

Intergovernmental Grants and Policy Competition: Concepts, Institutions, and Evidence¹

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Abstract

Our purpose is three-fold. First, we summarize some of the core insights from both classic and more recent papers in the literature on the role of intergovernmental grants in systems of fiscal federalism. Second, we provide an updated look at some of the key institutions through which intergovernmental transfers are implemented in the United States. Third, we consider the rich environment of the COVID-19 pandemic in which new additional intergovernmental transfers were deployed, and present empirical evidence on how they affected state-level corporate tax policy. We conclude by discussing productive directions for future research on the economics of fiscal federalism and the role of intergovernmental grants as policy instruments in federal systems.

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I Introduction

In the literature on fiscal federalism, the sources and implications of strategic interactions both within and between layers of government have long been of interest (Gordon, 1983; Dahlby, 1996; Agrawal, Hoyt, and Wilson, 2022). Examples include bidding wars over firm location, tax or expenditure competition over mobile workers or capital, as well as issues that can arise when the same base is taxed separately by multiple layers of government. Intergovernmental transfer arrangements have the potential to affect these interactions or to correct for some of the distortions from which these strategic interactions may stem (Gordon, 1983; Dahlby, 1996).

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II Theory and Empirics of Intergovernmental Transfers

In this section we summarize insights from both the theoretical and empirical literatures on the potential role of intergovernmental transfers in improving outcomes and subnational policy within federal systems. We begin in section II.1 by revisiting some of the canonical papers in the literature on fiscal federalism and discussing how their insights point to potential efficiency rationales for intergovernmental transfers. In section II.2 we discuss how equity considerations enter the picture. In section II.3 we discuss the basics of how intergovernmental grants alter the budget sets and behavior of state or local governments. Finally, in section II.4 we highlight that strategic interactions between governments can shape the effects of intergovernmental transfers in ways that extend beyond the immediate income and substitution effects of those grants.

⁴ Our paper joins papers by Fox and Bruce (Forthcoming), Kim (Forthcoming), Breuillé and Duran-Vigneron, (Forthcoming), Gordon (Forthcoming), Lyytikäinen, (Forthcoming), and Brülhart et al., (Forthcoming) as papers written for joint presentation and publication on the theme of Policy Responses to Interjurisdictional Tax Competition. The other papers prepared for the volume include analyses of sales taxation in a world of e-commerce (Fox and Bruce, Forthcoming), of possibilities for interjurisdictional coordination as well as competition (Kim, Forthcoming), on the relevance of the possibility of interdependencies that may shape the mobility of multiple tax bases (Breuillé and Duran-Vigneron, Forthcoming), on the role of the income tax in the context of fiscal federalism (Gordon, Forthcoming), on the role of minimum property tax rates as a response to the forces of tax competition (Lyytikäinen, Forthcoming), and on the themes of competition, harmonization, and redistribution in the context of the corporate income tax (Brülhart et al., Forthcoming)

II.1 Efficiency Rationales for Intergovernmental Grants

Classic papers in the literature on fiscal federalism have described the conditions under which the decentralized provision of public goods can outperform federal provision, as in Oates's "decentralization theorem" (1972), and perhaps even result in efficient allocations and delivery, as in Tiebout (1956). Later work in this tradition has explored the implications of relaxing the assumptions of the Tiebout model and the decentralization theorem. That is, subsequent research (e.g., Gordon, 1983) has drawn attention to a number of channels through which decentralized revenue collections or public goods provision may yield inefficient outcomes. These later insights highlight the potential role for intergovernmental grants and other instruments of intergovernmental relations in combatting inefficiencies that can arise in federal systems.

As the literature has highlighted, intergovernmental transfer arrangements have the potential to better align the incentives of subnational governments with the preferences of the federation. As we discuss below, this may sometimes involve straightforward corrections to the misaligned incentives. However, it may require accounting for such considerations as the strategic interactions between governments or differences in preferences across the jurisdictions within a federation.

It is instructive to distinguish between three classes of inefficiencies in the provision of public goods: those associated with private objectives (e.g., agency problems) or constraints (e.g., imperfect information), or those which prevail even under the right private objectives and in the absence of such constraints (e.g., externalities).

In Tiebout (1956), residential choice across jurisdictions serves several functions that help to overcome these challenges. First, the classic "Tiebout sorting" mechanism emphasizes that mobility across jurisdictions gives individuals with similar preferences an opportunity to group themselves together. This sorting mechanism can be beneficial even under omniscient and benevolent government due to the "public" nature of local public goods consumption. That is, absent sorting across jurisdictions, the level of public goods could not be tailored to individual preferences. A related advantage is that by "voting with their feet," individuals effectively reveal the level of public goods consumption they desire, which can help alleviate the informational problems facing benevolent but constrained governance. Finally, the competitive pressures associated with mobility give politicians an incentive to produce those public goods efficiently even if their objective is to maximize rents.

Oates (1972) highlights the importance of informational and delivery constraints on the governance of benevolent, centralized authorities. In Oates's "decentralization theorem" the role of variations in local preferences for public goods takes center stage. In the absence of cross-jurisdictional externalities or additional economies of scale in production, it is more efficient for local governments to finance and supply the locally preferred levels of public goods consumption than for the federal government to provide the same level of public goods consumption to all localities. A key force underlying the recommendation to decentralize is the idea that local governments will tend to have superior information, as also highlighted by Tiebout (1956), for assessing the level of public goods consumption their constituents desire.

While different models of electoral competition and of politician behavior have different implications for policy competition, there is empirical evidence that decentralization is particularly effective when local political actors face political competition and accountability. Basurto et al. (2020), for example, find that local chiefs in Malawi do a good job of targeting resources towards households that generate substantial returns on their farm inputs despite also engaging in a degree of nepotism on the side. Bianchi et al. (2021) find that effectiveness of a decentralization effort in Italy increased in the degree of local political competition. Janvry et al. (2012) also find positive effects of political competition in the context of a decentralized cash transfer program in Brazil. While this is of course speculative, it may be well be that reduced levels of electoral competition at the state level (Abramowitz and Webster, 2016) have contributed to the lackluster administrative capacity of a number of state employment agencies in the United States, as demonstrated, for example, by their inability during the COVID-19 pandemic to process Unemployment Insurance benefits that imply reasonable replacement rates (Ganong, Noel, and Vavra, 2020).

While the Tiebout (1956) model and decentralization theorem (Oates, 1972) are sometimes read as arguments in favor of decentralization, they can also be read as statements of its limits. A complementary analysis from Olson (1969), for example, explicitly considered the optimal assignment of responsibilities across levels of government. Regarding externalities in the benefits of public goods, a key point in Olson's (1969) analysis is to emphasize that efficiency requires boundaries to be drawn so as to match the beneficiaries and financers of each public good.⁵ Musgrave (1971) raises similar points.

As summarized by Oates (2008), more recent theoretical developments layer in additional considerations. One strand of literature emphasizes that the performance of decentralized governments can suffer from the moral hazard of potential federal bailouts. That is, the cost of fiscal mismanagement may be borne in part, at least in expectation, by the residents of other jurisdictions, giving each jurisdiction a perverse incentive to "raid the fiscal commons." This suggests a role for balanced budget requirements and other institutional constraints on the behavior of subnational governments. Another strand of literature has relaxed the assumptions of benevolent governance and uniform public goods provision, inspired by the public choice and political economy literatures.

These theoretical extensions highlight that the forces at work in determining legislative outcomes at the federal level versus more localized levels need not imply that any one level of government is systematically preferred to others. Indeed, the analyses of Olson (1969) and Musgrave (1971) highlight that multiple, and potentially overlapping, layers of government may be necessary to

⁵ A consequence of this insight, as Olson (1969) writes, that "Only if there are several levels of government and a large number of governments can immense disparities between the boundaries of jurisdictions and the boundaries of collective goods be avoided. There is a case for every type of institution from the international organization to the smallest local government." This insight this provides a potential rationale for the large set of geographically overlapping governments found in the United States. Whether that patchwork is actually operating efficiently is, of course, another matter.

map jurisdictions into the regions that capture the benefits of various public goods. Additionally, there are cases in which allowing multiple levels of government to tax the same base can be efficiency improving (Hoyt, 2017).

Gordon (1983) can similarly be read as cautioning readers that decentralization is not a panacea. He illustrates several inefficiencies that can arise due to externalities associated with either the tax instruments deployed by local governments or through the provision of the public goods themselves. First, some tax instruments may generate revenues from non-residents as well as residents. Second, if local policies shift economic activity across jurisdictions, the revenues of both the activity-losing and the activity-gaining jurisdiction will be affected. Third, the policies of one jurisdiction may alter the resource costs faced by other jurisdictions. Fourth, the benefits from local public goods will not tend to vanish at the borders of the jurisdictions that have been drawn. Transportation networks, the incapacitation effects of incarceration, and the improvements in air or water quality that derive from local regulations will tend to have benefits that accrue in part to neighboring areas. Such spillovers need not be positive, as when policing generates displacement effects or when one jurisdiction's industrial development has negative environmental consequences for its neighbors. Gordon notes, additionally, that decentralized "communities will tend to enact excessive tax rates on congestion producing activities, since they enjoy any gains from decongestion, but ignore the associated loss from extra congestion elsewhere."

Among the papers discussed above, the analysis of Gordon (1983) connects most directly to the remainder of the current paper. Though he focuses primarily on developing an analysis of the inefficiencies that can be associated with interjurisdictional tax and expenditure externalities, Gordon also discusses potential remedies. Among those remedies are intergovernmental grants, which can be structured to effectively subsidize the provision of goods that are underprovided or penalize the provision of goods that are overprovided. This possibility is ultimately created by the separation across levels of government of, on the one hand, taxation and, on the other hand, spending and program administration. A subsequent paper by Dahlby (1996) helpfully provides a more comprehensive assessment of how such subsidies and penalties might optimally be set. In the subsections below, we turn to characterizing the potential structure of both corrective and purely redistributive grants, as well as discussing some of the empirical evidence on the effects of such efforts in practice.

II.2 Equity Rationales for Intergovernmental Grants

Equity considerations feature prominently in discussions or analyses of intergovernmental transfer arrangements. In early analyses, an argument for using intergovernmental grants for redistribution tended to arise from standard logic involving differences in marginal utilities across space. Equity considerations emerge in the Gordon (1983) classic, for example, as well as in the model of Wildasin (1984), who examines the welfare impact of intergovernmental transfers when recipient governments use distortionary taxes. An important question is whether such transfers would remain attractive even if individual-based redistribution has been fine-tuned

according to social welfare considerations. Gaubert, Kline, and Yagan (2021) provide an argument that the answer can be yes, with emphasis on the potential importance of concentrations of poverty among households with limited capacity to move.

The use of intergovernmental transfers to redistribute resources across regions raises standard political economy concerns. That is, the objective function of a federal legislature will, of course, include a desire to redistribute across politically defined constituencies in addition to, or perhaps in place of, redistributing out of purely equity-driven concerns. Studies finding that variations in political representation shape the distribution of federal funds across regions include Atlas et al. (1995), Lee (1998), Hauk and Wacziarg (2007), Knight (2008), Rodden (2002), and Clemens and Veuger (2021).

Fiscal assistance packages delivered on an ad-hoc basis under emergency circumstances, as during the COVID-19 pandemic, can be especially ill-designed with respect to both the magnitude of the assistance and its distribution across regions, which suggests potential value to designing such programs as automatic stabilizers (Clemens and Veuger, 2023). Formula-based aid also has the potential to reduce policy uncertainty at the subnational level and to improve macroeconomic outcomes as a result (Shoag and Veuger, 2016).⁶

Arguments for redistribution through intergovernmental grants may be at their strongest in the context of K-12 school finance, where the public service in question is an investment in human capital for which children are dependent on their parents and communities. In the U.S. context, an important literature has considered the court-ordered equalization of school finances, which highlights the potential relevance of the distributional preferences of political actors at various levels of government. A number of papers have demonstrated that court-ordered school finance equalization reduces across-district spending inequality as measured using a variety of metrics (Card and Payne, 2002; Corcoran et al., 2004; and Baicker and Gordon, 2006). Interestingly, Baicker and Gordon (2006) find additionally that states offset the increase in education resources sent to low-income districts by reducing grants targeted at other expenditure categories.

