Vertical Fiscal Gaps and Economic Performance

A Theoretical Review and an Empirical Meta-analysis

Jason Sorens

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Abstract

How can policymakers reform US federalism for better economic performance? This paper focuses on *vertical fiscal gaps*: the proportion of subcentral government expenditure funded by central government grants and shared revenue over which subcentral governments lack autonomous control. On one hand, public finance theories show that central grants to subcentral governments can serve a useful purpose in aligning subcentral incentives to public welfare. On the other hand, political economy logic predicts that these grant programs will be a tempting target for rent-seeking politics, harming economic performance. To settle the theoretical conflict, it is necessary to investigate the evidence on the economic effects of vertical fiscal gaps in federal democracies. That evidence shows that, among federal democracies like the United States, vertical fiscal gaps lead to higher subcentral and overall government debt and spending. Moreover, in the United States, cost-sharing grants appear to promote a higher state and local tax burden, and transfers also undermine voter knowledge and public-sector efficiency. These findings are more consistent with political economy theories than with the traditional public finance view. Although intergovernmental transfers may sometimes be appropriate, the evidence suggests that in the United States the greater risk comes from their overuse. This paper derives policy implications for the United States.

JEL codes: H11, H70, H77, R59

Keywords: public finance, flypaper effect, budgets, grants, intergovernmental transfers, equalization, fiscal decentralization, federalism, taxation

Author Affiliation and Contact Information

Jason Sorens
Affiliated Scholar, Mercatus Center at George Mason University
Lecturer, Government Department, Dartmouth College
Jason.p.sorens@dartmouth.edu

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Jason Sorens

Americans have long debated the proper role of the central government in the US federal system. Can federalism promote economic growth and public well-being? If so, how should it be designed? Scholars have taken up the tools of social science to fashion answers to these questions.[1] A key question in the literature is whether and to what extent subcentral governments should be required to fund their programs out of autonomous, own-source revenue—that is, sources of local funding such as taxes, which subcentral governments can manage by varying their rates, rather than through grants and shared revenue from the central government. Intergovernmental grants are also a controversial issue in constitutional law and public policy in the United States. In *National Federation of Independent Business v. Sebelius*, the US Supreme Court ruled that federal cost-sharing grants to states may be so generous and restrictive as to become unconstitutionally coercive.[2]

How should the US Congress reform federal grants to states, if at all? How should states treat their dependent local governments? To answer questions such as these, it is necessary to investigate the scholarship on fiscal federalism. Political scientists and economists have developed theoretical models of fiscal federalism and have tested the implications of those

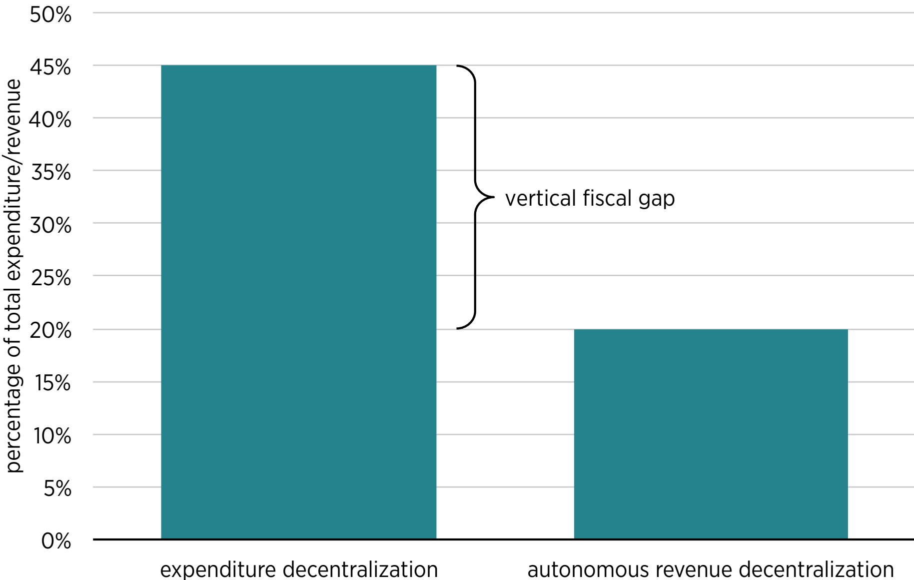
[1] Such scholars include Tiebout (1956); Brennan and Buchanan (1980); Boadway (1979); Oates (1985; 1999); Forbes and Zampelli (1989); Prud'homme (1995); Weingast (1995; 2009); Dahlby (1996); Saiegh and Tommasi (1999); Bardhan (2002); Bird and Smart (2002); Rodden (2002; 2006); Rodden, Eskeland, and Litvack (2003); Treisman (2007); Boadway and Shah (2009); Fan, Lin, and Treisman (2009); Gemmell, Kneller, and Sanz (2013); and Sorens (2014a).

[2] 567 U.S. ___ (2012), 132 S.Ct 2566.

models on a wide range of evidence. Although positive social science can never yield necessary normative conclusions for policy, it can inform policy.

This paper examines theories and evidence on the question of vertical fiscal gaps or imbalances, the share of subcentral government spending funded out of grants or shared revenue from higher-level governments (see figure 1 for a conceptual illustration). Based on econometric evidence from the United States and similarly situated countries, this paper concludes that vertical fiscal gaps incentivize bigger, more expensive, and more indebted government and inhibit the democratic accountability and responsiveness of subcentral governments. These outcomes are likely harmful to economic performance and public welfare, and policymakers concerned with these desiderata will therefore have good reason to reform the US system of intergovernmental grants, either through centralization of program administration or decentralization of policy and fiscal authority.

