specifically, Table A.2 demonstrates that our results are not sensitive to the exclusion of covariates altogether, while Table A.3 shows that are results are not sensitive to augmenting the covariate set with additional controls for pre-pandemic macroeconomic trajectories and for differential access to the Federal Reserve's municipal lending facility. Table A.4 shows that the estimates we obtain when the high severance tax states are returned to the sample are also robust to the inclusion of these additional controls. Table A.5 shows that our baseline estimates are robust to the addition of a control for the stringency of the economic restrictions states imposed in response to the pandemic. Table A.6 shows our results for pension contributions are similarly robust.

5 Conclusion

Our analysis provides the first comprehensive assessment of how state governments have ultimately utilized the windfalls in federal aid they received through COVID-19 relief legislation. As detailed above, we draw on a unique dataset and an estimation strategy that leverages the dramatic variations in funds that were committed to states with low vs. high

levels of per resident representation in the U.S. Congress.

Our analysis documents the following facts. First, for every $1000 of committed federal aid per capita, $655 appears as increased intergovernmental grant revenue in states over the years 2020-2022. Second, total revenues of states increased by approximately as much, indicating that states did not offset the federal revenue windfall with other revenue sources. Third, total expenditures of states increased by $770 per capita for every $1000 of federal aid committed, statistically indistinguishable from the revenue estimate. Fourth, the spending categories in which expenditures increase most strongly and significantly are General Government Expenditures ($379 per $1000 of federal aid) and state and local pension contributions ($74 per $1000 of federal aid). General government expenditures consists of the non-healthcare, non-educational functions of government, and include expenditures on administrative services and various departments. This category accounted for nearly half of the $770 spending increase we document while accounting for less than 10 percent of total expenditures. We do not find any statistically significant evidence that aid increased expenditures in any one of the functional categories of healthcare, education, or infrastructure, nor are there statistically significant increases in these aggregated functional categories, although we cannot reject the hypothesis that they also increased. Finally, we find that an addition $1000 of federal aid generated a roughly $70 increase in contributions to state and local pension plans, even though the fiscal legislation that sent money to states in 2021 specified that those funds were not to be used for pension funding.

With no observed increases in liquid cash positions and essentially full spending of received aid, our findings suggest that the pandemic aid programs were largely successful in their goals to induce state governments to spend additional money. However, we also find evidence of considerable leakage into general governmental administrative services, while pension contributions increased as well, despite explicit prohibitions on using the aid funds for the latter.

References

ALMEIDA, H., M. CAMPELLO, AND M. S. WEISBACH (2004): "The Cash Flow Sensitivity of Cash," *The Journal of Finance*, 59(4), 1777–1804.

BAICKER, K., AND N. GORDON (2006): "The effect of state education finance reform on total local resources," *Journal of Public Economics*, 90(8), 1519–1535.

BARTRAM, S. M. (2018): "In good times and in bad: Defined-benefit pensions and corporate financial policy," *Journal of Corporate Finance*, 48, 331–351.

BLANCHARD, O. J., F. L. DE SILANES, AND A. SHLEIFER (1994): "What do firms do with cash windfalls?," *Journal of Financial Economics*, 36(3), 337–360.

BODIE, Z. (1990): "The ABO, the PBO and Pension Investment Policy," *Financial Analysts Journal*, 46(5), 27–34.

BRADFORD, D. F., AND W. E. OATES (1971): "The Analysis of Revenue Sharing in a New Approach to Collective Fiscal Decisions," *The Quarterly Journal of Economics*, 85(3), 416–439.

BUNDORF, M. K., AND D. P. KESSLER (2022): "The Responsiveness of Medicaid Spending to the Federal Subsidy," *National Tax Journal*, 75(4), 661–680.

CLEMENS, J., P. HOXIE, J. KEARNS, AND S. VEUGER (2023): "How did federal aid to states and localities affect testing and vaccine delivery?," *Journal of Public Economics*, 225, 104972.

CLEMENS, J., AND S. MIRAN (2012): "Fiscal Policy Multipliers on Subnational Government Spending," *American Economic Journal: Economic Policy*, 4(2), 46–68.

CLEMENS, J., AND S. VEUGER (2020): "Implications of the COVID-19 pandemic for state government tax revenues," *National Tax Journal*, 73(3), 619–644.

——— (2021): "Politics and the distribution of federal funds: Evidence from federal legislation in response to COVID-19," *Journal of Public Economics*, 204, 104554.

——— (2023): "Intergovernmental Grants and Policy Competition: Concepts, Institutions, and Evidence," *NBER Working Paper 31251*.

CLEMENS, J., S. VEUGER, AND P. HOXIE (2022): "Was Pandemic Fiscal Relief Effective Fiscal Stimulus? Evidence from Aid to State and Local Governments," *NBER Working Paper 30168*.

COCCO, J. A. F. (2014): "Corporate Pension Plans," *Annual Review of Financial Economics*, 6(1), 163–184.

COMMITTEE FOR A RESPONSIBLE FEDERAL BUDGET (2021): "COVID-19 Money Tracker," *https://www.covidmoneytracker.org/*.

GIESECKE, O., AND S. DUFFY (2023): "State and Local Government Financial Fundamentals," *Available at SSRN*.

GIESECKE, O., H. MATEEN, AND M. JARDIM SENA (2022): "Local government valuation," *Available at SSRN 4160225*.

GIESECKE, O., AND J. D. RAUH (2022): "Trends in State and Local Pension Funds," *Annual Review of Financial Economics*, 15, 221–238.

HINES, J. R., AND R. H. THALER (1995): "The Flypaper Effect," *Journal of Economic Perspectives*, 9(4), 217–226.

JIN, L., R. C. MERTON, AND Z. BODIE (2006): "Do a firm's equity returns reflect the risk of its pension plan?," *Journal of Financial Economics*, 81(1), 1–26.

KALLEN, C. (2017): "State tax expenditure limitation and supermajority requirement: New and updated data," .

KAPLAN, S. N., AND L. ZINGALES (1997): "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?," *The Quarterly Journal of Economics*, 112(1), 169–215.

KNIGHT, B. (2002): "Endogenous Federal Grants and Crowd-out of State Government Spending: Theory and Evidence from the Federal Highway Aid Program," *American Economic Review*, 92(1), 71–92.

LAMONT, O. (1997): "Cash Flow and Investment: Evidence from Internal Capital Markets," *The Journal of Finance*, 52(1), 83–109.

LEUNG, P. (2022): "State responses to federal matching grants: The case of medicaid," *Journal of Public Economics*, 216, 104746.

LEWIS, J. B. K. P. H. R. A. B. A. R., AND L. SONNET (2021): "Voteview: Congressional Roll-Call Votes Database," *https://voteview.com/*.