School finance interventions have varied in their effect on spending levels. Reforms that clawed back the high spending of wealthy districts' have been found to "level down" by reducing school spending (Hoxby, 2001). In contrast, reforms that increased the "foundation grants" to low-income districts without altering the effective price of spending by high-income districts have been found to increase spending (Jackson, Johnson, and Persico, 2016). Jackson, Johnson, and Persico (2016) find that School Finance Equalizations (SFEs) stemming from rulings that districts were failing an "adequacy" standard spurred additional spending while purely "equity" driven SFEs do not. The associated variations in spending are predictive of variations in children's subsequent education and labor market outcomes. A key question for evaluating these school finance interventions is whether the objective is to equalize resources, equalize outcomes, raise the floor for outcomes in low-resource districts, or something else altogether. This is a

⁶ Though the formulas have to be appropriate for stabilization purposes, which is not necessarily the case when apportionment is based on formulas used in normal times. We discuss this consideration in more detail in subsection IV.2.

question, of course, on which there may be substantial disagreements across key stakeholders and across jurisdictions.

II.3 Intergovernmental Grants and Institutional Changes to Subnational Budget Sets

Moving from motivation to implementation, in this subsection we describe in broad terms how the policy levers associated with intergovernmental relations can alter the incentives and constraints facing state and local governments. The core policy instruments include matching grants, categorical block grants, general fiscal assistance, and a myriad of rules including balanced budget requirements, maintenance of effort requirements, and either floors or ceilings on either the level or growth of revenues or expenditures. We describe the basic structure of such instruments, their theoretical effects, and empirical evidence on their effects in practice.

II.3.A Matching Grants

If the federal government's primary concern is that state or local governments may have an insufficient incentive to deliver a particular public good, or to engage in spending on goods, services, and transfers more generally, a natural remedy is to correct that incentive through a matching grant. By matching (or reimbursing) a state's expenditures at some fixed rate, the federal government can lower the effective price and induce state governments to increase the level at which the good, service, or transfer is provided. The optimal subsidy rate can be analyzed in the same vein as Pigouvian taxes for correcting environmental or other externalities.

One central choice the federal government can make is to subsidize the provision of a particular expenditure category or of state and local government spending in total. An interesting insight of Gordon (1983) is that the federal government can subsidize the overall revenue collections of state and local governments by making those tax payments deductible at the federal level. The deductibility of state and local tax payments is thus a tool that can be used to subsidize overall state and local government revenue collections and may thus correct for under-provision in aggregate. Cullen and Gordon (2008) and Hemel (2019) analyze arguments in favor of and against this approach. A program-specific matching grant, in contrast, can alter the relative prices of particular types of spending (e.g., education or highway construction vs. health care) and are thus useful for correcting the over- or under-provision of one type of spending relative to another.

A reasonably robust empirical literature has found evidence that matching grants are an effective tool for increasing expenditure on targeted categories. Baicker (2005a), for example, finds that both the number of U.S. states' welfare beneficiaries and the generosity of the benefits those beneficiaries receive are sensitive to the generosity of the rates at which state welfare spending has been reimbursed by the federal government. In a pair of recent papers, both Bundorf and Kessler (2022), and Leung (2022) find evidence that higher matching rates in the federal subsidy

for U.S. states' Medicaid programs result in substantially higher spending per beneficiary.⁷ Coyne (2017) estimates a substantial elasticity of deductible revenues to variations in the tax price generated by the deductibility of local taxes at the federal level. The spending of U.S. school districts has also been found to respond to the implicit subsidy and taxation associated with SFE arrangements (Hoxby, 2001).

The responsiveness of spending to the incentives created by matching grants raises the question of whether the induced spending is a corrective to an under-provision problem or a manifestation of a moral hazard problem. This question underlies a perennial debate over the desirability of converting matching grants into block grants, as occurred in the 1996 welfare reform through which the U.S. federal government replaced the Aid for Families with Dependent Children (AFDC) program with the Temporary Assistance for Needy Families (TANF) program.

Similar changes in the structure of federal support for the Medicaid program have been proposed regularly, but not adopted. A complication of such reform proposals is that they tend to bundle changes in incentives with changes in the long-run growth of federal support and substantial redistributions of federal funds across states (Clemens and Ippolito, 2018). Notably, the Medicaid financing reform proposal included in the unsuccessful 2017 American Health Care Act converted federal support into a capped, fixed amount per enrollee, which was commonly referred to as a “per capita cap” (Adler, Fiedler, and Gronniger, 2017). This is of interest because the per capita cap financing structure maintains an incentive for states to enroll additional beneficiaries while turning off the incentive to spend more per beneficiary. The latter margin, namely spending per beneficiary, is in the margin along which recent estimates from Leung (2022) and from Bundorf and Kessler (2022) find state spending to be highly elastic.

Matching grants formulas create a perverse incentive to “relabel” unmatched expenditures as matched expenditures in ways that can undermine the federal government's desired targeting. This phenomenon is illustrated by research on the Disproportionate Share Hospital (DSH) program, through which the federal government sought to incentivize the states to support hospitals that serve low-income populations (Duggan, 2000; Baicker and Staiger, 2005). It did so by including DSH payments from states to eligible hospitals as among the expenditures that received a federal match. A brazen strategy for increasing federal dollars without actually supporting these institutions was to target them with hospital specific taxes, then return the money in the form of match-rate-eligible DSH payments.⁸ A less transparent approach involved the wiring of funds back and forth between the state government and hospitals owned by local governments, where the state's “DSH payment” to the local public hospital would generate a

⁷ Bundorf and Kessler (2022) and Leung (2022) arrive at this conclusion using different sources of variation. Leung estimates that variations in the traditional Federal Medical Assistance Percentage, which delivers less generous subsidies to relatively high-income states subject to floor match-rate of 50 percent. Bundorf and Kessler (2022) analyze variations in match-rates generated by the Affordable Care Act (ACA), which resulted in more generous overall match-rates for states that elected to expand coverage to childless, low-income adults, some of whom were eligible for states' Medicaid programs prior to the ACA expansions.

⁸ Baicker and Staiger write: “One such mechanism used in the early 1990s was the imposition of provider-specific taxes. For example, a state could impose a tax of \$1 billion dollars on a particular hospital. It could then pay the hospital \$1 billion dollars in DSH payments, which would be matched by the federal government with at least \$500 million – a net increase in state resources, accompanied by no change in resources to the hospital.”

match, creating a surplus to be shared between the entities via an upward transfer from the hospital to the state.⁹ Hackmann et al. (2022) provide additional evidence that states engage in “creative financing schemes” in efforts to divert federal matching funds towards alternative purposes. Ensuring that matching grants hit their intended targets is thus non-trivial.

II.3.B Categorical Block Grants and Maintenance of Effort Requirements

The federal government can also provide funds to state and local governments in the form of block grants. Block grants can, in turn, be “unrestricted,” such that the money is distributed as a form of general budgetary support, or “categorical,” meaning that the money is earmarked for particular uses. In this subsection we focus on the latter.

A standard but important point regarding categorical (or targeted) block grants is that the recipient government may not use the funds for their intended purpose. When both state and federal funds are used to finance spending on the targeted good, service, or transfer, a categorical block grant may simply crowd out counterfactual own-source funding. Knight (2002), for example, finds that federal highway aid substantially crowds out state funds once the endogeneity of the distribution of federal grants is accounted for. Such grants are thus only assured to increase targeted spending if they set a binding floor on a state’s spending. For example, the TANF program (discussed further in subsection III.2) combines categorical block grants with maintenance-of-effort requirements derived from 1994 state welfare spending levels.

The SFEs described earlier, whereby states with insufficient low-income school district spending are found by courts to fail an “adequacy” standard, function effectively as such a binding floor.¹⁰ Although these standards do not tend to involve explicit spending floors (Corcoran et al, 2004), they generated substantial increases in per-pupil spending in low-income school districts, supported by increases in state government grants (Jackson, Johnson, and Persico, 2015).

The literature on block grants has drawn attention to a “behavioral” phenomenon widely known as “the flypaper effect.” This term is used commonly in two different ways. In the context of categorical blocks grants, it highlights a tendency to spend targeted funds disproportionately on the targeted spending category, even in the absence of binding requirements imposed on the lower level of governments. We discuss its usage in the context of unrestricted block grants in the next subsection.

II.3.C Unrestricted Block Grants and Balanced Budget Requirements

A federal government can also provide unrestricted block grants, which provide a general form of support that augments a jurisdiction’s own-source general revenue. Unrestricted block grants

⁹ Summarizing a rather transparent instance of such a scheme, Baicker and Staiger write: “For example, the GAO (1994) documented the transfer of a \$277 million federal/state DSH payment to a Michigan county nursing facility, which wired \$271 million back to the state the same day.”

¹⁰ In this example the state is of course the “federal” or “higher” level of government.

do not alter the incentives associated with the provision of any particular public good. They can be described as providing a foundation of fiscal capacity, which tends to have a redistributive motive, as discussed earlier in Section II.2.

As an empirical matter, it has long been observed that unrestricted block grants influence spending more than standard economic theory would predict. That is, an unrestricted federal grant increases the wealth of a jurisdiction's residents. In theory, the resulting increase in the demand for public goods will correspond with residents' marginal propensity to consume public goods out of an increase in their own wealth or income. In practice, as discussed by Hines and Thaler (1995), it has often been estimated that each dollar in unrestricted block grants generates substantial increases in local government expenditure. Estimates from Inman (1971), Feldstein, (1975), Case, Hines, and Rosen (1993), Dahlberg et al. (2008), and Feiveson (2015) suggest, across a variety of settings, that a dollar in federal grants generates net spending increases that range from 60 cents to the full dollar. LeDuc and Wilson (2017) find an even larger effect from American Recovery and Reinvestment Act grants for highway spending, with net spending increasing more than dollar-for-dollar.

These results embody the aforementioned "flypaper effect," whereby federal dollars "stick" where they land rather than being sent to local taxpayers. In light of this effect, the distribution of federal dollars through unrestricted block grants can plausibly be viewed as a measure designed to increase state and local spending, even though it does not change the tax-price of state and local expenditures on the margin. Note that the flypaper effect does not necessarily indicate inefficiency: Allers and Vermeulen (2016) provide evidence from the Netherlands of full capitalization of grants into home prices in a context with significant flypaper effects.

A second rationale for unrestricted block grants is to provide revenue stability over the course of the business cycle (as in Clemens and Veuger, 2023). This can be necessary in part due to subnational balanced-budget requirements, which may in turn be a response to moral hazard concerns (the raiding of the fiscal commons, etc.). In the U.S. context, all states save Vermont have voluntarily adopted balanced budget requirements either through legislation or as provisions in state constitutions. In a number of cases, these rules were adopted in direct response to fiscal crises in the mid-19th century. These requirements vary in their effective stringency, and requirements that expressly limit the ex-post carrying over of unexpected deficits into subsequent fiscal years have been found to exert their intended impact on the average size of state budget deficits as well as the pace at which states restore balance in the wake of negative shocks (Alt and Lowry, 1994; Poterba, 1994; Bohn and Inman, 1996; Clemens and Miran, 2012).¹¹ These binding balanced-budget requirements can lead states to raise taxes or cut spending during recessions. Revenue stabilization grants may thus serve a purpose of limiting the extent to which state spending fluctuations exacerbate the business cycle.

¹¹ Stricter fiscal rules are also associated with lower interest rates (Eichengreen, 1992; Goldstein and Woglom, 1992; Bayoumi, Goldstein, and Woglom, 1995; Poterba and Reuben, 1999). While the evidence is suggestive that bond markets may reward polities for adopting strict fiscal rules, research in this area has acknowledged the difficulty of isolating plausibly exogenous variation in fiscal rules that might enable a causal impact on interest rates to be established.

In the European context, the Stability and Growth Pact and its subsequent modifications impose restrictions on the size of allowable deficit and debt levels. Those restrictions were widely seen to have exacerbated the Great Recession in several member states, without necessarily ensuring their primary objective of fiscal sustainability. In response to the next economic crisis, that triggered by the COVID-19 pandemic, not only were the budget rules waived, but the European Union also developed, for the first time, significant countercyclical fiscal authority in the form of the Next Generation EU Agreement.