Figure 1. Vertical Fiscal Gap under Subcentral Balanced Budgets



Note: Expenditure decentralization = subcentral spending/(subcentral + central spending); autonomous revenue decentralization = subcentral autonomous revenue/(subcentral + central revenue).

In the next section, I survey two stylized bodies of theory on fiscal federalism: the traditional public finance approach and the political economy approach. These theories generate different hypotheses about the sources and consequences of vertical fiscal gaps. The third section presents a meta-analysis of the econometric literature since 1995 on each of the hypotheses. The paper does not formally consider the case study literature, which has produced some important insights on the political dynamics and consequences of particular transfer programs. The fourth section discusses implications of the findings for theory. The concluding section of the paper draws out policy implications from the findings.

Theoretical Perspectives

Broadly speaking, there are two frameworks of analysis in which scholars of fiscal federalism have worked. Although many, or even most, scholars work with tools from both frameworks, highlighting their differences as distinct and coherent theoretical architectures can be useful. I call one view the *public finance perspective* and the other the *political economy perspective*.

Public Finance Theories

Traditional public finance economics has an efficiency-centered view of policy. Private actors are self-interested or boundedly rational, and it is possible for the government to regulate their activities in such a way as to promote social welfare. In particular, private actors sometimes fall into market failures, and the job of government is to tweak incentives so as to solve these failures (Samuelson [1947] 1983). This viewpoint carries forward into theories of fiscal federalism, in which the central government is viewed as having the autonomy to implement policy solutions to the pathologies from which subcentral governments suffer.

Perhaps the most significant rationale for intergovernmental grants is equalization. According to one view, when equalization programs are not in place, decentralization of tax and economic policy encourages widening regional inequalities and distorts allocation of the most mobile factor of production, generally assumed to be capital. The reason is that decentralization allows richer regions to levy lower tax rates for the same level of services relative to poorer regions (or equivalently, a more lavish level of services for a given tax rate), because the tax base per person is larger in richer regions. Richer regions should then be able to attract more investment than poorer regions, because capital holders will choose to invest where taxation is lower, all else being equal (Prud'homme 1995). Because investment flows from poor regions to rich regions, inequality grows over time, and poorer regions lose the incentive even to attempt to attract investment (Cai and Treisman 2005). Moreover, this pattern of investment is economically inefficient, because in an ideal market factors would flow to their most productive uses, and only with perfectly harmonized tax rates across jurisdictions can factor income purely reflect productivity (Boadway 1979). Equalization grants are said to solve the distortion introduced by tax decentralization with mobile capital:

> A nation that values horizontal equity (the equal treatment of all citizens nationwide) and fiscal efficiency needs to correct the fiscal inequity and inefficiency that naturally arise in a decentralized government. Grants from the central government to state or local governments can eliminate these differences in net fiscal benefits if the transfers depend on the fiscal capacity of each state relative to others and on the relative need for and cost of providing public services. The more decentralized the tax system is, the greater the need for equalizing transfers. The elimination of net fiscal benefits requires a comprehensive fiscal equalization program that equalizes fiscal capacity . . . to a national average standard. (Shah 2007, 19–20)

The other major justification for vertical fiscal gaps pertains to interjurisdictional externalities. When regional governments provide services that create spillover benefits for other regions, they will tend to underspend unless they are given cost-sharing grants, which provide

the incentive to spend the optimal amount. (A cost-sharing or matching grant provides more grant money the more the regional government spends.)

As an example, suppose that a welfare program for the poor that is lavishly funded by one state attracts poor people from states that have more parsimonious programs. As a result, the welfare budget of the lavish state grows and the welfare budgets of the other states fall, causing taxes to rise in the former and fall in the latter. The stingy states enjoy some of the benefits of the welfare program provided by the lavish state. The private benefit of the lavish state's program is less than its social benefit, and all states will therefore underprovide the program. To correct the externality, the central government could provide cost-sharing grants. Similar examples of interjurisdictional externalities might include environmental mitigation programs, transportation infrastructure, and education. Economists who favor this tradition argue that tax competition leads to inefficiently low taxation, because interjurisdictional migration increases the tax rate elasticity of revenue (Boadway and Shah 2009, 40). Relatedly, central transfers to states could serve as insurance for idiosyncratic regional shocks (Sanguinetti and Tommasi 2004).

The equalization logic for transfer programs faces several hurdles. The first is that capital may not be much more mobile than labor. In the United States, labor has long moved from poorer to richer states, thereby promoting per capita income convergence (Roback 1982, 1988; Barro and Sala-i-Martin 1991).[3] Second, if states depend more heavily on taxing land and labor than on taxing capital, as competition for capital may lead them to do, capital mobility will not undermine poorer states' fiscal capacity. Third, in the United States, intergovernmental transfers are not very redistributive or equalizing (Rodden 2010). The fact that states converged in per capita income at a rate of about 2 percent per year (Barro and Sala-i-Martin 1991) in a

[3] This process has recently broken down due to restrictive housing policies in higher per capita income states (Ganong and Shoag 2015).

decentralized federal system without equalization transfers supports the view that labor mobility may have been as important as capital mobility (Sorens 2014a). Finally, full equalization of fiscal capacity discourages regions from pursuing policies that promote development and expand the tax base, because full equalization taxes away the revenue gains that regional governments could enjoy from growth (Weingast 2009). Instead of full equalization, Weingast essentially recommends adequacy transfers that bring all regional governments up to a certain standard, while ensuring that they retain a high percentage of revenue derived from marginal increases in their tax base.