LOVE, D. A., P. A. SMITH, AND D. W. WILCOX (2011): "The effect of regulation on optimal corporate pension risk," *Journal of Financial Economics*, 101(1), 18–35.

MULLINS, D., AND K. COX (1995): *Tax and Expenditure Limits on Local Governments*. Advisory Council on Intergovernmental Relations.

NASBO (2022): *Fiscal Survey of States*.

POTERBA, J. M., AND K. S. RUEBEN (1995): "The Effect of Property-Tax Limits on Wages and Employment in the Local Public Sector," *The American Economic Review*, 85(2), 384–389.

RAUH, J. D. (2006): "Investment and Financing Constraints: Evidence from the Funding of Corporate Pension Plans," *The Journal of Finance*, 61(1), 33–71.

——— (2009): "Risk Shifting versus Risk Management: Investment Policy in Corporate Pension Plans," *The Review of Financial Studies*, 22(7), 2687–2733.

RIDDICK, L. A., AND T. M. WHITED (2009): "The Corporate Propensity to Save," *The Journal of Finance*, 64(4), 1729–1766.

SHIVDASANI, A., AND I. STEFANESCU (2009): "How Do Pensions Affect Corporate Capital Structure Decisions?," *The Review of Financial Studies*, 23(3), 1287–1323.

SHOAG, D. (2010): "The Impact of Government Spending Shocks: Evidence on the Multiplier from State Pension Plan Returns," .

STOCK, J. H., AND M. YOGO (2002): "Testing for weak instruments in linear IV regression," *NBER Technical Working Paper 284*.

WALCZAK, J. (2023): "There's Still Room for Responsible State Income Tax Relief in 2023," .

Figures and Tables

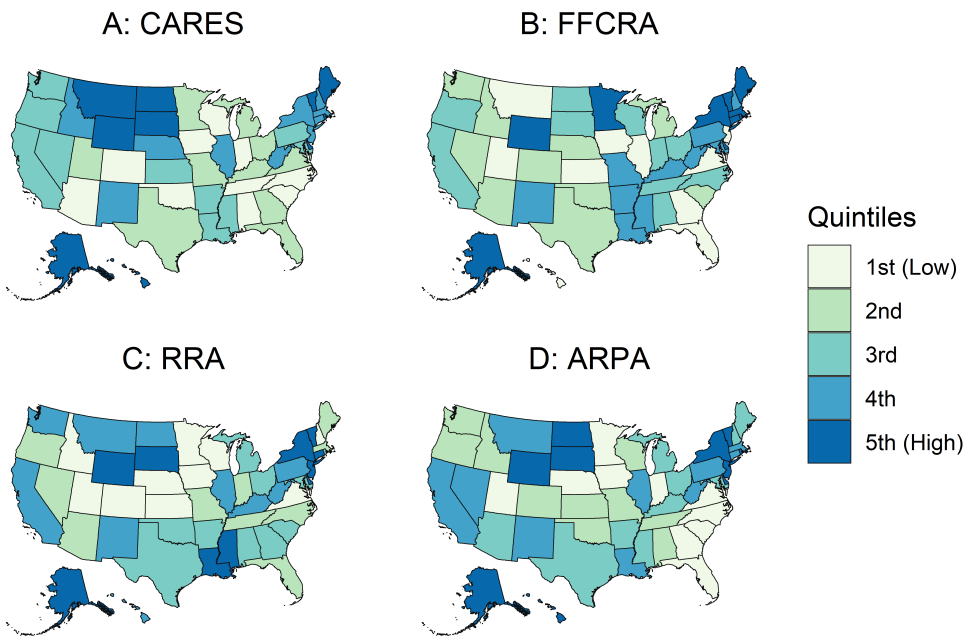


Figure 1: Pandemic Aid by Relief Package

Notes: This figure shows the quintiles of total state and local government funds per capita for the 50 US states by bill. The quintiles are shown for the CARES Act, Families First Act, Recovery and Relief Act, and American Rescue Plan Act in panels A, B, C, and D respectively. This figure appeared earlier as Figure A2 in Clemens and Veuger (2021).

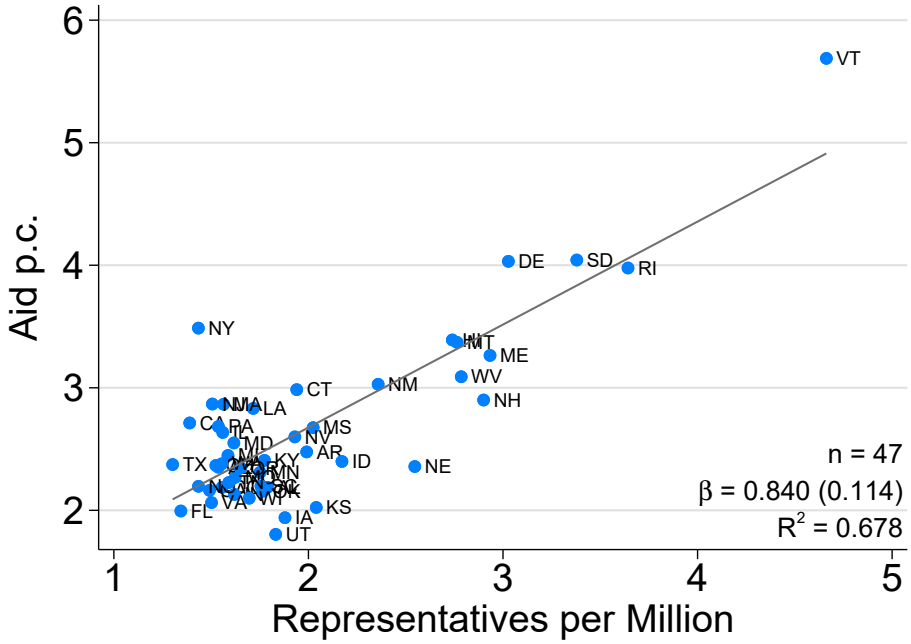


Figure 2: Representatives per Million and Pandemic Aid Per Capita

Notes: The figure shows the bivariate scatter plot between the representatives per million and the aid per capita for our baseline sample.