II.3.D Strings Attached

An aspect of intergovernmental grants that is typically underemphasized in textbook treatments involves the restrictions that are often imposed as a condition for receipt. That is, both categorical and matching intergovernmental grants can and often do come with restrictions that, to varying degrees, limit the autonomy of subnational governments when it comes to using the funding. These restrictions are not just limited categorical restrictions of the kind mentioned in the previous subsection: they often go significantly further by mandating eligibility rules, delivery mechanisms, compliance with Civil Rights legislation, and other rules that, in some cases, have at best a tangential connection to the purpose of the funds in question.

Prominent examples of the strings attached to federal funds span the full range of the most prominent expenditure categories. First, to be eligible for federal matching funds, state Medicaid programs must be certified by the federal government as having met requirements that impose floors on the populations made eligible and on the medical benefits to which beneficiaries are entitled. Second, as noted above, a maintenance of effort requirement ensures that TANF spending remains at or above the 1994 spending on states' cash welfare assistance programs. Third, the receipt of funding through Title I of the Elementary and Secondary Education Act is linked to compliance with academic standards and testing requirements, as implemented through the No Child Left Behind Act and subsequently revised by the Every Student Succeeds Act (Skinner, 2022). Finally, the receipt of up to 10% of federal highway funds was famously linked to states' adoption of a prohibition on alcohol consumption by individuals below age 21 by the 1984 National Minimum Drinking Age Act. Baicker, Clemens, and Singhal (2012) discuss how the mid-to-late-20th century rise in state government spending as a share of total spending corresponded with a rise of mandates and other requirements of this sort.¹²

The discussion in Section III of the current set of intergovernmental grant programs in the U.S. context illustrates the wide range of restrictions at play here. Mauri (2023) emphasizes the distinction between subnational autonomy as measured by budgetary entries and their “effective” autonomy as measured by adjustments to their behavior in response to shocks to grant levels. But

¹² There are constitutional limits to the strings the federal governments may attach. While the Supreme Court in *South Dakota v. Dole* upheld the National Minimum Drinking Act's withholding of funding from non-compliant states, it struck down part of the Affordable Care Act for not leaving the states with a real choice in the matter of the expansion of the Medicaid program, as discussed below in subsection III.2.

even the latter does not fully capture effective autonomy, as quantitative responses may not fully reflect the qualitative nature of many of the aforementioned federal rules and regulations.

II.4 Intergovernmental Grants and Policy Competition

Subnational governments do not sit quiescently, of course, waiting for the federal government to send them and their peers instructions and to make tweaks to their budget sets. They also respond directly to the policies enacted by other subnational jurisdictions, and indirectly to federal policy to the extent that it affects policy decisions by other subnational governments. This combination of facts has given rise to a literature that studies how federal instruments, including the intergovernmental grants we are interested in, can correct for features of subnational policy competition that are deemed undesirable.

Agrawal et al. (2023) establish a framework to quantify the welfare effects of decentralized policies. Local policies result in benefit-spillovers, mobility of households and firms, and interjurisdictional fiscal externalities that are not internalized by the government enacting the policy. They delineate and quantify these external benefits and costs. Their magnitudes are measured by a new metric, the “marginal corrective transfer” (MCT), that is, the grant a federal government should provide to induce a locality to internalize these interjurisdictional externalities. Formally, the MCT is estimated as the wedge between the marginal value of public funds (MVPF) of the locality enacting the policy and the MVPF of the entire federation.¹³

Dahlby (1996) helpfully enumerates the various sorts of tax and expenditure externalities and the matching grants that correct for them. Externalities can be horizontal, when policy in one subnational unit affects other subnational units, or vertical, when policy in a subnational unit affects the federal budget constraint.¹⁴ They can also be direct or indirect, where indirect externalities correspond to what are frequently referred to as “fiscal externalities.” Appendix Figure 1 reproduces his Tables 1 and 2.

A number of theoretical papers analyze the effects of fiscal equalization transfers on tax competition specifically. For example, Buettner’s (2006) model distinguishes two different ways in which such transfers can affect subnational tax policy. If the overall grant volume goes up, tax rates are likely to go down. On the other hand, if the federal grant declines with increases in the tax base, that likely leads to higher tax rates. This second finding is in line with work of Koethenbuerger (2002) and can in fact lead to excess taxation (Bucovetsky and Smart, 2006). Boadway (2004) reviews fiscal equalization in theory and practice. In a more recent paper,

¹³ See Hendren (2016) and Hendren and Sprung-Keyser (2020) for elaboration on the concept of the Marginal Value of Public Funds and how it can be inferred through analyses of the effects of public policy.

¹⁴ A famous example of vertical externalities from the U.S. context is the Maryland tax policy at the heart of the dispute in the 1819 Supreme Court case *McCulloch v. Maryland*. Maryland had attempted to impose a tax on notes issued by banks not chartered in the state, of which there was only one: the Second Bank of the United States. The Court struck down the Maryland tax, explained that “the power to tax involves the power to destroy,” and determined that the Necessary and Proper Clause of the U.S. Constitution indicates that the federal government has implied powers in addition to its enumerated ones.

Chirinko and Wilson (2017) emphasize that how tax policy response to windfalls depends crucially on whether private goods are necessities or luxuries.

On the empirical front, Egger et al. (2010) use evidence from Lower Saxony to show that capacity equalization grants raise equilibrium tax rates, confirming the findings of Buettner (2006) for Baden-Wuerttemberg. On the international side of things, Devereux et al. (2002) study corporate income tax competition between EU and G7 countries.

Turning to the spending side, Calabrese et al.'s (2012) model and computations suggest the externality associated with low-income households entering high-income communities can make decentralization with property tax financing a welfare-reducing proposition. The idea is that Tiebout sorting, and the differing levels of public-good provision associated with communities of differing incomes, is undermined by free-riding in the housing market. This is similar to the logic of the "welfare magnet" hypothesis associated with Peterson and Rom (1989 and 1990), and illustrates the "indirect horizontal effects" of anti-poverty spending.

Early empirical work by Case et al. (1993) shows that subnational governments indeed appear to mimic each other's spending behavior, as Baicker (2005b) confirms for the policy decisions of the U.S. states in the Medicaid context. Caldeira et al. (2015) develop complementary findings in an analysis of the spending decisions of local governments in Benin.

Rom, Peterson, and Scheve (1998), Brueckner (2000), Saavedra (2000), Volden (2002), and Berry, Fording, and Hanson (2003) were part of a boomlet of work on these questions around the time AFDC became TANF (and a matching grant thereby became a block grant). The evidence for a "race to the bottom," that interstate competition has worked to reduce the generosity of redistribution in anti-poverty programs, is relatively weak. This may be due to caseload shifting in what is ultimately a patchwork of different programs, as Bailey and Rom (2004) suggest. Goodman-Bacon and Schmidt (2020) find evidence for this in the context of the introduction of Supplemental Security Income (SSI).

Skupnik (2015) studies whether there is a race to the bottom in welfare generosity in the European Union, but does not find much evidence. This can be explained in the European context by the lack of response of migration flows to welfare levels.

To the extent that race-to-the-bottom or welfare-magnet-type effects exist, a binding floor on spending, whether mandated or financed by the federal government through categorical block grants, will tend to have spillover effects on the spending decisions of jurisdictions that were not bound directly by the floor. This implies that increases in spending on a particular public good can, in such cases, be achieved through less heavy-handed federal policy. In other settings, however, spillover effects might work in opposition to the goals of federal policy and thus require what looks like a more aggressive approach.

III Intergovernmental Transfers in the United States

Most of the mechanisms analyzed in section II are features of the current system of fiscal federalism in the United States. In this section, we provide an overview of the key institutions through which intergovernmental transfers are implemented in practice. Our focus is mostly on transfers from the federal government to subnational jurisdictions; the states, of course, play a supplemental role in providing funding to cities, counties, and other local jurisdictions.

Figure 1 illustrates the evolution over time of federal grants by functional category. Federal grants to states and localities grew steadily between the 1950s and the Great Recession, from under 1% to over 3% of GDP. They were relatively stable at around 3.4% of GDP between the Great Recession and the start of the COVID-19 pandemic but hit an all-time high of 5.6% of GDP in 2021.

The composition of federal grants has changed dramatically over time. In 1959, transportation accounted for 41% of federal grants to state and local governments. It was just under 7% in 2021. Health related federal grants, by contrast, rose from 5 to 15% of total grants with the 1965 introduction of the Medicaid program and continued to expand in importance thereafter.

Other components of the federal grants portfolio have not followed such stark trends. Education peaked at just over 25% of total federal grants with the rollout of the Great Society programs during the 1960s, but in the early-1980s the federal role in education finance declined. Recently education's share of total federal grants has drifted below 10%. Income security has been relatively steady over the last 70 years, with mild countercyclical fluctuations.

A visually striking episode in Figure 1 is the dramatic rise in "other" transfers in the late 1970s. This increase consisted of funds from the General Revenue Sharing trust fund, funds associated with active labor market policies initiated by the Nixon administration, and transfers for community and regional development that peaked during the Carter administration.

The General Revenue Sharing episode has been analyzed by Feiveson (2015), who finds that "cities increased expenditures one-for-one with federal grants." This is suggestive of a large flypaper effect of the kind discussed in subsection II.3.C. Characteristics of subnational jurisdictions played an important role in moderating the allocation of these resources. In states with pro-union collective bargaining laws, cities used more than half of the transfers for wage increases for public-sector workers. Cities in other states dedicated more of the funding to increased service provision.

Leading up to the COVID-19 pandemic, grants related to health care had become far and away the largest category of intergovernmental transfers. The health share reached just over 60% in the years prior to the pandemic.

Table 1 shows the main programs driving intergovernmental transfers in the years 2015-2019: the two largest programs in each grant category, as well as the five largest other programs. The table makes clear how health spending came to dominate intergovernmental transfers: it is largely a consequence of the size of the Medicaid program. Medicaid is currently the single largest source of transfers from the federal government to states and localities, accounting for about half of the total. In the following five subsections, we analyze this and other significant

programs as they stood just prior to the pandemic, category by category. We discuss pandemic-era changes to the landscape in Section IV, in particular subsection in IV.2.

III.1 Health Care

The Medicaid program was enacted in 1965 and provides health insurance primarily for individuals with low incomes. All states and territories have Medicaid programs. The federal government sets certain parameters, such as coverage and eligibility requirements, and provides matching funds, but each state administers its own program and can set coverage and eligibility levels above and beyond certain federal minima. The regular matching rate (Federal Medical Assistance Percentage, or FMAP) varies across states based on per capita income, but is in principle at least 50% and at most 83%. This means the states receive at least one dollar in federal support for each dollar spent on Medicaid.¹⁵ It was by far the largest federal grant program in 2015-2019, with an average annual outlay of over \$350 billion in real 2012 dollars.

The Medicaid program illustrates some of the key points discussed in Section 2. First, it is an example of a program designed to incentivize higher spending levels on a specific service than would otherwise materialize. It does so by lowering the relative price, to each state, of spending on Medicaid. Note that there are limits on how far the federal government can go in its deployment of incentives along these lines. In the 2012 case of *NFIB v. Sebelius*, the Supreme Court provisions of the Affordable Care Act that threatened the withdrawal of all Medicaid reimbursements from states that refused to expand their Medicaid program to all adults under the age of 65 with incomes up to 133% of the federal poverty level (FPL). This decision was rooted in the view that the threat of losing all Medicaid reimbursements did not leave the states with a “legitimate choice” and was a “gun to the head.” The Court argued that effectively forcing the states to implement a new federal program would undermine political accountability; that “when the State has no choice, the Federal Government can achieve its objectives without accountability.”

Second, the Medicaid program’s lower bounds on the generosity of states’ programs serves to limit policy competition. By placing a floor on the provision of health insurance to some of the most vulnerable groups in society, the program reduces the risk of a “race to the bottom” in the provision of the social safety net. And by providing significant subsidies to states that choose to run expansive Medicaid programs, it reduces the need for collection of own-source resources. This, in turn, reduces the scope for tax competition.