In principle, interjurisdictional externalities do provide an economic rationale for intergovernmental grants (Cooter and Siegel 2010). Yet whether externalities provide a rationale for such grants in practice depends on how adept the central government is at identifying these externalities and targeting grants optimally to correct for them. Social life is rife with externalities, both positive and negative, and the vast majority do not require third-party intervention. With regard to the putative insurance function of transfers, Buettner (2002) has found that even Germany's extremely equalizing and generous system of transfers does not reduce state-specific income shocks more than in the United States, the only federation to lack any kind of equalization system. Moreover, what counts as an externality is not easy to determine. It is easy to see why conservatives might consider welfare programs inefficient and thus not worry about decentralizing them, while progressives might prefer to centralize welfare programs or fund them through grants. Views about fiscal decentralization are often parasitic on general left-wing–right-wing ideologies.

Without intergovernmental grants, subcentral governments could solve their externality problems through compacts. In the United States, states already do this for some regulatory

issues, such as nursing licenses, fisheries management, and life insurance, as well as for interstate services such as ports, transit systems, and bridges. One barrier to this solution in the United States is that interstate compacts require congressional approval. Still, this requirement ensures that such compacts will be effected only when they are in the national interest (Greve 2012, 298–99). Myers (1990) finds that in a decentralized federation with congestion costs, regions will pay an optimal transfer out of self-interest in an effort to achieve the efficient level of population, requiring no central authority to distribute grants to discourage tax competition.

Another reason to be suspicious of intergovernmental transfers as a solution to interjurisdictional externalities is that full centralization provides a ready alternative to transfers. If externalities are sufficiently serious, why not have the federal government take over the policy altogether? By centralizing policy administration, the federal government limits the chain of principals and agents and provides clarity of responsibility for voters. The more that—owing to intersecting networks of program design, implementation, and transfers—the allocation of responsibilities among tiers of government resembles a marble cake rather than a layer cake, the harder it is for voters to hold their representatives accountable for performance (Wibbels 2006).[4] A counterargument is that state governments may enjoy a sufficiently important advantage over the federal government in voter accountability and local knowledge that they can be better trusted to administer these programs, even if not to fund them or decide on their policy outlines.

Political Economy Theories

Political economy takes as its starting point the interests of political actors (Bates 1990). If one admits the possibility that particular interests could capture the central government, the role that

[4] According to Stewart (1982, 9), the layer- and marble-cake metaphors originated with McLean (1952).

vertical fiscal gaps play in the broader institutional system of federalism becomes relevant. How do vertical fiscal gaps affect subcentral government incentives? Given that, why do governments adopt intergovernmental transfer programs?

Brennan and Buchanan (1980) assume that governments at all levels are net surplus maximizers (the so-called Leviathan thesis). One way for citizens to control government in their own interest is to set up a system of competitive federalism with many jurisdictions enjoying taxing and spending autonomy and facing hard budget constraints—that is, limits on their ability to spend beyond revenue. Governments that try to increase surplus by allowing services to deteriorate or by raising taxes for private benefit will suffer from an outflow of residents and investment. Competitive federalism therefore disciplines governments to act in the interests of their citizens.

Governments would like to find a way to relax the competitive constraint. One way is to form a cartel that is enforced by the central government. The central government can provide transfers to subcentral jurisdictions to relax budget constraints and allow even jurisdictions seeing an outflow of labor and capital to maintain wages and salaries (surplus). If Brennan and Buchanan (1980) are right about governments' interests and incentives, there is reason to be skeptical of intergovernmental transfer programs that create vertical fiscal gaps. The more dependent subcentral governments are on grants and shared revenue, the less they compete with each other for citizens and the more they can extract from citizens for their own benefit. Rather than limiting states' freedom of action, federal grants actually release states from the competitive constraint and thereby put citizens' interests at risk.

The empirical literature shows substantial evidence that central politicians make grant decisions on other than technical criteria. Grossman (1994) finds that party similarity between

state and federal politicians, size of state Democratic majority, size of state bureaucracy, and state union density correlate with greater grants for a state, suggesting that intergovernmental transfers in the United States are substantially politically rather than technically driven. Using difference-in-differences estimation, Solé-Ollé and Sorribas-Navarro (2008) also find that partisan similarity between upper- and lower-level governments results in more grants. Sørensen (2003) finds that local lobbying activities heavily influence intergovernmental grant decisions in Norway. Feld and Schaltegger (2005) find that Swiss cantons with direct democracy accept less federal grant money, implying that voters try to prevent transfer dependence when the risks of fly-paper effects—grants' stimulation of more spending than citizens desire—would otherwise be high. Borck and Owings (2003) find that grants to California counties increase with the counties' proximity to the state capital and positive spillovers, supporting both the political economy and the public finance explanations of grants.

What happens if the Brennan–Buchanan assumptions are relaxed? Qian and Weingast (1997, 85) incorrectly claim that the Brennan–Buchanan theory assumes a "malevolent government." In fact, the theory simply assumes that government officials are self-interested, seeking the highest return for the lowest effort. Yet in the context of broadly democratic institutions, one might want to assume more realistically that government at all levels values the public welfare to some degree. Even so, vertical fiscal gaps will affect subcentral governments' incentives on the margin, possibly adversely.