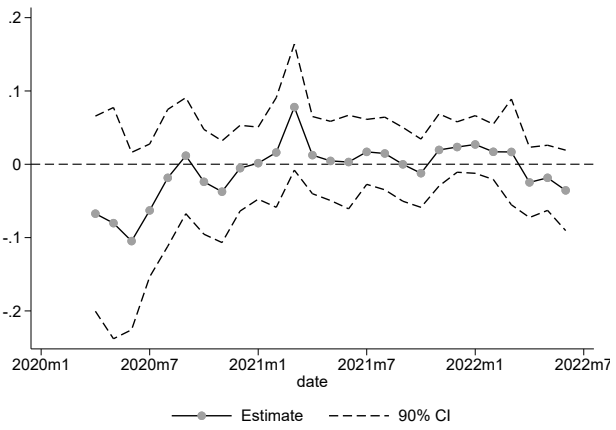


Figure 3: Pandemic Aid and Credit Spreads

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. $\Delta Y_{i,t,t+1}$ measures the change in the credit spread with respect to January 2020. The sample includes all 32 states for which tax-exempt general obligations bond transactions in the secondary market are available. Dashed lines represent the 90% confidence interval of the estimates.

	Mean	p25	p50	p75	count
Aid p.c. (thsd USD)	2.826	2.197	2.462	3.029	50
Federal Reps. per Million	2.137	1.557	1.761	2.547	50
Δ Public Empl. '18-'19	0.020	-0.022	0.026	0.058	50
Δ Private Empl. '18-'19	0.226	0.041	0.257	0.396	50
Δ Real GDP p.c. '18-'19	0.096	0.046	0.090	0.137	50
Sh. Pop. Municipal Liquidity Facility	0.423	0.256	0.378	0.552	50
Severance Tax Share	0.019	0.005	0.012	0.018	50
S&L NPL p.c. '19	4319.878	2073.421	3532.545	5074.365	50
State NPL p.c. '19	3925.741	2047.218	3402.014	4992.421	50
Local NPL p.c. '19	615.838	114.040	282.197	749.529	32
Teacher NPL p.c. '19	2421.631	1622.927	2028.058	3018.445	33
Oxford Stringency Index	0.235	0.222	0.229	0.245	50

Table 1: Control Variable Summary Statistics

Notes: The table shows the summary statistics of the instrument, the relief measure and other control variables. An observation count of less than 50 indicates that the information is unavailable for some states.

	Mean	p25	p50	p75	count
$\Delta_{'19-'22}$ Teacher Contr. (USD)	84.854	23.661	43.707	107.504	33
$\Delta_{'19-'22}$ Local Contr. (USD)	18.500	2.412	8.556	17.670	32
$\Delta_{'19-'22}$ State Contr. (USD)	191.179	73.130	118.945	257.020	50
$\Delta_{'19-'22}$ S&L Contr. (USD)	203.020	76.887	124.901	266.211	50
$\Delta_{'19-'22}$ Liquid Assets (USD)	1442.006	954.234	1299.329	1613.251	48
$\Delta_{'19-'22}$ Cash (USD)	960.215	340.009	916.093	1455.335	48
$\Delta_{'19-'22}$ Debt (USD)	126.739	-64.680	37.140	216.568	26
$\Delta_{'19-'22}$ Aggregate Financial Score (0-100)	10.883	7.646	10.589	14.626	48
$\Delta_{'19-'22}$ Total Exp. (USD)	5386.032	3978.162	4953.894	6474.356	48
$\Delta_{'19-'22}$ Gen Gov't Exp. (USD)	478.364	146.087	388.112	790.388	48
$\Delta_{'19-'22}$ Other Own Rev. (USD)	555.938	202.746	319.419	662.476	48
$\Delta_{'19-'22}$ Funct. Exp. (USD)	2204.082	1285.773	2045.955	2805.517	48
$\Delta_{'19-'22}$ Public Safety Exp. (USD)	202.479	4.218	87.675	206.358	33
$\Delta_{'19-'22}$ Education Exp. (USD)	600.024	449.872	635.700	858.589	48
$\Delta_{'19-'22}$ Health Exp. (USD)	1496.021	785.292	1430.359	2177.181	47
$\Delta_{'19-'22}$ Misc Exp. (USD)	2703.586	1725.266	2477.327	3549.104	48
$\Delta_{'19-'22}$ Total Tax (USD)	1308.313	915.411	1358.058	1804.636	48
$\Delta_{'19-'22}$ Intergov. Grants (USD)	4482.687	3309.931	4201.641	5390.793	48
$\Delta_{'19-'22}$ Other Own Rev. (USD)	555.938	202.746	319.419	662.476	48
$\Delta_{'19-'22}$ Total Rev. (USD)	6346.938	4887.469	5778.454	7622.610	48

Table 2: Outcome Variable Summary Statistics

Notes: The table shows the summary statistics of outcome variables. An observation count of less than 50 indicates that the information is unavailable for some states.

	Aid p.c. (thsd USD)			
	(1)	(2)	(3)	(4)
Federal Reps. per Million	0.857***	0.863***	0.850***	0.865***
	(0.107)	(0.0933)	(0.144)	(0.112)
Δ Real GDP p.c. '18-'19	1.712	1.823*	1.020	1.027
	(1.047)	(1.048)	(1.616)	(1.464)
Severance Tax Share		0.0116**		0.0120*
		(0.00481)		(0.00600)
Δ Public Empl. '18-'19			-0.908	-1.121
			(1.225)	(1.120)
Δ Private Empl. '18-'19			-0.228	-0.193
			(0.303)	(0.311)
Δ Real Wages p.c. '18-'19			2.028	2.220
			(2.710)	(2.160)
Δ Real Income p.c. '18-'19			-0.263	-0.130
			(1.343)	(1.284)
Sh. Pop. Municipal Liquidity Facility			0.556**	0.543**
			(0.245)	(0.237)
Constant	0.793***	0.753***	0.618**	0.543**
	(0.230)	(0.199)	(0.275)	(0.209)
R^2	0.706	0.839	0.732	0.856
F-stat on excluded instrument	64.577	85.709	34.651	59.633
Observations	47	50	47	50

Table 3: TSLS - First Stage Estimates

Notes: The table displays the first stage of a two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Alaska, North Dakota, and Wyoming are omitted in columns (1) and (3) due to the large severance tax share in their revenue composition. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Intergov. Grants	$\Delta_{'19-'22}$ Total Tax	$\Delta_{'19-'22}$ Other Own Rev.	$\Delta_{'19-'22}$ Total Rev.
	(1)	(2)	(3)	(4)
Aid p.c. (thsd USD)	645.8**	68.66	-36.13	678.3**
	(276.7)	(113.3)	(112.9)	(340.5)
Δ Real GDP p.c. '18-'19	4614.9*	2716.7**	1840.0	9171.6**
	(2660.6)	(1191.9)	(1848.9)	(3986.3)
Constant	2300.9***	987.2***	437.7	3725.8***
	(754.7)	(331.4)	(423.6)	(920.3)
R^2	0.341	0.123	0.029	0.343
Dependent Variable Mean 2019	2295	3039	1297	6631
Model	IV	IV	IV	IV
Observations	45	45	45	45