In addition, the FMAP illustrates a lesson that is relevant for the design of intergovernmental grants more generally. While its funding structure follows relatively straightforwardly from the motivations highlighted in the previous two paragraphs, federal policymakers have in recent decades relied repeatedly on this structure to shape the provision of grants for purposes of

¹⁵ The matching rate, or federal share, is calculated as 1 minus the state share. The state share, in turn, equals $45\% * ((\text{state per capita income})^2 / (\text{US per capita income})^2)$. The federal share is increased for the colonies, certain services, and certain beneficiaries. The latter group includes individuals newly eligible for Medicaid under the Affordable Care Act of 2010, for whom the FMAP is 90%.

macroeconomic stabilization. Specifically, in response to the 2001 recession, the Great Recession, and the pandemic, the federal governments has temporarily raised FMAPs as a mechanism for injecting additional funds into state governments' budgets (Leung, 2022; Clemens, Ippolito and Veuger, 2021; Clemens and Veuger, 2023). We have observed elsewhere that this linking of macroeconomic stabilization to the size of states' Medicaid programs violates the Tinbergen rule, which holds that independent policy objectives are best met through the use of independent policy instruments (Clemens and Veuger, 2023).

While much smaller than Medicaid, the second-largest health program in terms of intergovernmental grants is the Children's Health Insurance Program (CHIP) at \$14 billion a year. CHIP complements the Medicaid program by providing federal matching grants to the states to provide health insurance for children in households with incomes that are modest but that nonetheless exceed the Medicaid limit. CHIP matching grants are calculated on the basis of a so-called "enhanced" FMAP (eFMAP) that is higher than the regular FMAP but otherwise relies on similar considerations.¹⁶

III.2 Income Security

During the 2015-2019 period, the two largest federal grant programs meant to provide income security to households, especially households with children, were the child nutrition (school breakfasts and lunches) and tenant-based rental assistance (TBRA) programs. Both involved federal grants of around \$20 billion a year. Four other income security programs merit mention here for the relatively large amounts of grant money involved. The TANF program, which succeeded cash assistance through the AFDC program following the 1996 welfare reform, involves some \$15 billion per year. In combination, federal food aid through the Supplemental Nutrition Assistance Program (SNAP, formerly food stamps), the supplemental food program for Women, Infants and Children (WIC), and the Commodity Supplemental Food Program (CSFP) generates about \$11 billion in intergovernmental transfers.¹⁷ Finally, the federal government provides \$7.5 billion in annual Foster Care and Adoption Assistance grants.

The four food aid programs in this category (school breakfasts and lunches, SNAP, WIC, and CSFP) vary in both the groups of recipients they target, and in their delivery. All of them are means-tested and exist, in principle, to provide sufficient nutrition to vulnerable categories of individuals: low-income school-age children; low-income households; low-income women during pregnancy, post-partum, and while breastfeeding, as well as children under 5; and low-

¹⁶ The eFMAP is equal to $FMAP + 0.3 * (100\% - FMAP)$, with a maximum value of 85%.

¹⁷ Note that some of these programs and other programs discussed later in this section are significantly larger than these numbers would seem to indicate, as the programs' primary benefits involve direct transfers to households and other third parties as well. For key programs including Unemployment Insurance, for example, federal grants primarily fund program administration as opposed to program benefits. Or take the Low-Income Housing Tax Credit (LIHTEC) program: while it is associated with an annual cost to the federal government of \$13.5 billion, this cost overwhelmingly consists in a tax expenditure associated with tax credits that are allocated to the states (and by them to developers through a public bidding process) as opposed to conventional spending (Keightley, 2023).

income seniors. The states generally have some flexibility in how they deliver these benefits and who is eligible for them, within a set of federal parameters.

Delivery is an interesting aspect of these programs. The child nutrition programs are largely in-kind: the school system is deployed to deliver breakfast and lunch to school-age children. Similarly, CSFP benefits are typically delivered as a monthly package. As we move ever so slightly toward the cash benefit side of the spectrum, WIC benefits typically come in the form of vouchers or checks that can be used to purchase specific types of food, though some states deliver packages for this program as well. For such programs, the administrative burdens imposed on stores become relevant, as not all stores participate which, in turn, imposes convenience costs on beneficiaries (Meckel and Rossin-Slater, 2021). The store-based delivery mechanism creates a tension between anti-fraud measures, which reduce the profitability of store participation, and the value of the program to beneficiaries (Meckel, 2020). Finally, SNAP benefits come in the form of electronic benefit cards that can be used to purchase a wide (but restricted) range of food products. This delivery mechanism raises questions involving the potential costs associated with high-frequency fluctuations in demand that arise due to the monthly benefit-deliver cycle (Wilde, and Ranney, 2000; Shapiro, 2005; Goldin, Homonoff, and Meckel, 2021).

The relatively heavy reliance on in-kind delivery and restrictions on the use of benefits may reflect, besides a paternalistic impulse, the central role of the congressional agriculture committees and the U.S. Department of Agriculture in designing and administering these federal grant programs.¹⁸ Either way, these aspects also embody significant restrictions on the use of funds by subnational governments compared to a counterfactual of unrestricted block or matching grants.

In addition to delivery mechanisms, the food aid programs also differ in how their funding is allocated procedurally by Congress. SNAP and the school breakfasts and lunch programs constitute so-called mandatory spending,¹⁹ in the sense that the authorizing legislation has set their funding levels,²⁰ while the WIC and CSFP programs involve discretionary spending that is controlled by the annual appropriations process (Aussenberg and Billings, 2020).

An interesting contrast involves appropriations for WIC and for TBRA. Most of the latter is distributed through the Section 8 Housing Choice Voucher Program (HCVP). While both WIC and the HCVP are subject to the annual appropriations process, the link between eligibility and ability to receive benefits is significantly more tenuous for the HCVP. Since the 1990s, the WIC program has been funded at a level that has allowed the states to provide benefits to everyone who applied (Aussenberg, 2017). The HCVP, on the other hand, has been characterized by rationing in the form of years-long waiting lists of the sort one might more commonly associate with the immigration bureaucracy or the British national health care service, as eligibility standards and/or benefit levels are too generous relative to the amount of federal funding

¹⁸ Currie and Gahvari (2008) provide a wide-ranging discussion of the potential motivations for the use of in-kind transfers as an alternative to paying out benefits in the form of cash.

¹⁹ So do Medicaid and CHIP, discussed in the previous subsection.

²⁰ Most recently the 2018 Farm Bill.

Congress makes available. While this has been useful to researchers as a source of econometric identification (see e.g. Jacob and Ludwig, 2012), it is hard to square with conventional notions of horizontal equity.²¹

In addition to subsidizing housing provided by third parties, public housing agencies also operate their own developments, subsidized by the federal government through the Public Housing Operating Fund. A salient characteristic of these programs is the extent to which their effectiveness depends on the interaction of program generosity with state and local characteristics such as housing supply elasticities (Eriksen and Ross, 2015), land use restrictions (Corith and Irvine, 2021), and the efficiency of agency operations (see e.g. Thompson, 2022).

The programs discussed so far all involve in-kind transfers or transfers of cash that can only be spent on specific goods and services. This is a manifestation of the broader move away from cash benefits in the U.S. safety net over the past several decades, at least for most families with little or no earnings.²² The main remnant of the traditional cash welfare system is the Temporary Assistance for Needy Families (TANF) program, which replaced the New Deal-era Aid to Families with Dependent Children (AFDC) program in 1997. The current structure of the program is of a block grant to the states, the size of which is based on pre-TANF federal funding amounts. The block grants have not been adjusted for inflation or population growth since 1996 and have lost 45% of their real value over that period. To receive their full block grant, states must meet certain requirements, including a maintenance-of-effort requirement that sets minimum levels of spending from state funds, based on pre-TANF levels, on TANF and related activities.²³

Finally, the federal government provides significant funds to states under the banner of Foster Care and Adoption Assistance, generally through the FMAP-based matching system discussed earlier for Medicaid. Recent research has found that the generosity of states' foster payments have little impact on the supply of homes for children in need of placement and may also have limited impact on child well-being, which contrasts with typical estimates of the effects of household income generated through other cash assistance program (Chorniy and Mills, 2022).

III.3 Transportation

²¹ In response to this longstanding issue, Collinson, Ellen and Ludwig (2019) argue for shallower or time-limited subsidies.

²² This move has been offset to an extent – and to a large extent for low-income households with significant market income – by the expansion of the Earned Income Tax Credit and the (refundable portion of the) Child Tax Credit, and by the rapid growth, especially during the 1990s, in the number of non-elderly recipients of Supplemental Security Income.

²³ Whether these funds reach their intended targets is, of course, a matter of governance. In a high-profile case that will probe some of the limits of how such funds can be used, Mississippi's Department of Health of Human Services has filed a lawsuit in an attempt to retrieve tens of millions of TANF dollars that were allegedly paid to former NFL quarterback Brett Favre and others in exchange for services that services that may not have been delivered and in connection with various projects, such as the construction of a university volleyball facility and the capitalization of a biotechnology startup, that may be incompatible with the objectives of the program (Baker, 2022).

Transportation-related programs were the dominant category of federal grantmaking to the states in the late 1950s. Of the different categories of intergovernmental grants, it is arguably the area that has experienced the least amount of change in the postwar period. The Federal-Aid Highway Program (FAHP) continues to be the source of a large majority of federal funds allocated to the states in this category. Over time, highway funds started to be allocated through an increasing number of FAHP programs, with funding calculated on the basis of various formulas. Congress eliminated or consolidated many of these programs in 2012 and simplified the allocation mechanism. In recent years, federal highway aid has been allocated based on each state's share of funding in fiscal year 2015, with a floor equal to 95% of each state's contribution to the highway account of the Highway Trust Fund (HTF). Contributions to the trust fund come primarily from excise taxes on motor fuels (Kirk, 2021), although Congress has increasingly had to supplement these revenues with general revenue over time.²⁴ There are two principal reasons for this. First, the excise taxes on both gas and diesel fuel have been eroded in real terms as they are not indexed to, and have not been raised otherwise to keep up with, inflation. Second, increasing fuel efficiency and growing adoption of electric vehicles have reduced the excise tax base. Note that the FAHP does not rely on congressional appropriations directly. Instead, the Federal Highway Authority has contract authority over the trust fund and enters into binding contracts to fund projects.

This “revenue sharing” structure, through which revenue is collected at the federal level, but then returned almost directly to the states, illustrates perhaps most directly how fiscal federalism can reduce the scope for tax competition while leaving program administration and implementation up to the states. In that sense it stands in contrast with the previously discussed programs, which are also substantively concerned with avoiding a “race to the bottom” in the provision of services.

The second-largest, but significantly smaller, transportation program is the Federal Public Transportation Program (FPTP), which OMB refers to as Urban Mass Transportation Grants. The federal government had limited involvement with public transportation until the mid-1960s, when reduced ridership triggered bailouts of public transit systems that in a sense have become permanent (Mallett, 2022). In 2019, close to 90% of all public transportation trips were made by bus or heavy rail, though the program funds other types of public transit as well. The grants in question flow from the public transit account of the Highway Trust Fund. Funding is allocated through dozens of programs and on the basis of various formulas. The largest one of these, the Urbanized Area Formula Program, bases the allocation of funds on a mix of characteristics of urban areas that include population, population density, the number of low-income individuals, plus various measures of public transit usage and cost.

²⁴ Between September 2008 and 2021 a total of \$157 billion was transferred to the HTF from Treasury general funds and the Leaking Underground Storage Tank (LUST) Trust Fund, including \$125 billion to the highway account (Kirk, 2021). The 2021 Infrastructure Investment and Jobs Act includes an additional \$118 billion general revenue transfer, but also increases future contract authority levels. In combination these changes are projected to increase the trust fund's funding gap (Committee for a Responsible Federal Budget, 2023).