Even scholars working broadly within the traditional public finance paradigm recognize that grants and shared revenue can create fiscal commons problems, encouraging jurisdictions to impose negative externalities on each other. First, matching grants to states reduce each state's cost of spending below the total cost, thereby encouraging states to spend more than the social

optimum, provided the spending does not have proportionately significant positive externalities. Because central legislators can target spending toward their constituencies in a system with geographic electoral districts and simple majority rule in the legislature, central legislators will tend to overspend on their own constituencies, taking into account only a fraction of the tax burden generated by this spending (Besley and Coate 2003). Allowing the central government to provide transfers to subcentral governments therefore results in both overspending and geographic misallocation of spending. Second, "grants can make local governments less accountable for their fiscal decisions (they may now increase spending without increasing taxes); hence there will be less incentive to improve the efficiency of local government operations and develop innovative methods of delivering public services" (Bahl and Linn 1992, 428). This problem is especially severe when central governments provide "gap-filling" grants to fund whatever spending levels subcentral governments decide on.

To these considerations the political economy approach adds three additional reasons to avoid vertical fiscal gaps. First, as already mentioned, such gaps may subvert desirable fiscal competition among jurisdictions. Second, when states become more dependent on grants and less dependent on own-source revenue, their incentive to grow the local revenue base weakens (Careaga and Weingast 2003; Weingast 2009). This problem is more severe when grants are strongly progressive or have been means tested, essentially taxing away most of the gains of growth from regions that improve their economic performance. Because of the dominance of the dynamic effects of a fiscal decentralization system over the long run, Singh and Srinivasan (2006, 33) argue that "the allocative efficiency of the tax system in a standard public economics sense is of second order importance relative to fiscal autonomy on the revenue side." In other words, fine-tuning incentives to correct subtle externalities is of lower priority than providing

robust incentives to promote growth over the long run, which only a system with small vertical fiscal gaps and ample subcentral tax autonomy can do.

Third and perhaps most significantly, vertical fiscal gaps politically undermine fiscal discipline. Rodden (2006, 78–79) argues that grants make subcentral governments expect central assistance if they fall into fiscal difficulty. Because the central government already funds substantial portions of subcentral budgets, subcentral governments will find it politically difficult to resist pleas for bailouts to avert bankruptcy. The more that subcentral governments depend on the central government for fiscal support, the more that creditors and voters will assume that the subcentral governments are simply administrative arms of the center and that the latter is responsible for the fiscal condition of its subordinates. Knowing this, subcentral governments will be more likely to run up large debts in the first place—the familiar phenomenon of moral hazard.

Moreover, vertical fiscal gaps can atrophy subcentral fiscal capacity. As subcentral governments depend more and more on central grants, they will find less reason to build the autonomous revenue sources they might need to fend off adverse fiscal shocks and speculative attacks on their debt. As Rodden puts it (2006, 78), a transfer-dependent state government "may not have the flexibility to raise additional revenue, forcing it to cut services, run deficits, or rely on arrears to employees and contractors." States' inability to remedy their own situation adds to the political pressure on the federal government to bail states out.

A large empirical literature on the fly-paper effect has found that intergovernmental transfers, even in the form of unrestricted block grants, make the recipients spend much more but not necessarily tax less (Hines and Thaler 1995).[5] Since money is fungible, this result at first seems inconsistent with rationality. As Hines and Thaler (1995, 218) put it, "Residents of the

[5] This finding even applies to transfers between independent governments, such as overseas development assistance (Remmer 2004).

local jurisdiction should spend this increase in income [from an unrestricted grant] just like any other increase, and the share devoted to government goods and services should be equivalent to the marginal propensity of local governments to spend out of income," a mere fraction of each additional dollar. On the one hand, the fly-paper effect suggests that the aforementioned fear that transfers will sap recipients' tax capacity may be overstated. But on the other, the fly-paper effect tends to support the Brennan–Buchanan fear that transfers will relax the competitive constraint and allow recipient governments to extract greater surplus from citizens. As Inman (2008) writes, the best explanation of the fly-paper effect is politics. The problem appears to be that transfers simply make recipient governments *too big*.

Beyond the amount of vertical transfers, there is debate over the form that they take. For public finance theorists, equalization grants are necessary to prevent relatively rich regions from enjoying fiscal advantage in the competition for capital. For political economy theorists, equalization grants can punish success, especially if they are based on actual revenue collected in each region rather than on revenue capacity (Bird and Smart 2002, 904). However, Kotsogiannis and Schwager (2008) provide new political economy rationales for both opposing and supporting equalizing transfers. In support, they say that equalization renders the remaining differences in tax rates across regions a purer function of rent-seeking behavior (as opposed to fiscal advantage), thus allowing voters to hold politicians more accountable. On the down side, equalization programs are so complex that they reduce voters' ability to observe public goods provision. The overall effect of equalization on accountability depends on the balance between these two effects.

A final and more technical worry about equalization transfers has to do with measurement of fiscal capacity at the local level. More productive localities will offer higher

nominal wages to workers but also charge them higher nominal rents, especially if land is scarce due to geographic or regulatory constraints (Roback 1982; Chen and Rosenthal 2008). Unless equalization programs correct fiscal capacity measures for differences in purchasing power across regions, they will tend to overpunish high-income regions and overreward low-income ones.