Table 4: Pandemic Aid and Primary Government Revenue Outcomes (Cumulative Per Capita), 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variables are measured as cumulative per capita changes. That is, we use the cumulative change in FY 2020-2022 in excess of those in FY 2019 in the numerator. The outcome variables are expressed as USD per capita. Total revenues consist of intergovernmental grants, total tax revenue, and other own source revenue. Intergovernmental grants constitutes operating, capital, and general purpose grants. Total taxes include sales, property, income, and other miscellaneous taxes. Notable other sources of own source revenue include investment earnings and service charges. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Total Exp.	$\Delta_{'19-'22}$ Gen Gov't Exp.	$\Delta_{'19-'22}$ All Other Exp.
	(1)	(2)	(3)
Aid p.c. (thsd USD)	770.1**	378.5***	391.6
	(340.9)	(127.8)	(344.2)
Δ Real GDP p.c. '18-'19	7070.0*	-440.0	7509.9**
	(3854.9)	(1001.6)	(3460.1)
Constant	2759.7***	-468.8	3228.5***
	(872.9)	(338.2)	(937.1)
R^2	0.321	0.100	0.225
Dependent Variable Mean 2019	6309	419	5890
Model	IV	IV	IV
Observations	45	45	45

Table 5: Pandemic Aid and Primary Government Expenditure Outcomes (Cumulative Per Capita), 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variables are measured as cumulative per capita changes. That is, we use the cumulative change in FY 2020-2022 in excess of those in FY 2019 in the numerator. The outcome variables are expressed as USD per capita. General government expenditures consists of the non-healthcare, non-educational functions of government. This includes the legislative branch, the staff of the state's executive, and the budget of various general purpose governmental departments like the finance division, the department of revenue, and other miscellaneous administrative divisions. All other expenditure represents healthcare, educational, public safety, and miscellaneous expenses. Total expenses are the sum of all other expenditure, general government expenses, and infrastructure expenses. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ S&L Contr.	$\Delta_{'19-'22}$ State Contr.	$\Delta_{'19-'22}$ Local Contr.	$\Delta_{'19-'22}$ Teacher Contr.
	(1)	(2)	(3)	(4)
Aid p.c. (thsd USD)	71.97*	68.77*	0.293	80.27***
	(38.16)	(39.46)	(3.045)	(19.98)
Δ Real GDP p.c. '18-'19	-374.1	-307.7	-68.35	-221.7
	(269.8)	(219.7)	(135.3)	(217.0)
S&L NPL p.c. '19	0.0378***			
	(0.00498)			
State NPL p.c. '19		0.0371***		
		(0.00545)		
Local NPL p.c. '19			0.0270***	
			(0.00763)	
Teacher NPL p.c. '19				0.0277***
				(0.0107)
Constant	-111.2	-103.6	7.939	-175.7***
	(96.04)	(100.1)	(9.274)	(47.32)
R^2	0.549	0.512	0.462	0.442
Dependent Variable Mean 2019	360	316	64	166
Model	IV	IV	IV	IV
Observations	47	47	32	31

Table 6: Pandemic Aid and Pension Contribution Outcomes (Cumulative Per Capita), 2022

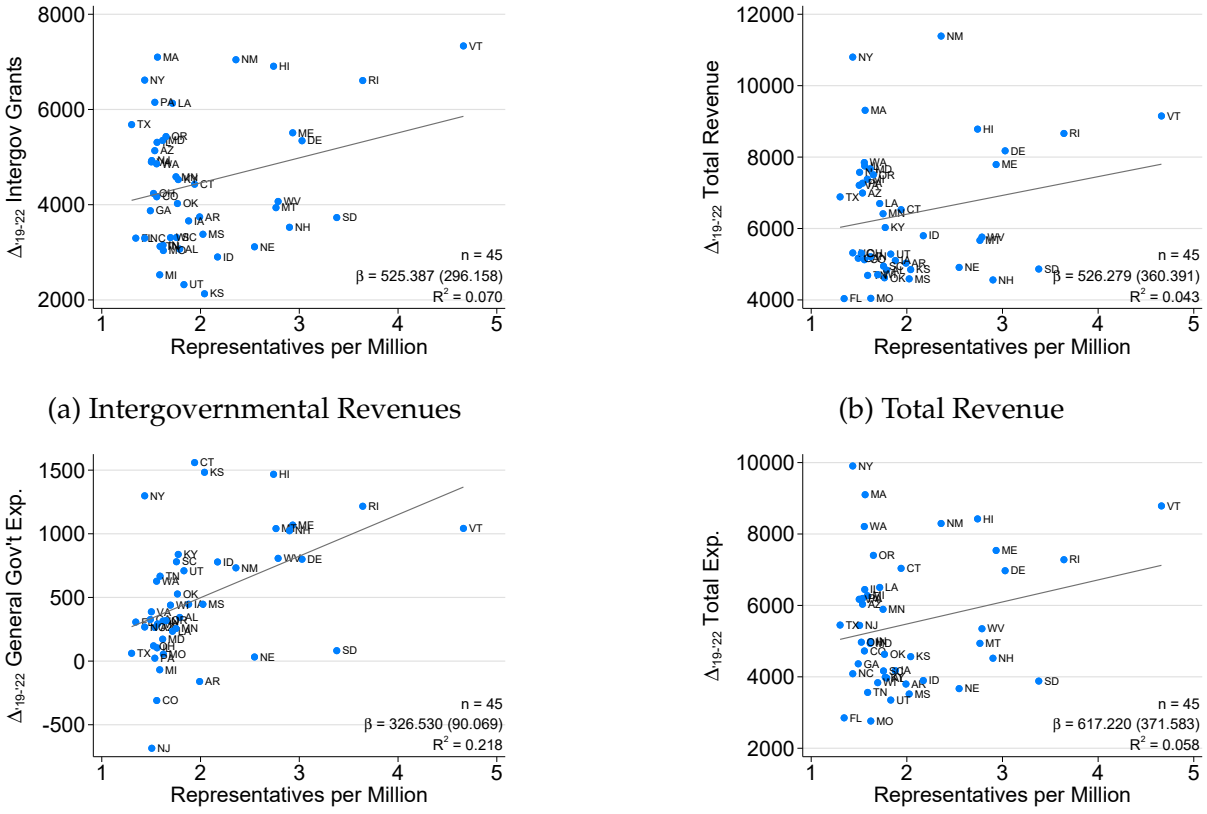
Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variables are measured as cumulative per capita changes. That is, we use the cumulative change in FY 2020-2022 in excess of those in FY 2019 in the numerator. The outcome variables are expressed as USD per capita. We have a total of 43 state plans + 10 local plans categorized as teachers' pension funds (out of 271 state plans and 377 local plans). We only have teacher plans for about 33 states (The remaining states cover teachers in their general employee plan.). *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Aggregate Financial Score	$\Delta_{'19-'22}$ Liquid Assets	$\Delta_{'19-'22}$ Cash	$\Delta_{'19-'22}$ Debt
	(1)	(2)	(3)	(4)
Aid p.c. (thsd USD)	-0.650	81.20	169.7	10.14
	(0.984)	(148.0)	(151.9)	(83.85)
Δ Real GDP p.c. '18-'19	9.796	1632.4	763.6	235.1
	(9.651)	(1794.1)	(1567.0)	(1099.1)
Constant	12.41***	961.0**	357.6	82.12
	(2.675)	(441.0)	(420.4)	(207.9)
R^2	0.002	0.070	0.072	0.006
Dependent Variable Mean 2019	58.919	644	439	1993
Model	IV	IV	IV	IV
Observations	45	45	45	25