III.4 Education

While the federal government’s role in financing K-12 education is generally limited, it does among other things provide school districts with additional funding intended to support children from low-income families (“formula children”) and children with special needs. Funds for formula children are authorized under Title I of the Elementary and Secondary Education Act of 1965, as amended, and fall into four buckets: Basic Grants (the largest component), Concentration Grants, Targeted Grants, and Education Finance Incentive Grants. The different types of grants are calculated based on different formulas that incorporate elements such as the number of formula children, the amount of own-source spending per child, a minimum amount for small states, and provisions that keep funding from declining rapidly year over year.²⁵ The different formulas combine to produce allocations that may strike some as counterintuitive: districts with similar shares of formula children, for example, can receive wildly different allocations per child, and different states receive very different allocations per formula child (Gordon and Reber, 2023). These types of discrepancies are of course typical for a system of matching grants, but they are exacerbated by specific details of the formulas.

The 1974 Individuals with Disabilities Education Act (IDEA) authorized federal funding of up to 40% of nationwide, per-student spending for children in need of special education. Kolbe, Dhuey, and Menlove Dautre (2022) illustrate that the IDEA formulas, as revised in 1999, generate allocations that are more detached from the number of children with special needs than one might expect.

III.5 Other

The “Other” category naturally includes a grab bag of different programs, some of which are quite significant in terms of the associated federal grants to state and local governments. We discuss the Disaster Relief Fund, the second-largest line item in normal times, in more detail in the context of the COVID-19 pandemic (below in subsection IV.2). Here we will focus on Children and Families Services Programs and the Community Development Fund.

By far the largest Children and Families Services Programs, accounting for about 80% of total grants, is Head Start. Head Start funds early-childhood development services for low-income children below the age of compulsory school attendance (i.e., those ages 0-4). At least 90% of beneficiaries need to meet one of several criteria. They must come from families with incomes below the FPL, they must be categorically eligible because their families receive SSI or TANF, or they must be in foster care or homeless. There are limited exceptions for children from households between 100% and 130% of the FPL. The program facilitates a comprehensive set of educational, health, nutritional, and social services for close to 1,000,000 children through non-profit and for-profit providers. Kline and Walters (2016) find that Head Start draws about a third of its beneficiaries from competing programs, and that its positive effects are particularly large in

²⁵ Authorized amounts have not been fully appropriated since the second year of Title I’s existence. The actual grants are reduced accordingly. The provisions that prevent funding from declining rapidly year over year are known as “hold harmless” provisions.

place where services would not otherwise be provided. Accounting for this cross-program substitution effect reduces estimates of the net fiscal impact of the program and raises its benefit-cost ratio.²⁶

The Community Development Fund provides block grants to state and (large) local governments to engage in a wide range of activities meant to improve the circumstances of low- and moderate-income people, prevent or eliminate blight, or address threats to the health or welfare of the community.²⁷ In this instance, the potential use of funds is purposefully broad. Money is allocated on the basis of two formulas, and to two categories of grantees: so-called entitlement communities (principal metropolitan cities, other cities with a population over 50,000, and (other) urban counties with over 200,000 residents) and the states, which then redistribute the funds to non-entitlement communities. Funding is allocated based on two different formulas (that in turn differ slightly for entitlement communities in states) that involve population, poverty, overcrowding, housing built before 1940, and lagged population growth. Supplemental funding is at times appropriated to in response to disasters and emergencies, as we will see in subsection IV.2.

IV The COVID-19 Pandemic

IV.1 Intergovernmental Grants and Strategic Interactions During COVID-19

The COVID-19 pandemic has proven to be an important episode with respect to developments associated with the strategic interactions among governments as well as with respect to the role of intergovernmental grants as instruments of fiscal and social policy. Externalities associated with cross-border flows of COVID-19 itself, for example, raise important issues related to the costs of cross-border economic activity and the potential importance of cooperation among neighboring governments.

In the United States, an interesting development in this regard was the emergence of several interstate compacts: the Western States Pact, the Midwest Governors' Regional Pact, and the Eastern States Multi-State Council. While it is not entirely clear what purposes these compacts, the interstate equivalent of treaties, ultimately served, one of their ostensible purposes was to facilitate coordination on the eventual rolling back of restrictions on economic activity. To the best of our knowledge, these pacts have not yet been the subject of economics research.

The pandemic gave rise to demand for novel sets of goods, services, and regulatory measures that pose considerable challenges linked to spillovers across jurisdictions. As an initial example, the development of vaccines provides a case of a global public good for which international cooperation to achieve high levels of investment would have been attractive. Second, the

²⁶ Similar cost and benefit accounting issues arose previously in our discussion of Baicker and Staiger's (2005) research on the effects the DSH program.

²⁷ 24 CFR § 570.200.

pandemic's early stages provided an unusually clean case study in Gordon's (1983) point that one government's activities may alter the resource costs faced by others. When personal protective equipment, ventilators, and vaccine doses were in short supply, purchases secured by one government could alter the prices and availability facing others. Third, the continuation of economic activity in one jurisdiction could alter the flows of case counts into others through a classic pandemic disease externality. Fourth, shutdowns to economic activity impaired supply chains in ways that exerted negative externalities on the productivity of other jurisdictions. Notably, the opposing implications of considerations three and four make it difficult to sign the net direction of the externalities associated with any one jurisdiction's decision to shut down or maintain economic activity.

In addition to these spillovers and externalities, the pandemic generated a shock to both the types and amounts of spending in which state and local governments were expected to engage. Because contractions of economic activity threaten governments' tax bases and other sources of revenue (Clemens and Veuger, 2020a and 2020b), this combination of factors contributed to widespread support for the use of large federal transfers to support the activities of state and local governments. In the U.S. context, this led federal grants to state and local governments to reach historic highs, not only in absolute terms but also as a share of GDP, by a considerable margin. We now turn to discussing how these grants were designed and allocated.

IV.2 COVID-19-Era Intergovernmental Grants in the United States

The federal government's response to the COVID-19 pandemic was wide-ranging and involved dramatic changes to fiscal, monetary, healthcare, tax, immigration, housing, and public-health policy. Most relevant to us here is the component of the fiscal policy response that involved aid to state, local, tribal, and territorial governments, which amounted to some \$900 billion.²⁸ We have discussed and analyzed the macroeconomic and public finance implications of this aid elsewhere (e.g. Clemens and Veuger, 2023); here and in the next section we will concentrate on the specific programs and vehicles used to deliver the aid and its implications for policy competition.

Our discussion of how federal grants to the states were adjusted in response to the COVID-19 pandemic mostly follows the structure of Section III. Table 2 follows the same structure as Table 1 and shows average outlays for 2020 and 2021, as well as estimated outlays for 2022. Many of the programs in Table 2 were also included in Table 1, though four new programs made the list during the pandemic: non-trust-fund Urban Mass Transportation Grants, the Education Stabilization Fund, the Coronavirus Relief Fund, and Emergency Rental Assistance. Additionally, many of the programs that did appear in Table 1 were expanded significantly.

²⁸ This number does not (and should not) correspond to the totals in Table 2 below. Differences are due to a variety of factors, including that the current exercise focuses on fiscal years 2020 and 2021, that not all funds appropriated have been committed or disbursed, that we do not include aid to tribal and territorial governments here, categorization differences between OMB and the Committee for a Responsible Federal Budget, and that the amounts in the tables are in real 2012 USD.

IV.2.A Health Care

One of the very first measures Congress took in response to the COVID-19 pandemic, in the mid-March 2020 Families First Coronavirus Response Act, was to increase the FMAP by 6.2 percentage points²⁹ and the CHIP matching rate by 4.34 percentage points. This federal generosity – Medicaid grants in 2020-21 were 20% greater in real terms than in 2015-2019 – did come with strings attached. Most importantly, the states had to comply with a continuous coverage requirement to keep people who lost eligibility enrolled in Medicaid and CHIP. As a result, enrollment grew by some 21 million people from February 2020 through November 2021.³⁰ While a principal goal of the FMAP increase was to stabilize state budgets, Clemens, Ippolito, and Veuger (2021) find that the increases in matching funds were not correlated with variations in states' Medicaid enrollment increases due to the large variation in expenditures on the inframarginal, pre-pandemic beneficiary population. The late-2022 Consolidated Appropriations Act phases out the matching rate increases between April and December, 2023.

IV.2.B Income Security

The federal government took dramatic steps to provide income security to households throughout 2020 and 2021. This happened not only through direct cash payments, increased unemployment insurance benefits,³¹ and the Paycheck Protection Program, but also through increased spending on grants to state and local governments in this category.

A particularly large new program was the Emergency Rental Assistance (ERA) program, one of many aggressive interventions in housing markets during a period that perhaps most remarkably featured a nationwide eviction moratorium. Subnational governments enjoyed significant leeway in determining how to allocate funds, but Driessen, McCarty, and Perl (2023) report that:

...from the first quarter of 2021 through the second quarter of 2022 grantees had provided ERA to 5.35 million unique households, the majority of which had incomes at or below 30% of local area median income. Roughly 70% of those served received rental assistance and about 64% received assistance with rental arrears. About 14% received utility assistance and 27% received assistance with utility arrears.

A second program that merits mention here is the SNAP program. The federal government, which fully funds SNAP benefits and splits the cost of program administration with the states,

²⁹ This increase also triggered increased matching grants for Foster Care and Adoption Assistance, naturally.

³⁰ As pandemic policies unwind, this raises the question of how the insurance coverage status of these individuals will change as their Medicaid eligibility is reassessed (Dague and Ukert, 2022).

³¹ While the states processed the bonus unemployment insurance benefits paid by the federal government through programs like the Federal Pandemic Unemployment Compensation, Pandemic Emergency Unemployment Compensation, and Pandemic Unemployment Assistance, we follow the OMB's classification here and consider these to be payments to individuals, not intergovernmental grants. Tastes may differ, but gotta draw the line somewhere!

waived all work requirements and raised benefit amounts in different ways over the course of the pandemic, including by 15% through the first three quarters of 2021. While these emergency allotments ended for all states after February 2023, a number of states had chosen to end them prior to that, starting with Idaho in March 2021 (Long, 2023).

Finally, widespread school closures interfered with the delivery of school meals. In response, eligible school children received benefits through the Pandemic Electronic Benefit Transfer (P-EBT) program, which mimicked the approach of the SNAP program to the delivery of benefits.

IV.2.C Transportation

The public-health crisis and the associated changes in commuting patterns and work arrangements led to a steep drop-off in mass transit ridership. In response, Congress allocated large discretionary amounts of funding to transport systems, catapulting non-trust-fund FFTP grants to the second position in our transportation category. Note that many of these funds are being disbursed after fiscal year 2021, as Table 2 indicates. A key question is whether these grants will become permanent, similar to how permanent federal involvement in this area resulted from the negative shock to revenue from widespread car ownership, as discussed in subsection III.3.

IV.2.D Education

The main vehicle for education-related COVID-19 grants to state and local governments is the Education Stabilization Fund. The two main components of this fund were the Elementary and Secondary School Emergency Relief (ESSER) Fund and the Higher Education Emergency Relief Fund (HEERF). ESSER funds were allocated proportionally to existing Title 1 grants, creating the same distributional patterns (and associated concerns) that we discussed in subsection III.4. It is not obvious whether the distributional considerations underlying Title 1 grant formulas relate to the revenue and spending implications of the COVID-19 public health crisis.

IV.2.E Other

Two of the most significant sources of pandemic-era federal aid to state and local governments can also be described as “Other” programs. The first is the Disaster Relief Fund (DRF), mentioned in subsection III.5 above, which was supercharged during the pandemic. The DRF is managed by the Federal Emergency Management Agency (FEMA) and is meant to serve as a source of funds as needed by the federal government to address domestic emergencies through disaster relief. Funding arrives from a combination of annual appropriations and discretionary supplemental appropriations. The fund’s largest gross appropriations in history materialized in 2021 (\$50 billion from the American Rescue Plan Act), though they were larger in real terms in 2005, the year of hurricane Katrina (Painter, 2022). While the Disaster Relief Fund seems well suited to deal with unexpected disasters that strike specific parts of the country, its funding and

operating models are less suited for the provision of macroeconomic stabilization funds (Clemens and Veuger, 2023).

A large contribution to the stabilization objective was provided through the final program we shall discuss, namely the Coronavirus Relief Fund. The Coronavirus Relief Fund distributed general-purpose fiscal assistance grants to state, local, and tribal governments. As Clemens and Veuger (2023) emphasize, these grants would prove to be much larger than estimates of the shock to need.