Hypotheses

To adjudicate the different perspectives on intergovernmental grants in practice, researchers must resort to empirical tests. Do vertical fiscal gaps more often compensate for regional inequalities and correct interregional externalities, or do they more often incentivize fiscal irresponsibility, lack of voter accountability, and inefficiency?

There is a broad consensus that cost-sharing grants, like most intergovernmental transfers in the United States, will incentivize higher government spending (Wallis 1991; Adams and Wade 2001). Political economy theorists interpret this pattern as evidence that such transfers relax the competitive constraint and encourage inefficient expenditure. Traditional public finance perspectives maintain that cost-sharing grants justifiably encourage subcentral governments to spend more on programs with positive externalities (hypothesis 1). *Hypothesis 1: Cost-sharing transfers encourage higher subcentral and overall government spending.*

If the political economy interpretation is correct, cost-sharing transfers should also incentivize higher subcentral tax burdens as the competitive constraint is weakened (hypothesis 2a). For public finance theorists, these grants encourage additional spending in priority areas but also provide some resources for them. Subcentral governments should balance their budgets by cutting spending in nonpriority areas and will not increase taxes

significantly, if at all. *Hypothesis 2a (political economy/collusion): Cost-sharing transfers encourage higher subcentral and overall tax burden.*

Both the public finance and political economy perspectives agree that *equalization* transfers should raise subcentral governments' tax burden (hypothesis 2b). Tax capacity–based equalization programs reward subcentral governments for raising taxes, because such tax increases reduce measured tax capacity as taxpayers relocate to lower-tax jurisdictions (Koethenbuerger 2002; Smart 2007). For public finance theorists, this feature is desirable because tax competition is wasteful. For political economy theorists, it is undesirable because it encourages rent-seeking. *Hypothesis 2b: Equalization transfers encourage a higher subcentral tax burden.*

On the one hand, block grants and shared revenue should not increase overall government spending if local jurisdictions are rational, according to the public finance view. The political economy view, on the other hand, maintains that such grants still weaken the competitive constraint somewhat by reducing the proportion of total subcentral revenue subject to interjurisdictional competition (hypothesis 3) and by signaling central government backing of subcentral debts (hypothesis 4). *Hypothesis 3 (political economy/collusion): Vertical fiscal gaps encourage higher subcentral and total government spending. Hypothesis 4 (political economy/moral hazard): Vertical fiscal gaps encourage higher subcentral and total government debt.*

If vertical fiscal gaps generally weaken the competitive constraint, they should also allow subcentral governments to become less efficient, particularly when "voracious" interest groups rent-seek over the perceived windfall that new transfers represent (Tornell and Lane 1999). Thus, the two views also differ on hypothesis 5. *Hypothesis 5 (political economy/collusion/voracity): Vertical fiscal gaps undermine subcentral public sector productivity.*

Another charge made in the theoretical literature is that the marble-cake model of federalism facilitated by transfers makes it more difficult to hold government officials accountable. *Hypothesis 6 (political economy): Vertical fiscal gaps reduce voter knowledge about which level of government is responsible for which policies*.

Finally, the two stylized points of view come to different conclusions about the effects of vertical fiscal gaps on economic performance. For political economy theorists, vertical fiscal gaps generally reflect vertical fiscal *imbalance*—that is, a deviation from the optimal level of transfer dependence, which is quite low (hypothesis 7b). Public finance approaches caution against identifying vertical fiscal gaps with imbalance (Shah 2007, 17; hypothesis 7a). *Hypothesis 7a (public finance): Vertical fiscal gaps raise income per capita*. *Hypothesis 7b (political economy): Vertical fiscal gaps reduce income per capita.* Table 1 presents a summary of the various hypotheses derived from the public finance and political economy perspectives.

Table 1. Hypotheses

Prediction	Public finance	Political economy
Subcentral and total spending	Cost-sharing transfers: + Other transfers: 0	Cost-sharing transfers: + Other transfers: +
Subcentral tax burden	Cost-sharing transfers: 0 Equalization transfers: +	Cost-sharing transfers: + Equalization transfers: +
Debt	General transfers: 0	General transfers: +
Public-sector efficiency	General transfers: 0	General transfers: −
Voter knowledge		General transfers: −
Per capita income	General transfers: +	General transfers: −

Evidence

Here I report the results of a meta-analysis of the econometric literature on each of the seven hypotheses given above. To be included in the analysis, a paper had to meet three criteria. First,

it had to report a quantitative estimate of a regression coefficient or partial correlation between grants or vertical fiscal gap and an economic quantity of interest. I also include studies that report regression coefficients for both revenue or tax decentralization and expenditure decentralization, because an effect of grants can be backed out of the difference between these coefficients. Revenue or tax decentralization is the proportion of all revenue and taxes raised by subcentral governments, while expenditure decentralization is the proportion of all expenditures by subcentral governments. The difference between the two therefore reflects net central-to-subcentral grants plus net borrowing. However, the most common measures of revenue or tax decentralization, from the International Monetary Fund (IMF) Government Finance Statistics, include shared taxes over which subcentral governments have no rate-setting authority as subcentral revenue or taxes (Rodden 2002, 2003, 2004). Therefore, expenditure decentralization, controlling for revenue decentralization, is only a mediocre measure of subcentral transfer dependence. Rodden (2003) was the first to try to get around the problem by using figures from the Organisation for Economic Co-operation and Development (OECD) to separate countries with high tax autonomy from those with low tax autonomy. Stegarescu (2005) then developed a new dataset of autonomous subcentral revenue, and several studies since then have used this measure or have built on it. When these studies include autonomous revenue decentralization alongside expenditure decentralization, the gap between the two can be interpreted as reflecting not only grants as the IMF counts them but also shared revenue plus net subcentral borrowing.