Table 7: Pandemic Aid and Balance Sheet Outcomes, 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Cash, debt, and liquid asset (all cash and investments) outcomes are measured as per capita changes between FY 2019 and FY 2022. The aggregate financial score outcome is just the change in the score between FY 2019 and FY 2022. The aggregate financial score measures ten different dimensions of fiscal strength (see Giesecke and Duffy (2023) for more details). *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

Appendix Figures and Tables



(a) Intergovernmental Revenues

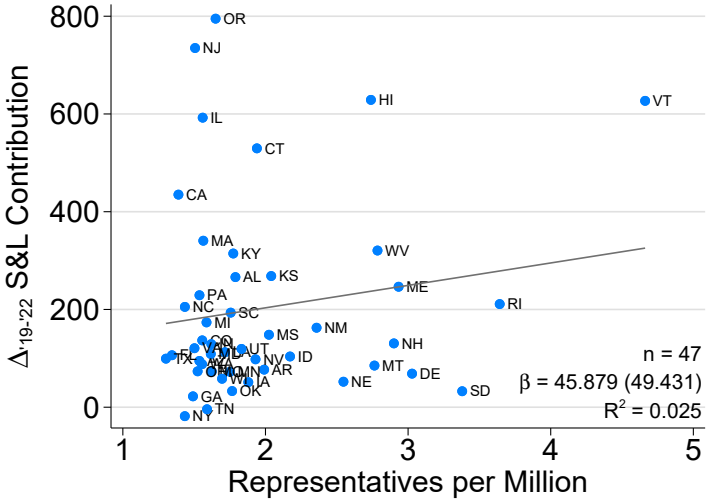
(b) Total Revenue

(c) General Government Expenditure

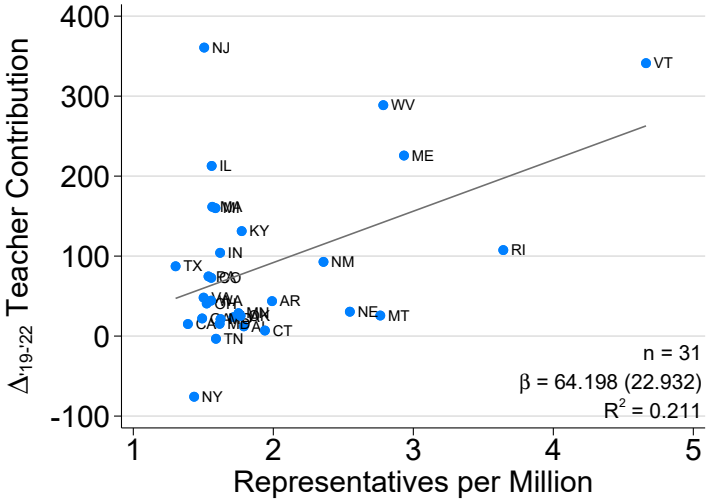
(d) Total Expenditure Outcomes

Figure A.1: Representatives per Million and Income Statement Outcomes (Cumulative per Capita)

Notes: The figure shows the reduced form scatter plots of revenue and expenditure outcomes for our baseline sample that excludes Alaska, North Dakota, and Wyoming.



(a) State & Local Contributions



(b) Teacher Contributions

Figure A.2: Representatives per Million and Pension Outcomes (Cumulative per Capita)

Notes: The figure shows the reduced form scatter plots of pension contributions for our baseline sample that excludes Alaska, North Dakota, and Wyoming.

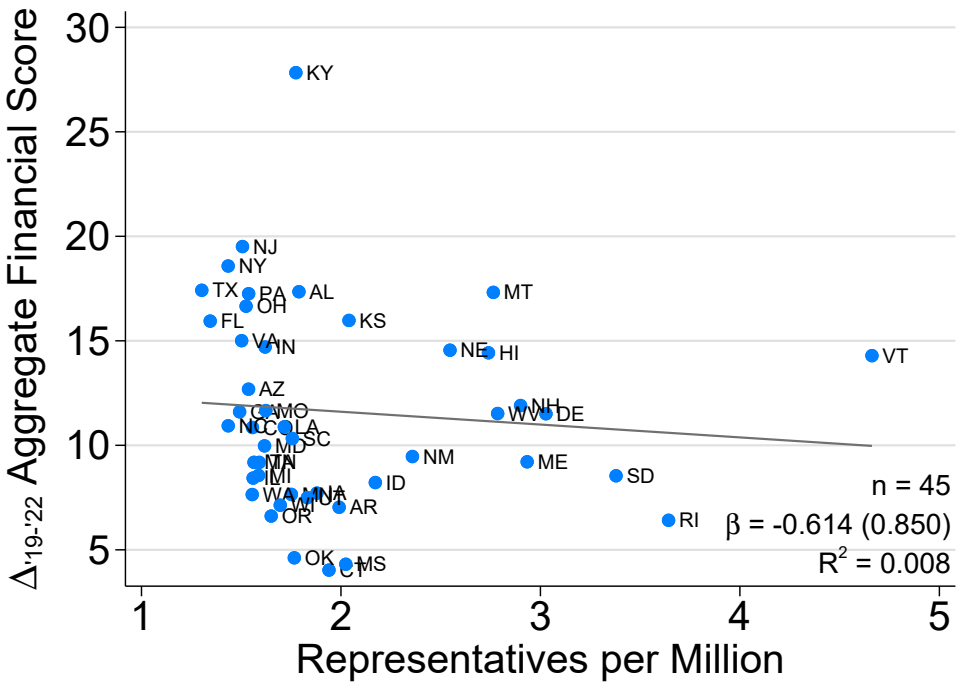


Figure A.3: Representatives per Million and Aggregate Financial Score Outcomes

Notes: The figure shows the reduced form scatter plot for the aggregate fiscal strength score as defined by Giesecke and Duffy (2023) for our baseline sample that excludes Alaska, North Dakota, and Wyoming.