IV.3 Intergovernmental Grants and Tax Competition During COVID-19

During the COVID-19 pandemic, federal aid has placed the budgets of state and local governments on unusually favorable footing (Clemens and Veuger, 2023). There is broad interest in the question of how state and local governments have utilized and will utilize their windfalls of federal fiscal assistance. A narrower question of interest is whether windfalls of federal fiscal assistance have been used to support states' efforts to lure capital through tax competition or, alternatively, through increased provision of public services that are of value to businesses. In this subsection we present new empirical results answering this question for the case of the corporate tax.

Whether windfalls encourage or discourage tax competition is theoretically ambiguous. Empirically, Helm and Stuhler (2021) find evidence of tax increases in response to windfalls, triggered by revised Census counts, for German municipalities. Berset and Schelker (2020) find the opposite effect of a sudden increase in fiscal equalization grants that befell municipalities in the Swiss canton of Zurich.

Perhaps most intuitively, a (temporary) loosening of the subnational budget constraint may trigger an across-the-board reduction in tax rates, especially in a context of restrictions on the size of budget surpluses. In fact, when this kind of tax reduction does not materialize, it is typically described as an anomaly (the flypaper effect discussed in subsection II.3.C). Additionally, a business-destroying shock like the pandemic might temporarily elevate the stakes of tax competition as states compete over the new firms and the new (intangible) capital that will replace the old.

On the other hand, large windfalls may, in themselves, enhance a location's attractiveness to new capital. That is, windfall transfers to state governments imply public procurers flush with cash. Similarly, where state and local windfalls are passed onto taxpayers, local demand for private goods may be elevated as well. With respect to firm location decisions, the prospect of heightened demand and strengthened public-good provision may substitute for the benefits of a lower tax rate and insulate states with particularly large windfalls from tax competition.

To add to the ambiguity, the effects of a windfall on the corporate tax rate also depends on the income elasticity of public relative to private consumption, as modeled by Chirinko and Wilson (2017). Larger windfalls may lead to either a lower or higher corporate tax rate. In their model, the resulting slope is informative regarding the reaction functions that are central to traditional

models of tax competition. Finally, different models of electoral competition also imply different responses to windfalls. In threshold models of retrospective voting, a politician who receives a small windfall will typically find it more attractive to set risky economic policies than a politician who receives a large windfall.

A key challenge to empirically estimating the effects of windfall fiscal assistance on tax policy is a standard endogeneity concern: fiscal assistance may tend to be targeted at areas in greatest need. Variations in economic prosperity and distress, rather than aid per se, may thus tend to underlie the observed correlation between aid and enacted tax rates. To overcome this and other potential sources of bias, we supplement a purely descriptive look at the data with an instrumental-variable estimator. In particular, we build on existing evidence showing that the overrepresentation of small states in the U.S. Congress led federal legislation to send disproportionate relief to the state and local governments in those states (Clemens and Veuger, 2021). Importantly, we confirm in our 2021 paper that variation induced by these predetermined, constitutionally anchored political factors was orthogonal to a rich set of measures of the COVID-19 crisis' direct impact on state-level public health and public finances. This strategy of instrumenting for federal aid with aid levels predicted by congressional representation, has supported separate analyses of the effects of pandemic fiscal assistance packages on macroeconomic outcomes (Clemens, Hoxie, and Veuger, 2022; Clemens, Kearns, Lee, and Veuger, 2023) as well as outcomes including population-wide vaccination and testing rates (Clemens, Hoxie, Kearns, and Veuger, 2022).

In the unadjusted data, on display in Figure 2, we observe that among the 11 states to enact reductions in their top corporate rate between 2019 and 2022, for example, only 3 were among the top half of states with respect to the federal fiscal assistance they received in per capita terms. In a simple bivariate regression, shown in Appendix Table 3, an additional \$1,000 in aid per capita, which is well within our empirical range, predicts a 13 percentage point lower likelihood of a decrease in the corporate tax rate; this estimate is statistically distinguishable from zero at the 99% confidence level. Similarly, an additional \$1,000 in aid per capita predicts a modest 0.15 percentage point increase in the corporate tax rate, an estimate that is statistically distinguishable from zero at the at the 95% confidence level.

Our instrumental-variables estimation strategy is described by the two equations below:

$$\frac{TotalAid_s}{Pop_{s,y_{2020}}} = \alpha + \gamma_1 ReprsPerMillion_s + \gamma_2 X_s + \varepsilon_s \quad (1a)$$

$$Corporate\ Rate\ Reduction_s = \alpha + \beta_1 \frac{\widehat{TotalAid}_s}{Pop_{s,y_{2020}}} + \beta_2 X_s + u_s.. \quad (1b)$$

In the first-stage regression (1a), $\frac{TotalAid_s}{Pop_{s,y_{2020}}}$ is regressed on the number of representatives and senators per million residents in 2020 and a vector of control variables, X_s , that differs across specifications. The first stage outcome, $\frac{TotalAid_s}{Pop_{s,y_{2020}}}$, is the sum of the fiscal aid a state and the local governments therein received across the four major pieces of pandemic relief legislation, namely

the Families First Coronavirus Response Act (FFCRA), the CARES Act, the Response and Relief Act (RRA), and the American Rescue Plan Act (ARPA).

Fitted values from the first stage (1a) are used to estimate the second stage (1b). Here the outcome is an indicator for whether a state enacted a corporate rate reduction in any year between 2019 and 2022. The coefficient β_1 is thus an estimate of the relationship between the variations in federal aid that were driven by variations in congressional representation and the likelihood that a state enacted a corporate rate cut. We also present estimates in which the outcome variable is an indicator for whether a state enacted an increase, as opposed to a reduction, in their corporate tax rate.

With respect to the covariates in X_s , in one specification, for example, we control only for the log of a state's population, such that our identifying variation relies solely on the unusual relationship between population and representation in the U.S. Congress. In additional specifications, we include controls for factors including the pre-pandemic trend in the corporate tax rate, other features of the pandemic policy landscape, variations in political factors, and variations in the severity of the pandemic.

Estimates of the model described above are reported in Tables 3 and 4. In our analyses of corporate tax declines (Table 3), we observe that the use of the instrumental-variables strategy results in larger coefficients describing the effect of pandemic fiscal assistance on the likelihood that a state enacted a corporate rate cut. In models that include controls for the pre-pandemic trend in corporate tax rates as well as for variations in other features of the pandemic policy landscape, an additional \$1,000 in aid per capita, which as noted above is well within our empirical range, predicts a 50 percent lower likelihood of a corporate rate reduction ($p < .01$). The finding that greater aid is negatively related with the enactment of corporate rate cuts is thus strengthened as we move from bivariate regression to instrumental-variable estimation.³²

Our analysis thus finds that the small-state bias in federal grants is negatively correlated with corporate rate reductions. That is, larger aid allocations predict a greater likelihood that corporate tax rates held steady, while smaller aid allocations predict reductions in corporate tax rates.

Table 4 presents our analysis of the relationship between federal aid and the enactment of increases in corporate tax rates. Here we obtain null effects. Further, the point estimates tend to fall outside of the confidence intervals associated with the estimates presented in Table 3, suggesting an asymmetry in the relationship between federal aid and the decision to reduce versus increase corporate rates. We also note, however, that the confidence intervals for the estimated effects of federal aid on increases in corporate rates are wider than the intervals for the estimated effects on decreases in corporate rates. This is related to the fact that increases in corporate rates were exceedingly rare during our sample period. In an environment of sizable surpluses, the comparative irrelevance of the rate increase margin may be the source of the asymmetry we observe.

³² Appendix Table 2 shows that our results are not driven by the largest states, which are "overrepresented" if we residualize members of Congress per capita by regressing that variable on the log of population.

This result is consistent with a scenario in which the income elasticity of demand for public goods exceeds the income elasticity of demand for private goods. This is consistent, for example, with the standard view of health care as a “luxury good.” The same is also plausibly true of higher education. The finding is also consistent with models of retrospective voting in which voters cannot observe effort or rely on simple heuristics. Whether this reduction in corporate tax competition is welfare-improving or -reducing once we aggregate over the states is of course not easily inferred, as discussed by Agrawal, Hoyt, and Wilson (2022).

V Conclusion

In this paper we have summarized some of the core insights from past research on intergovernmental relations and we have provided an updated look at the institutions through which intergovernmental transfers are implemented in practice in the United States. We further discussed the prominent role of intergovernmental transfers in the context of the federal government’s response to the COVID-19 pandemic, during which federal grants to state and local governments reached unprecedented levels, both in absolute terms and as a share of GDP. We conclude by discussing some dimensions of these issues that may be open for future research.

A first area for future work is opened by the prominent role of intergovernmental transfers in the context of the COVID-19 pandemic. Pandemic fiscal assistance opens a number of opportunities to investigate how fiscal institutions and alignments of interest groups shape the budgetary incidence of fiscal transfers. Large volumes of federal funds reached the budgets of cities, counties, school districts, and state governments, and much remains to be known regarding how funds were spent and the extent to which they impacted outcomes of interest. An understanding of how institutions shape these outcomes may be of use to policy makers going forward.

A second area that is ripe for additional research involves the effects of decentralization on how both the level of taxation and public services are selected and how they are targeted across beneficiary populations. One of the principle rationales for decentralization is to improve the extent to which public services cater to the preferences of the populations that finance them. As discussed above, however, a relatively limited empirical literature has addressed how decentralization shapes these choices and outcomes in practice. One noteworthy dimension of these issues is the question of how preferences within jurisdictions like U.S. states relate to the preferences of the population as aggregated across the entirety of the federation, in particular as relates to matters of redistribution.

One recurring theme in our discussion of the U.S. context specifically has been that much of the existing intergovernmental grants structure is focused on having the states administer anti-poverty programs funded by and operated within parameters set by the federal government. On one level, this can be rationalized as an effort to limit tax competition and reduce policy competition of the race-to-the-bottom variety. But those objectives could also be accomplished if the federal government were to send more checks to households, as it does with the elderly. An open question therefore is why these programs are administered at the subnational level. There

are a number of potential explanations. These include a desire to couple benefits with locally provided wrap-around services (Evans et al., 2023); efforts by opponents of benefit programs to strategically create administrative burdens (Herd and Moynihan, 2018); allowance for fine-tuning of program delivery to local preferences; constitutional constraints on federal mandates; the creation of space for the states to play their role as laboratories of democracy; and a view that program administration in particular benefits from more local mechanisms of political accountability and representation. The extent to which these and other explanations can account for the real-world patterns of fiscal federalism in the United States and the extent to which they reduce policy competition between subnational jurisdictions is not clear.