The tables that follow use different terms to capture different measurement concepts. “Grants, excluding shared revenue,” is for studies that use either the IMF’s measure of intergovernmental transfers as a share of total government revenue or spending or the IMF’s

measures of revenue and expenditure decentralization simultaneously. "VFI," meaning vertical fiscal imbalance, is used for studies that measure transfers and shared revenue as a proportion of all government revenue for the level of government being studied (general government or subcentral). "Grant dependence" is used to describe studies that measure grants or grants plus shared revenue as a proportion of subcentral revenue or expenditures.

To be included, a study must also include at least one high-income, democratic country. Studies solely on developing countries are excluded because federalism, like other political institutions, works vastly differently in developing versus developed countries.

The final criterion for inclusion is publication in 1995 or later. The Hines and Thaler (1995) piece includes a comprehensive review of the empirical literature on the fly-paper effect in the United States, finding evidence that strongly supports hypotheses 1 and 3: grants and other windfalls raise total and subcentral government spending, often dollar for dollar, whether matching or unconditional. Nevertheless, it is possible that new evidence and techniques that render due attention to causal identification have modified this result over the past 20 years. Additionally, the literature on subsidiary questions about debt, taxation, productivity, and income has exploded over the last 20 years.

The studies were gathered through EconLit and Google Scholar searches and by investigation of references cited in each of the studies gathered in the former manner. Although the literature review cannot be guaranteed to be comprehensive, it certainly includes all the most frequently cited empirical studies on the phenomena of interest to this paper.

The sections that follow are organized by dependent variable: spending, tax burden, debt, public-sector efficiency, voter knowledge, and income per capita.

Spending: The Fly-Paper Effect

Table 2 presents the recent literature on the fly-paper effect in developed countries. The "Identification" column describes the identification strategy if the paper uses a quasi-experimental method. Three papers use an instrumental variables (IV) method to identify the causal effect of grants on government spending. Knight (2002) instruments grants with several political variables, while Dahlberg et al. (2008) and Gordon (2004) are able to use sharp, arbitrary policy discontinuities to provide a comparatively strong, exogenous instrument. The down side of especially strong causal identification is that it is generally possible only in narrow contexts, thereby raising questions of external validity. Thus, Dahlberg et al. (2008) find that an equalization transfer threshold is strongly associated with changes in municipal spending in Sweden, while Gordon (2004) finds that abrupt changes in an unconditional federal school aid program in the United States increase local school district spending only in the first two years, after which new aid is fully crowded out by changes in local taxes. Do these results generalize beyond their contexts to, say, sovereign units in a federal system?

The last column in table 2 averages the *t*-statistics for headline results to indicate possible publication bias. Surveys of *t*-statistics from the quantitative literature frequently find a primary or secondary mode around a *t*-statistic of 2, indicating statistical significance at the $p < .05$ level. This "caliper test" shows that authors are strategically withholding papers from submission when they fail to find headline results at a commonly used yet arbitrary threshold of statistical significance (Gerber and Malhotra 2008, 17). Therefore, *t*-statistics under 2.1 may be worth discounting somewhat, although for several of these studies, such as Sorens (2014b), transfers are not the focus, and therefore publication bias is unlikely to explain their inclusion.

Table 2. Government Spending

Author	Sample	Identification	Result	*t*-statistic
Knight (2002)	US states	IV	Capped matching grants reduce state own-source spending; no effect on general spending.	2.40
Dahlberg et al. (2008)	Swedish municipalities	IV (strong)	Equalization grants increase general spending roughly one for one.	9.14
Jin and Zou (2002)	32 countries	None	Grants, excluding shared revenue, raise general spending.	4.79
Eyraud and Lusinyan (2011)	27 OECD countries	None	Grants, excluding shared revenue, raise general spending when combined with borrowing autonomy or regional disparity.	2.72
Fiva (2006)	18 OECD countries	None	VFI increases general spending and general government consumption.	3.06
Cassette and Paty (2010)	15 EU countries	None	Grant dependence, excluding shared revenue, raises subnational spending.	2.93
Sorens (2014b)	39 rich democracies	None	VFI raises general government consumption and subsidies but not social transfers.	1.95
Ashworth, Gali, and Padovano (2013)	18 OECD countries	None	Grant dependence, excluding shared revenue, raises general spending.	>2
Prohl and Schneider (2009)	29 countries	None	Grant dependence, excluding shared revenue, raises general spending.	2.90
Gordon (2004)	US school districts	IV (strong)	School block grant raises local spending only in the short run.	2.55
Gamkhar and Oates (1996)	US states	None	Matching grants increase state spending more than block grants.	2.63
Volden (1999)	US states	None	AFDC matching grants raise state benefit payments, but grant cuts do not decrease payments.	4.07
Rodden (2003)	44 countries	None	VFI raises general and subcentral spending.	2.62
Shadbegian (1999)	US states	None	Federal grants raise both (a) state and local spending and (b) general spending	4.70
Adams and Wade (2001)	US states	None	Medicaid matching grants raise total Medicaid spending but reduce state-funded spending	2.52

Note: IV = instrumental variables; OECD = Organisation for Economic Co-operation and Development; VFI = vertical fiscal imbalance; EU = European Union; AFDC = Aid to Families with Dependent Children.