	$\Delta_{'19-'22}$ Intergov. Grants	$\Delta_{'19-'22}$ Total Rev.	$\Delta_{'19-'22}$ Gen Gov't Exp.	$\Delta_{'19-'22}$ Total Exp.	$\Delta_{'19-'22}$ Aggregate Financial Score
	(1)	(2)	(3)	(4)	(5)
Aid p.c. (thsd USD)	397.2	124.8	335.8***	593.6*	-0.761
	(323.9)	(509.8)	(105.6)	(340.9)	(0.873)
Δ Real GDP p.c. '18-'19	5006.4*	10253.9**	-696.7	6323.4	11.66
	(2868.7)	(4608.2)	(1092.5)	(4251.5)	(9.632)
Severance Tax Share	0.150	5.388	-23.48***	-52.80**	
	(17.67)	(35.90)	(7.314)	(23.59)	
severance$_oil_exposure$					-0.162***
					(0.0512)
Constant	2892.8***	5018.4***	-299.4	3363.5***	12.71***
	(826.1)	(1265.9)	(278.2)	(848.2)	(2.344)
R^2	0.249	0.166	0.118	0.270	0.247
Dependent Variable Mean 2019	2361	7023	453	6560	60.497
Model	IV	IV	IV	IV	IV
Observations	48	48	48	48	48

Table A.1: Regression Results with Full Sample

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid_i} + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Outcome variable definitions do not differ from those defined previously. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Intergov. Grants	$\Delta_{'19-'22}$ Total Rev.	$\Delta_{'19-'22}$ Gen Gov't Exp.	$\Delta_{'19-'22}$ Total Exp.	$\Delta_{'19-'22}$ Aggregate Financial Score
	(1)	(2)	(3)	(4)	(5)
Aid p.c. (thsd USD)	613.9**	615.0*	381.6***	721.2*	-0.718
	(289.1)	(367.7)	(131.0)	(370.4)	(1.032)
Constant	2822.5***	4762.3***	-518.5	3558.8***	13.52***
	(779.7)	(994.3)	(345.8)	(1030.6)	(2.980)
R^2	0.281	0.207	0.095	0.240	.
Dependent Variable Mean 2019	2361	7023	453	6560	58.919
Model	IV	IV	IV	IV	IV
Observations	45	45	45	45	45

Table A.2: Regression Results with No Controls

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variable definitions do not differ from those defined previously. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Intergov. Grants	$\Delta_{'19-'22}$ Total Rev.	$\Delta_{'19-'22}$ Gen Gov't Exp.	$\Delta_{'19-'22}$ Total Exp.	$\Delta_{'19-'22}$ Aggregate Financial Score
	(1)	(2)	(3)	(4)	(5)
Aid p.c. (thsd USD)	826.6***	1048.3**	373.1**	767.2*	0.547
	(313.5)	(423.5)	(165.3)	(412.2)	(1.472)
Δ Public Empl. '18-'19	1623.3	4342.2	228.0	-68.26	15.03
	(3812.8)	(4922.9)	(1977.3)	(4716.0)	(17.50)
Δ Private Empl. '18-'19	1121.6	2242.9*	-69.86	132.0	6.693
	(902.5)	(1331.1)	(514.6)	(1195.2)	(4.371)
Δ Real GDP p.c. '18-'19	1686.3	3255.7	-140.4	5851.4	-4.886
	(3179.7)	(3791.3)	(1662.4)	(4475.4)	(13.33)
Sh. Pop. Municipal Liquidity Facility	517.7	1006.6	-196.0	1088.4	-0.594
	(965.3)	(1343.7)	(426.1)	(1429.4)	(4.768)
Constant	1618.5**	2337.8**	-392.1	2414.0**	9.167**
	(775.5)	(976.6)	(356.8)	(965.2)	(3.712)
R^2	0.408	0.464	0.110	0.331	0.089
Dependent Variable Mean 2019	2295	6631	419	6309	58.919
Model	IV	IV	IV	IV	IV
Observations	45	45	45	45	45

Table A.3: Regression Results with Expanded Controls

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variable definitions do not differ from those defined previously. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Intergov. Grants	$\Delta_{'19-'22}$ Total Rev.	$\Delta_{'19-'22}$ Gen Gov't Exp.	$\Delta_{'19-'22}$ Total Exp.	$\Delta_{'19-'22}$ Aggregate Financial Score
	(1)	(2)	(3)	(4)	(5)
Aid p.c. (thsd USD)	423.7	171.8	299.5**	490.6	0.105
	(339.5)	(549.2)	(123.8)	(360.3)	(1.142)
Δ Public Empl. '18-'19	-1820.2	-4497.7	559.7	490.7	13.97
	(3928.3)	(5875.3)	(1823.3)	(4519.4)	(14.58)
Δ Private Empl. '18-'19	309.7	612.1	-289.3	-676.4	6.008
	(880.8)	(1393.7)	(453.6)	(1100.3)	(4.062)
Δ Real GDP p.c. '18-'19	3551.7	7213.8	29.94	6680.6	-1.948
	(3608.3)	(5087.4)	(1634.9)	(4830.0)	(13.01)
Sh. Pop. Municipal Liquidity Facility	1058.0	2357.7	-159.4	1252.9	-0.537
	(1031.8)	(1592.4)	(386.4)	(1445.7)	(4.376)
Severance Tax Share	-0.988	3.812	-21.80***	-48.92**	
	(17.73)	(31.74)	(7.838)	(24.27)	
$\text{severance}_{oil_exposure}$					-0.217***
					(0.0703)
Constant	2496.2***	4170.5***	-156.1	3229.8***	10.45***
	(862.7)	(1271.1)	(262.9)	(875.6)	(3.038)
R^2	0.284	0.250	0.159	0.267	0.301
Dependent Variable Mean 2019	2361	7023	453	6560	60.497
Model	IV	IV	IV	IV	IV
Observations	48	48	48	48	48