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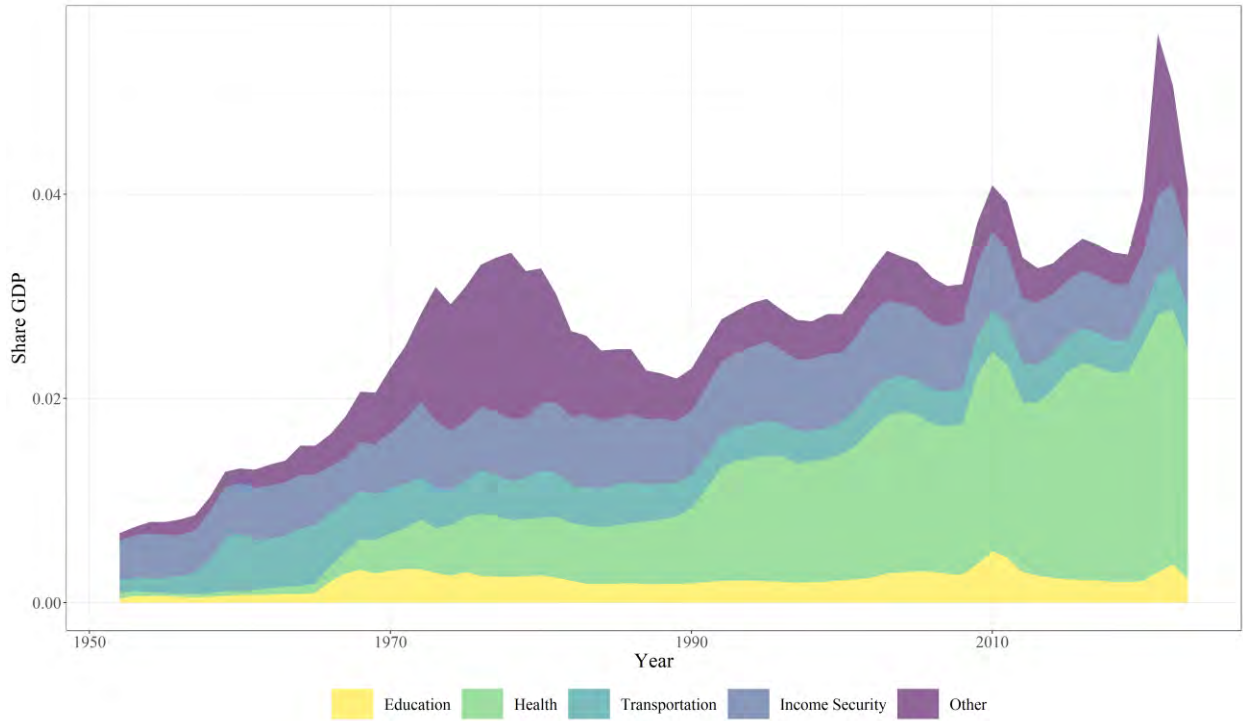
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Figure 1: Federal Intergovernmental Spending as a Share of GDP



Note: This table uses data from Office of Management and Budget (2022a, 2022b) to show federal grants to state and local governments as a share of GDP over time. A breakdown of the composition of each spending category shown can be found in Appendix Table 1.

Table 1: Average Annual Grant Outlays to State and Local Governments, FY 2015-2019

Category	Program Name	Annual Outlay	Category Total
<i>Largest Grants by Category</i>			
Health	Grants to States for Medicaid	353,628	377,092
Health	Children’s Health Insurance Fund	13,927	
Income Security	Child Nutrition Programs	20,847	100,341
Income Security	Tenant Based Rental Assistance	19,071	
Transportation	Federal-Aid Highways (Trust Fund)	40,150	59,771
Transportation	Urban Mass Transportation Grants (Trust Fund)	9,046	
Education	Education for the Disadvantaged	14,679	38,912
Education	Special Education	11,721	
Other	Children and Families Services Programs	9,677	55,473
Other	Disaster Relief Fund	5,552	
<i>Other Large Grants</i>			
Income Security	Temporary Assistance for Needy Families	14,872	
Income Security	SNAP, WIC, and CSFP	11,562	
Income Security	Foster Care and Adoption Assistance	7,460	
Other	Community Development Fund	5,485	
Income Security	Public Housing Operating Fund	4,408	
Average Annual Total Outlays for Grants			631,588

Note: This table uses data from Office of Management and Budget (2022b) and BEA (2023). Average annual outlay expressed in real 2012 USD millions and are deflated using the BEA’s implicit price deflator.

Table 2: Average Annual Grant Outlays to State and Local Governments, FY 2020-2021

Category	Program Name	Annual Outlay	2022 Estimated Outlay	Category Total
<i>Largest Grants by Category</i>				
Health	Grants to States for Medicaid	425,364	450,581	455,828
Health	Children's Health Insurance Fund	14,360	13,323	
Income Security	Tenant Based Rental Assistance	21,762	21,367	128,129
Income Security	Child Nutrition Programs	21,052	24,678	
Transportation	Federal-aid Highways (Trust Fund)	39,024	37,203	67,562
<i>Transportation</i>	<i>Urban Mass Transportation Grants</i>	<i>8,289</i>	<i>20,134</i>	
Education	Education for the Disadvantaged	13,878	15,737	47,741
<i>Education</i>	<i>Education Stabilization Fund</i>	<i>11,380</i>	<i>27,451</i>	
<i>Other</i>	<i>Coronavirus Relief Fund</i>	<i>103,032</i>	<i>87,933</i>	<i>198,562</i>
Other	Disaster Relief Fund	36,866	29,042	
<i>Other Large Grants</i>				
<i>Income Security</i>	<i>Emergency Rental Assistance</i>	<i>14,093</i>	<i>14,802</i>	
Income Security	Temporary Assistance for Needy Families	13,911	13,661	
Income Security	SNAP, WIC, and CSFP	13,141	12,440	
Education	Special Education	11,002	14,724	
Other	Children and Families Services Programs	10,829	11,728	
Average Annual Outlays for Grants				897,823

Note: This table uses data from Office of Management and Budget (2022b) and BEA (2023). Average annual outlay expressed in real 2012 USD millions and are deflated using the BEA's implicit price deflator. Programs that were not included in Table 1 are rendered in italics.

Table 3: Pandemic-Related Intergovernmental Grants and Corporate Tax Decreases

	Baseline	Political	COVID	Combined	Simple
	(1)	(2)	(3)	(4)	(5)
Total Aid per Resident (USD thousands)	-0.525*** (0.159)	-0.533*** (0.167)	-0.495*** (0.13)	-0.494*** (0.130)	-0.210** (0.107)
Log(Population)	-0.346*** (0.0811)	-0.261*** (0.0979)	-0.317*** (0.0749)	-0.208*** (0.0799)	-0.158*** (0.0477)
Share of Population Eligible for MLF	0.388 (0.361)	0.590* (0.357)	0.496 (0.408)	0.792** (0.365)	
Change Corporate Tax Rate (2018-2019)	2.367 (3.526)	-1.203 (3.554)	0.905 (4.604)	-3.339 (4.018)	
Average OSI (March 2020)	0.819 (1.037)	-0.322 (2.524)	-0.0735 (1.061)	-1.148 (2.111)	
Average OSI (January 2022)	2.237** (0.885)	2.893*** (0.932)	2.799*** (0.823)	3.504*** (0.874)	
Political Controls	N	Y	N	Y	N
COVID-19 Controls	N	N	Y	Y	N
Dep. Var. Mean	0.151	0.151	0.1512	0.151	0.151
Observations	44	44	44	44	44
R-squared	0.327	0.391	0.405	0.491	0.204
First-stage F-stat	13.944	15.564	44.635	43.613	73.824

Note: This table uses data from the Committee for a Responsible Federal Budget (2021), US Federal Transit Administration (2021a), US Census Bureau (2021), Chidambaram and Musumeci (2021), Medicaid and Chip Payment Access Commission (2021), US Office of Elementary and Secondary Education (2021), Lewis et al. (2021), US Department of the Treasury (2021a, 2021b), Federal Reserve Board (2021), Hale et al. (2020), Google LLC (2021), MIT Election and Data Science Lab (2017), and Tax Policy Center (2018, 2019, 2020, 2021, and 2022) to estimate the following equations:

$$\frac{TotalAid_s}{Pop_{s,y_{2020}}} = \alpha + \gamma_1 ReprsPerMillion_s + \gamma_2 X_s + \varepsilon_s \quad (1a)$$

$$Corporate\ Rate\ Reduction_s = \alpha + \beta_1 \frac{TotalAid_s}{Pop_{s,y_{2020}}} + \beta_2 X_s + u_s \quad (1b)$$

Where $TotalAid_s$ is the total federal aid per resident to state and local governments (USD thousands) in state s pooled across all four major bills. It is scaled by $Pop_{s,y_{2020}}$, state s 's 2020 official Census population. In first stage equation (1a), $\frac{TotalAid_s}{Pop_{s,y_{2020}}}$ is instrumented using $ReprsPerMillion_s$, the number of Representatives and Senators per million residents for state s in 2020. Estimates of equation (1b) are shown in Columns 1 through 5. $CCorporate\ Rate\ Reduction_s$ is a binary variable indicating whether a state's maximum corporate tax rate decreased between 2019 and 2022. Included is a set of state-level controls for state s (X_s). This includes the log of 2020 official Census population, the share of a state's population living in a town eligible for financing through the MLF, the March 2020, end of March 2020, and January 2022 month averages of a state's Oxford Stringency Index, Share of votes cast for Donald Trump in the 2020 US Presidential Election in state s , and the percent change in retail mobility relative from January 2022 to a February 2020 baseline. Observations are weighted by area population of state s and standard errors (in parentheses) are clustered by state s . States that do not have a corporate tax rate (South Dakota, Wyoming, Nevada, Ohio, Texas, and Washington) are excluded from this analysis.

Table 4: Pandemic-Related Intergovernmental Grants and Corporate Tax Increases

	Baseline	Political	COVID	Combined	Simple
	(1)	(2)	(3)	(4)	(5)
Total Aid per Resident (USD thousands)	-0.219 (0.246)	-0.183 (0.153)	-0.0926 (0.0917)	-0.107 (0.0967)	0.0488 (0.0874)
Log(Population)	-0.0927 (0.125)	-0.159 (0.102)	-0.0402 (0.0506)	-0.0749 (0.0661)	0.0687 (0.0738)
Share of Population Eligible for MLF	0.103 (0.200)	0.367 (0.242)	0.215 (0.167)	0.265 (0.206)	
Change Corporate Tax Rate (2018-2019)	2.123 (4.412)	-1.549 (5.419)	-15.38*** (5.752)	-11.14** (5.077)	
Average OSI (March 2020)	2.122 (1.954)	4.442** (2.253)	-0.0316 (0.489)	2.454* (1.274)	
Average OSI (January 2022)	1.394 (1.265)	0.505 (0.358)	1.658** (0.684)	1.161** (0.456)	
Political Controls	N	Y	N	Y	N
COVID-19 Controls	N	N	Y	Y	N
Dep. Var. Mean	0.073	0.073	0.073	0.073	0.073
Observations	44	44	44	44	44
R-squared	N/A	0.511	0.639	0.693	0.146
First-stage F-stat	13.944	23.221	44.635	34.359	73.824

Note: This table uses data from the Committee for a Responsible Federal Budget (2021), US Federal Transit Administration (2021a), US Census Bureau (2021), Chidambaram and Musumeci (2021), Medicaid and Chip Payment Access Commission (2021), US Office of Elementary and Secondary Education (2021), Lewis et al. (2021), US Department of the Treasury (2021a, 2021b), Federal Reserve Board (2021), Hale et al. (2020), Google LLC (2021), MIT Election and Data Science Lab (2017), and Tax Policy Center (2018, 2019, 2020, 2021, and 2022) to estimate the following equations:

$$\frac{TotalAid_s}{Pop_{s,y_{2020}}} = \alpha + \gamma_1 ReprsPerMillion_s + \gamma_2 X_s + \varepsilon_s \quad (2a)$$

$$Corporate\ Rate\ Increase_s = \alpha + \beta_1 \frac{TotalAid_s}{Pop_{s,y_{2020}}} + \beta_2 X_s + u_{s..} \quad (2b)$$

Where $TotalAid_s$ is the total federal aid per resident to state and local governments (USD thousands) in state s pooled across all four major bills. It is scaled by $Pop_{s,y_{2020}}$, state s 's 2020 official Census population. In first stage equation (1a), $\frac{TotalAid_s}{Pop_{s,y_{2020}}}$ is instrumented using $ReprsPerMillion_s$, the number of Representatives and Senators per million residents for state s in 2020. Estimates of equation (2b) are shown in Columns 1 through 5. $Corporate\ Rate\ Increase_s$ is a binary variable indicating whether a state's maximum corporate tax rate increased between 2019 and 2022. Included is a set of state-level controls for state s (X_s). This includes the log of 2020 official Census population, the share of a state's population living in a town eligible for financing through the MLF, the March 2020, end of March 2020, and January 2022 month averages of a state's Oxford Stringency Index, Share of votes cast for Donald Trump in the 2020 US Presidential Election in state s , and the percent change in retail mobility relative from January 2022 to a February 2020 baseline. Observations are weighted by area population of state s and standard errors (in parentheses) are clustered by state s . States that do not have a corporate tax rate (South Dakota, Wyoming, Nevada, Ohio, Texas, and Washington) are excluded from this analysis.

Appendix Figure 1: Table 1 and 2 from Dahlby (1996)

Table 1. Tax externalities.