The observational, cross-national, and cross-state studies of the United States consistently find a fly-paper effect: when a subcentral tier is more dependent on grants and shared revenue, it spends more, and when grants and shared revenue are more significant in the fiscal system as a whole, general government spending is higher, particularly for consumption (wages, salaries, supplies, and services for the government's own use). Looking at a single program, Aid to Families with Dependent Children, Volden (1999) finds a fly-paper effect for US states only when grants are increased, not cut, implying a ratchet effect from grant increases, but Gamkhar and Oates (1996) look at grants in general and find no such asymmetry.

Nevertheless, it is interesting that two of the three studies using state-of-the-art causal identification methods find results consistent with no fly-paper effect. Knight's (2002) and Gordon's (2004) findings do not reject a moderate fly-paper effect but do reject a dollar-for-dollar increase in spending commensurate with grants received. The Dahlberg et al. (2008) study focuses on equalization grants, which because of their progressivity may have incentive effects that differ from those of other types of grants. On the whole, the evidence is stronger for hypothesis 1 than for hypothesis 3, but a substantial amount of evidence favors hypothesis 3, tending to support the "collusion" thesis.

Tax Burden

Table 3 summarizes the results of studies on the effects of grants on overall and subcentral tax burdens.

Here, the results are less consistent. The quasi-experimental studies—IV, regression discontinuity design (RDD), and difference-in-differences estimation (DID)—find different results on crowding out (when recipient governments simply cut taxes proportionately to

transfers received and overall spending does not rise) versus crowding in (not only do recipients spend all transfers they receive, they also raise more of their own resources to spend). As already mentioned, Gordon (2004) finds crowding out. Dahlberg et al. (2008) find evidence of neither phenomenon—the classic fly-paper result (recipient governments spend the transfers but do not raise their own taxes).

Table 3. Taxes

Author	Sample	Identification	Result	*t*-statistic
Dahlberg et al. (2008)	Swedish municipalities	IV	Equalization grants do not raise local taxes.	0.14
Buettner (2006)	German municipalities	RDD, DID	Equalization increases local taxes.	3.55
Egger, Koethenbuerger, and Smart (2010)	German municipalities	DID	Equalization increases local taxes.	1.97
Eyraud and Lunsinyan (2011)	27 OECD countries	None	Grants, excluding shared revenue, reduce general taxes.	5.36
Prohl and Schneider (2009)	29 countries	None	Grants, excluding shared revenue, do not raise general revenue.	0.83
Gordon (2004)	US school districts	IV (strong)	School block grants eventually cut local revenue one for one.	3.59
Anderson and van den Berg (1998)	45 countries	None	Grants, excluding shared revenue, raise general revenue.	1.68
Baretti, Huber, and Lichtblau (2002)	West German states	None	Steepness of equalization transfers cuts state collection of shared taxes.	4.92
Sobel and Crowley (2014)	US states, Pennsylvania counties	IV	Present-day grants reduce recipient taxes; past grants raise them.	5.62

Note: IV = instrumental variables; RDD = regression discontinuity design; DID = difference-in-differences estimation; OECD = Organisation for Economic Co-operation and Development.

Two studies of German municipalities, which have some tax autonomy, find that sharp reductions in eligibility for equalization grants incentivize these governments to cut business taxes. These studies are the clearest evidence yet that transfers affect interjurisdictional competition incentives in the manner expected by Brennan and Buchanan (1980). Baretti, Huber, and Lichtblau (2002) find that the effective marginal tax rate on new income raised by German *Länder* (states) is negatively associated with state-level collections of shared taxes. States have no tax autonomy in Germany, but they do collect taxes mandated by and shared with the federal government. Given that the taxes are shared, there is a clear incentive to shirk in collection. The study finds that the incentive to shirk is stronger the more the state is punished by the equalization system for increasing fiscal capacity.

The most recent study, by Sobel and Crowley (2014), instruments for US grants with political variables like those of Knight (2002) and distinguishes between present-period and past-period grants. Present-period grants are partially spent and partially used to cut present-period taxes, a familiar fly-paper result. Interestingly, past-period grants seem to cause *higher* taxes in the present, a result the authors interpret as a "ratchet effect." Once transfer-funded programs are in place, states do not eliminate them even after the transfers disappear; they instead raise their own taxes to fund the programs. The reason states choose not to eliminate the programs may be that interest groups benefiting from government spending organize to resist cuts.

The cross-national studies cited here yield inconsistent results, although a key problem with all of them is that they do not include shared revenue in measures of the significance of transfers to public finances. Moreover, there are no cross-state studies in the United States to compare the effects of matching and block grants on state tax levels. The evidence supports hypothesis 2b with respect to equalization transfers and is inconsistent on hypothesis 2a,

although the only study to distinguish between past and present transfers finds that transfers permanently grow the tax burden.

Debt

Table 4 presents the research results on vertical fiscal gaps and deficits or debt, one of the most closely studied topics in fiscal federalism.