Table A.4: Regression Results with Expanded Controls and Sample

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid_i} + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Outcome variable definitions do not differ from those defined previously. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Intergov. Grants	$\Delta_{'19-'22}$ Total Rev.	$\Delta_{'19-'22}$ Gen Gov't Exp.	$\Delta_{'19-'22}$ Total Exp.	$\Delta_{'19-'22}$ Aggregate Financial Score
	(1)	(2)	(3)	(4)	(5)
Aid p.c. (thsd USD)	643.5**	673.8*	379.1***	768.8**	-0.668
	(278.1)	(346.4)	(126.0)	(342.9)	(0.942)
Δ Real GDP p.c. '18-'19	4503.0*	8956.1**	-413.7	7007.7*	8.949
	(2586.8)	(3902.3)	(1011.9)	(3775.1)	(9.304)
Oxford Stringency Index	-3566.3	-6867.1	838.9	-1985.2	-26.99
	(8405.4)	(10321.5)	(2672.8)	(10750.5)	(31.84)
Constant	3155.9	5372.0*	-669.9	3235.6	18.88**
	(2302.2)	(2776.1)	(771.9)	(2808.7)	(8.066)
R^2	0.343	0.349	0.101	0.321	0.016
Dependent Variable Mean 2019	2295	6631	419	6309	58.919
Model	IV	IV	IV	IV	IV
Observations	45	45	45	45	45

Table A.5: Regression Results with Covid Controls

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. The Oxford Stringency Index aggregates information about several different government policy responses to the Covid-19 pandemic into an index measuring the restrictiveness of government response. Outcome variable definitions do not differ from those defined previously. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ S&L Contr.				
	(1)	(2)	(3)	(4)	(5)
Aid p.c. (thsd USD)	76.65**	71.71*	72.05**	81.22*	78.86**
	(38.21)	(37.83)	(31.41)	(41.56)	(31.74)
S&L NPL p.c. '19	0.0383***	0.0377***	0.0382***	0.0379***	0.0383***
	(0.00479)	(0.00504)	(0.00480)	(0.00474)	(0.00441)
Δ Real GDP p.c. '18-'19		-376.8	-394.7	-404.1	-421.8
		(273.8)	(257.1)	(384.8)	(360.4)
Oxford Stringency Index		-167.5			
		(685.6)			
Severance Tax Share			-5.405***		-5.717***
			(1.572)		(1.804)
Δ Public Empl. '18-'19				-62.06	5.825
				(375.2)	(325.8)
Δ Private Empl. '18-'19				53.30	47.26
				(127.0)	(123.1)
Sh. Pop. Municipal Liquidity Facility				-70.00	-70.85
				(98.47)	(86.36)
Constant	-162.7*	-70.61	-103.0	-115.0	-99.83
	(97.53)	(194.5)	(79.25)	(95.14)	(80.69)
R^2	0.530	0.550	0.570	0.552	0.573
Dependent Variable Mean 2019	360	360	360	360	360
Model	IV	IV	IV	IV	IV
Observations	47	47	50	47	50

Table A.6: Pandemic Aid and S&L Pension Contributions (Cumulative Per Capita), 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted in columns (1) and (3) due to the large severance tax share in their revenue composition. The Oxford Stringency Index aggregates information about several different government policy responses to the Covid-19 pandemic into an index measuring the restrictiveness of government response. Outcome variable definitions do not differ from those defined previously. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ All Other Exp.	$\Delta_{'19-'22}$ Funct. Exp.	$\Delta_{'19-'22}$ Health Exp.	$\Delta_{'19-'22}$ Education Exp.	$\Delta_{'19-'22}$ Public Safety Exp.	$\Delta_{'19-'22}$ Misc Exp.
	(1)	(2)	(3)	(4)	(5)	(6)
Aid p.c. (thsd USD)	391.6	357.3	149.8	84.85	141.6*	34.26
	(344.2)	(267.0)	(188.6)	(109.4)	(76.00)	(288.5)
Δ Real GDP p.c. '18-'19	7509.9**	4806.7*	4632.5*	1133.9	-359.4	2703.2
	(3460.1)	(2907.4)	(2414.1)	(858.6)	(667.3)	(3868.9)
Constant	3228.5***	850.4	681.6	302.2	-149.9	2378.1***
	(937.1)	(744.0)	(537.2)	(272.8)	(248.6)	(694.4)
R^2	0.225	0.151	0.147	0.079	0.101	0.025
Dependent Variable Mean 2019	5890	4202	2234	1828	285	1687
Model	IV	IV	IV	IV	IV	IV
Observations	45	45	44	45	31	45

Table A.7: Pandemic Aid and Other Primary Government Expenditure Outcomes (Cumulative Per Capita), 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variables are measured as cumulative per capita changes. That is, we use the cumulative change in FY 2020-2022 in excess of those in FY 2019 in the numerator. The outcome variables are expressed as USD per capita. All other expenditure represents healthcare, educational, public safety, and miscellaneous expenses. Functional expenses is the sum of healthcare, educational, and public safety expenses. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Total Exp.	$\Delta_{'19-'22}$ Gen Gov't Exp.	$\Delta_{'19-'22}$ All Other Exp.
	(1)	(2)	(3)
Aid × Tight FC	871.1**	372.7***	498.4
	(395.3)	(134.7)	(369.4)
Aid × Loose FC	715.4*	381.7***	333.7
	(368.6)	(130.2)	(403.5)
Δ Real GDP p.c. '18-'19	7134.0*	-443.7	7577.6**
	(3909.5)	(991.5)	(3475.8)
Constant	2693.4***	-464.9	3158.3***
	(946.9)	(343.8)	(1012.5)
R^2	0.333	0.100	0.240
Dependent Variable Mean 2019	6309	419	5890
Model	IV	IV	IV
Observations	45	45	45

Table A.8: Pandemic Aid and Primary Government Expenditure Outcomes (Cumulative Per Capita), 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid_i} + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variables are measured as cumulative per capita changes. That is, we use the cumulative change in FY 2020-2022 in excess of those in FY 2019 in the numerator. The outcome variables are expressed as USD per capita. General government expenditures consists of the non-healthcare, non-educational functions of government. This includes the legislative branch, the staff of the state's executive, and the budget of various general purpose governmental departments like the finance division, the department of revenue, and other miscellaneous administrative divisions. All other expenditure represents healthcare, educational, public safety, and miscellaneous expenses. Total expenses are the sum of all other expenditure, general government expenses, and infrastructure expenses. Idaho has no infrastructure expenses listed explicitly on its statement of activities. "Tight FC" is a dummy variables that takes on the value of one if the tax expenditure limitation (TEL) index is larger than the median value; "Loose FC" capture it otherwise. We use the TEL index as of 2015 from Kallen (2017). *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ S&L Contr.	$\Delta_{'19-'22}$ State Contr.	$\Delta_{'19-'22}$ Local Contr.	$\Delta_{'19-'22}$ Teacher Contr.
	(1)	(2)	(3)	(4)
Aid × Tight FC	66.26**	60.82*	5.288	75.90***
	(32.68)	(32.48)	(4.802)	(26.91)
Aid × Loose FC	74.59**	72.47*	0.0584	79.93***
	(37.76)	(38.10)	(3.330)	(19.76)
Δ Real GDP p.c. '18-'19	-367.8	-298.2	-82.83	-220.8
	(277.8)	(222.7)	(131.6)	(217.6)
S&L NPL p.c. '19	0.0378***			
	(0.00497)			
State NPL p.c. '19		0.0373***		
		(0.00518)		
Local NPL p.c. '19			0.0283***	
			(0.00699)	
Teacher NPL p.c. '19				0.0274**
				(0.0107)
Constant	-107.4	-98.93	1.573	-169.0***
	(87.52)	(89.68)	(8.199)	(58.01)
R^2	0.550	0.518	0.512	0.447
Dependent Variable Mean 2019	360	316	64	166
Model	IV	IV	IV	IV
Observations	47	47	32	31