Types of Externality	Examples	Fiscal Implications	Revenue Matching Grant Rate
Direct Horizontal	Tax Exporting: A hotel tax which is borne by visitors from other states	Increased reliance on taxes where at least part of the burden is borne by residents of other jurisdictions.	$\frac{\sum_{k=1}^n X_i^k - X_i^i}{\sum_{k=1}^n X_i^k}$
Indirect Horizontal	Tax Competition: A sales tax which causes consumers to purchase the taxed commodities in another state.	The potential mobility of the tax base leads to downward pressure on tax rates.	$\frac{\sum_{k=1}^n R_{ij}^k - R_{ij}^i}{R_{ij}^i}$
Indirect Vertical	Tax Base Overlap: Federal and state excise taxes on cigarettes.	State governments, and possibly the federal government, will impose excessive tax rates on the shared tax base. Both levels of government could end up on the "wrong" side of the Laffer curve for total tax revenue.	$\frac{\tau_{0j}\epsilon_{jj}}{1 + \tau_{ij}\epsilon_{jj}}$

Where X_i^k is the quantity of the good taxed by state i and consumed by the residents of state k , R_{ij}^k is the change in total revenue in state k as a result of an increase in the tax on commodity j by state i , ϵ_{jj} is the elasticity of demand for commodity j , τ_{0j} is the federal ad valorem tax rate on commodity j , and τ_{ij} is the state ad valorem tax rate on commodity j .

Table 2. Expenditure externalities.

Types of Externality	Examples	Fiscal Implications	Expenditure Matching Grant Rate
Direct Horizontal	Benefit Spillovers: Pollution abatement activity which benefits the downstream residents of other states.	Under-provision of activities which generate beneficial externalities.	$\sigma_{g_i}(1 - \rho_{g_i})$
Indirect Horizontal	Spending Competition: Economic development grants which attract investment that would otherwise have occurred in other states.	Over-provision of activities which reduce the tax revenue of other state governments.	$\rho_{g_i} - \rho_{g_i}^i$
Indirect Vertical	Expenditure Interdependence. State education expenditures which increase the federal government's income, payroll, and sales tax revenues because of the increase in students' lifetime earnings.	Under-provision of activities which have a positive effect on the net revenues of other levels of government.	$\tau_0\phi(g_i)(1 + \eta)$

Where σ_{g_i} is the fraction of the direct benefits from the provision of a public service by state i which accrue to non-residents, ρ_{g_i} is the additional revenue that accrues to all governments from an additional dollar spent on the public service by state i , $\rho_{g_i}^i$ is the additional revenue that accrues to state i when it spends an additional dollar on the public service, τ_0 is the federal tax rate on labor income, $\phi(g_i)$ is the increase in the wage rate when an additional dollar is spent on g_i by state i , and η is the uncompensated labor supply elasticity.

Appendix Table 1: Data Appendix

Major Grant Category	Program Name
Health	Salaries and Expenses
	Health Resources and Services
	Payments for Tribal Leases
	Contract Support Costs
	Disease control (Preventive health)
	National Institutes of Health
	Substance Use And Mental Health Services Administration
	Rate Review Grants
	Affordable Insurance Exchange Grants
	State Grants and Demonstrations
	Mental Health Parity Enforcement Grants
	Public Health and Social Services Emergency Fund
	Prevention and Wellness Fund, Recovery Act
	Payment to the State Response to the Opioid Abuse Crisis Account
	General Departmental Management
	Maternal, Infant, and Early Childhood Home Visiting Programs
	Health Resources and Services
	Substance Use And Mental Health Services Administration
	Cost-sharing Reductions
	Grants to States for Medicaid
Children's Health Insurance Fund	
Child Enrollment Contingency Fund	
Pregnancy Assistance Fund	
Health Activities Funds	
Education	Reading Excellence
	Education Jobs Fund
	Indian Education
	Impact Aid
	Safe Schools and Citizenship Education
	Chicago Litigation Settlement
	Education Stabilization Fund
	Education Reform
	Education for the Disadvantaged
	School Improvement Programs
	State Fiscal Stabilization Fund, Recovery Act
	Innovation and Improvement
	English Language Acquisition
	Special Education
	Rehabilitation Services

Special institutions for the handicapped
Promotion of education for the blind
Career, Technical and Adult Education
Higher education (including college housing loans)
Institute of Education Sciences
Disaster Education Recovery
Student Financial Assistance
Disaster Education Recovery

Transportation

Supp Disc Grants for Natl Surface Transport System, Recovery Act
National Infrastructure Investments
National Culvert Removal, Replacement, and Restoration Grant Pro
Strengthening Mobility and Revolutionizing Transportation Grant
Safe Streets and Roads for All
Grants-in-aid for Airports, Recovery Act
Airport Terminal Program
Airport Infrastructure Grants
Payment to Grants-in-aid for Airports
Grants for airports (Airport and airway trust fund)
Grants for airports (federal funds)
Federal-aid highways (trust fund)
Other Federal fund aid for highways
Other Trust fund aid for highways
Motor Carrier Safety Grants, General Fund
National Motor Carrier Safety Program
Motor Carrier Safety
Motor Carrier Safety Grants
Border Enforcement Program
Crash Data
Supplemental Highway Traffic Safety Programs
Highway safety grants
Operating Subsidy Grants to the National Railroad Passenger Corp
Northeast Corridor Improvement Program
Emergency Railroad Rehabilitation and Repair
Capital and Debt Service Grants to the National Railroad Passeng
Restoration and Enhancement Grants
Alameda corridor direct loan financing program
Rail service assistance
Rail Safety Technology Program
Railroad Safety Grants
Grants to the National Railroad Passenger Corporation
Local rail freight assistance
Intercity Passenger Rail Grant Program
Rail Line Relocation and Improvement Program

Capital Assistance for High Speed Rail Corridors and Intercity P
 Next Generation High-speed Rail
 Pennsylvania Station Redevelopment Project
 Alaska Railroad Rehabilitation
 Railroad Research and Development
 Conrail commuter transition assistance
 Northeast Corridor Grants to the National Railroad Passenger Cor
 National Network Grants to the National Railroad Passenger Corpo
 Federal-State Partnership for Intercity Passenger Rail Grants
 Consolidated Rail Infrastructure and Safety Improvements
 Northeast corridor improvement program
 Urban mass transportation grants
 Urban mass transportation grants
 Research and special programs (pipeline safety and other)
 Natural Gas Distribution Infrastructure Safety and Modernization
 Emergency Preparedness Grants
 Trust Fund Share of Pipeline Safety
 Port Infrastructure Development Program
 Merchant Marine Schools

Income Security

Total, 600 (Income Security)

Other

Total, 050 (National Defense)
 Total, 150 (International Affairs)
 Total, 270 (Energy)
 Total, 300 (Natural Resources and Environment)
 Total, 350 (Agriculture)
 Total, 370 (Commerce and Housing Credit)
 All other 400 (Transportation)
 Total, 450 (Community and Regional Development)
 All other 500 (Education, Training, Employment, and Social Services)
 All other 550 (Health)
 Total, 650 (Social Security)
 Total, 700 (Veterans Benefits and Services)
 Total, 750 (Administration of Justice)
 Total, 800 (General Government)

Note: This table uses data from the Office of Management and Budget (OMB) (2022) to describe the composition of each of the five major outlay categories shown in Figure 1. Because OMB classifications for outlays allocated for Transportation (OMB 400), Education (OMB 500), and Health (OMB 550) are broad, (OMB 500, for example, encompasses “Education, Training, Employment, and Social Services”), our classification of these three categories includes only the subset of grants within these OMB categories specifically encompassed within “Subtotal, Transportation”, “Subtotal, Education”, and “Subtotal, Health and Human Services”, respectively. All other outlays with OMB 400, 500, and 550 not allocated into our Transportation, Education, and Health categories are grouped into the Other category. Program names appear un-edited from how they appear in the OMB tables, with the

exception of lines which begin with “Total” (OMB categories are added in parentheses for ease of reference), and with the exception of lines beginning with “All other”, which encompass all other grants in OMB categories 400, 500, and 550 not allocated to our Transportation, Education, and Health categories.

Appendix Table 2: Pandemic-Related Intergovernmental Grants and Corporate Tax Decreases Excluding Five Most Populous States

	(1) Baseline	(2) Political	(3) COVID	(4) Combined	(5) Simple
Total Aid per Resident (USD thousands)	-0.614*** (0.157)	-0.431*** (0.165)	-0.673*** (0.192)	-0.501*** (0.192)	-0.617*** (0.181)
Log(Population)	-0.430*** (0.0942)	-0.213 (0.137)	-0.489*** (0.131)	-0.175 (0.168)	-0.459*** (0.113)
Share of Population Eligible for MLF	0.253 (0.394)	0.285 (0.454)	0.272 (0.391)	0.324 (0.351)	
Change Corporate Tax Rate (2018-2019)	6.822 (4.634)	4.571 (5.337)	6.946 (6.772)	-4.519 (8.016)	
Average OSI (March 2020)	0.556 (0.901)	-0.708 (2.718)	-0.346 (1.145)	-0.805 (2.617)	
Average OSI (January 2022)	1.748 (1.232)	1.725 (1.113)	2.670** (1.239)	3.043*** (1.028)	
Political Controls	N	Y	N	Y	N
COVID-19 Controls	N	N	Y	Y	N
Dep. Var. Mean	0.246	0.246	0.246	0.246	0.246
Observations	39	39	39	39	39
R-squared	0.301	0.384	0.360	0.516	0.194
First-Stage F-stat	47.454	28.105	21.402	25.664	48.066

Note: This table uses data from the Committee for a Responsible Federal Budget (2021), US Federal Transit Administration (2021a), US Census Bureau (2021), Chidambaram and Musumeci (2021), Medicaid and Chip Payment Access Commission (2021), US Office of Elementary and Secondary Education (2021), Lewis et al. (2021), US Department of the Treasury (2021a, 2021b), Federal Reserve Board (2021), Hale et al. (2020), Google LLC (2021), MIT Election and Data Science Lab (2017), and Tax Policy Center (2018, 2019, 2020, 2021, and 2022) to estimate the following equations:

$$\frac{TotalAid_s}{Pop_{s,y_{2020}}} = \alpha + \gamma_1 ReprsPerMillion_s + \gamma_2 X_s + \varepsilon_s \quad (1a)$$

$$Corporate Rate Reduction_s = \alpha + \beta_1 \frac{TotalAid_s}{Pop_{s,y_{2020}}} + \beta_2 X_s + u_s \quad (1b)$$

Where $TotalAid_s$ is the total federal aid per resident to state and local governments (USD thousands) in state s pooled across all four major bills. It is scaled by $Pop_{s,y_{2020}}$, state s 's 2020 official Census population. In first stage equation (1a), $\frac{TotalAid_s}{Pop_{s,y_{2020}}}$ is instrumented using $ReprsPerMillion_s$, the number of Representatives and Senators per million residents for state s in 2020. Estimates of equation (1b) are shown in Columns 1 through 5. $Corporate Rate Reduction_s$ is a binary variable indicating whether a state's maximum corporate tax rate decreased between 2019 and 2022. Included is a set of state-level controls for state s (X_s). This includes the log of 2020 official Census population, the share of a state's population living in a town eligible for financing through the MLF, the March 2020, end of March 2020, and January 2022 month averages of a state's Oxford Stringency Index, Share of votes cast for Donald Trump in the 2020 US Presidential Election in state s , and the percent change in retail mobility relative from January 2022 to a February 2020 baseline. Observations are weighted by area population of state s and standard errors (in parentheses) are clustered by state s . States that do not have a corporate tax rate (South Dakota, Wyoming, Nevada, Ohio, Texas, and Washington) are excluded from this analysis, as are the five most populous states not already excluded (California, New York, Florida, Pennsylvania, and Illinois).

Appendix Table 3: Bivariate Regressions

	(1) Decrease Indicator	(2) Decrease Size
Total Aid Per Resident	-0.131*** (0.0418)	0.00151** (0.000672)
Constant	0.589*** (0.162)	-0.00611** (0.00251)
Observations	50	50
R-squared	0.086	0.065

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1