Table A.9: Pandemic Aid and Pension Contribution Outcomes (Cumulative Per Capita), 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid_i} + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variables are measured as cumulative per capita changes. That is, we use the cumulative change in FY 2020-2022 in excess of those in FY 2019 in the numerator. The outcome variables are expressed as USD per capita. We have a total of 43 state plans + 10 local plans categorized as teachers' pension funds (out of 271 state plans and 377 local plans). We only have teacher plans for about 33 states (The remaining states cover teachers in their general employee plan.). "Tight FC" is a dummy variables that takes on the value of one if the tax expenditure limitation (TEL) index is larger than the median value; "Loose FC" capture it otherwise. We use the TEL index as of 2015 from Kallen (2017). *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ Total Exp.		$\Delta_{'19-'22}$ Gen Gov't Exp.		$\Delta_{'19-'22}$ All Other Exp.	
	(1)	(2)	(3)	(4)	(5)	(6)
Aid p.c. (thsd USD)	771.3	868.0***	432.1**	354.3**	339.3	513.6
	(650.9)	(317.4)	(186.0)	(169.3)	(508.1)	(441.6)
Δ Real GDP p.c. '18-'19	4312.9	9839.6**	-1549.8	564.5	5862.7	9275.2**
	(5121.8)	(4934.1)	(1191.8)	(1349.2)	(4634.2)	(4504.9)
Constant	3247.8**	2008.1**	-534.1	-480.5	3781.9***	2488.7**
	(1592.3)	(969.3)	(467.4)	(492.3)	(1351.8)	(1261.9)
R^2	0.172	0.542	0.245	0.027	0.120	0.389
Dependent Variable Mean 2019	6346	6269	432	405	5914	5864
Model	IV	IV	IV	IV	IV	IV
Subsample	Tight FC	Loose FC	Tight FC	Loose FC	Tight FC	Loose FC
Observations	22	23	22	23	22	23

Table A.10: Pandemic Aid and Primary Government Expenditure Outcomes Sub-sample Analysis, 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted due to the large severance tax share in their revenue composition. Outcome variables are measured as cumulative per capita changes. That is, we use the cumulative change in FY 2020-2022 in excess of those in FY 2019 in the numerator. The outcome variables are expressed as USD per capita. General government expenditures consists of the non-healthcare, non-educational functions of government. This includes the legislative branch, the staff of the state's executive, and the budget of various general purpose governmental departments like the finance division, the department of revenue, and other miscellaneous administrative divisions. All other expenditure represents healthcare, educational, public safety, and miscellaneous expenses. Total expenses are the sum of all other expenditure, general government expenses, and infrastructure expenses. The sub-sample "Tight FC" is refers to those states for which the expenditure limitation (TEL) index is larger than the median value; and "Loose FC" to the remaining states. We use the TEL index as of 2015 from Kallen (2017). *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.

	$\Delta_{'19-'22}$ S&L Contr.		$\Delta_{'19-'22}$ State Contr.		$\Delta_{'19-'22}$ Local Contr.		$\Delta_{'19-'22}$ Teacher Contr.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aid p.c. (thsd USD)	19.43	104.1***	17.17	102.2***	3.613	2.106	69.54	90.38***
	(34.60)	(35.36)	(34.89)	(35.40)	(4.390)	(3.145)	(46.99)	(11.52)
Δ Real GDP p.c. '18-'19	99.10	-849.1***	7.402	-597.9**	67.98	-427.0***	148.0	-557.1**
	(266.0)	(327.4)	(246.2)	(279.2)	(45.91)	(139.4)	(196.8)	(275.7)
S&L NPL p.c. '19	0.0489***	0.0319***						
	(0.00616)	(0.00655)						
State NPL p.c. '19			0.0450***	0.0327***				
			(0.00673)	(0.00798)				
Local NPL p.c. '19					0.0511***	0.0260***		
					(0.00948)	(0.00347)		
Teacher NPL p.c. '19							-0.000760	0.0367***
							(0.0181)	(0.0120)
Constant	-65.09	-123.4	-33.43	-139.4	-19.75*	29.10**	-124.6	-193.2***
	(103.2)	(85.71)	(111.0)	(87.64)	(10.85)	(13.53)	(105.5)	(39.30)
R^2	0.495	0.714	0.417	0.700	0.752	0.800	0.137	0.696
Dependent Variable Mean 2019	373	346	334	298	51	80	182	152
Model	IV	IV	IV	IV	IV	IV	IV	IV
Subsample	Tight FC	Loose FC	Tight FC	Loose FC	Tight FC	Loose FC	Tight FC	Loose FC
Observations	24	23	24	23	18	14	15	16

Table A.11: Pandemic Aid and S&L Pension Contributions Sub-sample Analysis 2022

Notes: The table estimates two stage least square specifications of the following form. First stage: $Aid_i = \gamma_0 + \gamma_1 \text{Repr. p.c.}_i + \gamma_2' X_i + \epsilon_i$. Second stage: $\Delta Y_{i,t,t+1} = \beta_0 + \beta_1 \widehat{Aid}_i + \beta_2' X_i + u_i$. Nevada and California have not published their FY 2022 CAFR. Alaska, North Dakota, and Wyoming are omitted in columns (1) and (3) due to the large severance tax share in their revenue composition. The Oxford Stringency Index aggregates information about several different government policy responses to the Covid-19 pandemic into an index measuring the restrictiveness of government response. Outcome variable definitions do not differ from those defined previously. The sub-sample "Tight FC" is refers to those states for which the expenditure limitation (TEL) index is larger than the median value; and "Loose FC" to the remaining states. We use the TEL index as of 2015 from Kallen (2017). *,**, *** indicates significance at the 0.1, 0.05, 0.01 level, respectively. Standard errors are robust to heteroskedasticity.