Table 4. Debt

Author	Sample	Identification	Result	*t*-statistic
Rodden (2002, 2006)	State and local sectors from 33 countries	None	Conditional on borrowing autonomy or federation, VFI reduces subcentral government and total net surplus.	3.78
Rodden and Wibbels (2002)	15 federations	None	Grant dependence cuts total net surplus more the higher expenditure decentralization is, and increases inflation.	1.73
de Mello (2000)	30 countries	None	Grant dependence, excluding shared revenue, raises the deficit when expenditure decentralization is high and cuts it when low.	3.52
Eyraud and Lusinyan (2011)	27 OECD countries	None or IV	Grants, excluding shared revenue, raise the deficit when combined with borrowing autonomy or regional disparity.	4.09
Baskaran (2010)	17 OECD countries	None	VFI cuts general debt.	2.09

Note: VFI = vertical fiscal imbalance; OECD = Organisation for Economic Co-operation and Development; IV = instrumental variables.

The classic studies are Rodden (2002, 2006) and Rodden and Wibbels (2002), which find that, conditional on borrowing autonomy or on being a unit in a federation, greater dependence on intergovernmental transfers and shared revenue causes a subcentral government to take on more debt. The more significant subcentral expenditures are as a share of general government

expenditures, the greater the effect on general government finances. In some federations, such as Brazil and Argentina, subcentral fiscal profligacy induced by soft budget constraints has been so great as to bring about hyperinflation. The de Mello (2000) article, though not as sophisticated as the Rodden studies, is essentially consistent with this finding, because it shows that VFI raises general government deficits when subcentral expenditures are a significant share of the total. The mediocre *t*-statistic in the Rodden and Wibbels (2002) paper reflects inconsistent findings on the effect of VFI on inflation. There is more reason for confidence that VFI induces deficits than that it induces inflation, which presumably has a great deal to do with whether subcentral or central governments can induce their central bank to monetize new debt.

The only inconsistent finding comes from Baskaran (2010), but a key problem is that the study does not condition on borrowing autonomy or separate the sample by high and low borrowing autonomy. At most, Baskaran suggests that in rich OECD countries, vertical fiscal imbalance is not, on average, associated with more debt. The classic finding, that VFI encourages fiscal profligacy when borrowing autonomy is high, remains intact.

Public-Sector Efficiency

Measuring public-sector efficiency or productivity is a difficult and controversial enterprise, but recently economists have made an attempt. The standard approach is to estimate, across jurisdictions, the relationship between spending in one area, such as hospitals, and some measure of output in that area, such as the number of hospital beds. The residual from the regression equation essentially represents efficiency—how close to the productive frontier (outputs per unit of expenditure) each jurisdiction comes.

A small, related literature looks at whether temporal allocation of grants is economically sensible. Does the central government try to mitigate the business cycle by providing grants countercyclically? The desirability of doing so is all the clearer because subcentral spending is highly procyclical (Rodden and Wibbels 2010). Table 5 presents research on the productivity and cyclicality fronts.

Table 5. Public-Sector Productivity

Author	Sample	Identification	Result	*t*-statistic
Geys, Heinemann, and Kalb (2010)	German municipalities	None	Voter involvement's boost to public-sector productivity is greatest when grant dependence is lowest.	2.88
Boetti, Piacenza, and Turati (2012)	Italian municipalities	None	Grant dependence raises local spending inefficiency.	8.49
Abbott and Jones (2012)	11 OECD countries	None	GDP growth increases transfer spending/GDP but not other subcentral spending.	3.74
Kalb (2010)	German municipalities	None	More grants and more equalization raise local spending inefficiency.	8.46
Rodden and Wibbels (2010)	7 federations	None	Federal grants are acyclical or procyclical, except in Australia.	n/a
Blöchliger and Égert (2013)	OECD countries	None	Country output gap raises transfer spending.	n/a

Note: GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development; n/a = not applicable.

Rodden and Wibbels (2010), Abbott and Jones (2012), and Blöchliger and Égert (2013) all show that central transfers to subcentral governments are at best acyclical and more often procyclical. Thus, intergovernmental transfers are not allocated diachronically in a macroeconomically sensible fashion. Rodden and Wibbels (2010) find that in the United States federal transfers to the states are essentially acyclical and thus do not compensate states for the strong procyclicality in their revenue and, due to balanced budget requirements, their expenditures.

Kalb (2010) and Boetti, Piacenza, and Turati (2012) both find a strong and direct relationship between a jurisdiction's dependence on transfers and its inefficiency. Geys, Heinemann, and Kalb (2010) do not investigate this direct relationship, but they find that when transfer dependence is high, the beneficial effects of voter turnout and "free voter leagues" (essentially, nonpartisan good-government electoral alliances in Germany) decline or disappear.

Not mentioned in table 5, because it is not a direct econometric estimation of the effects of grants, is Knight's (2004) use of congressional voting data on highway funds to estimate the welfare effects of such transfers in the United States. Knight estimates that $0.95 out of every dollar of intergovernmental highway spending is wasted, but Inman (2008) shows that this estimate incorrectly assumes that without federal transfers, states cannot fund highways at all. Using Knight's data, Inman instead comes up with an estimate of 40 percent of federal highway funds being wasted.

In conclusion, the existing evidence strongly supports hypothesis 5: Vertical fiscal imbalance undermines government efficiency.

Voter Knowledge

Surprisingly, I could find only one study that investigates the link between transfer dependence and voter knowledge about which level of government is responsible for policies—a study of Spain by León (2012). She exploits asymmetric variation in the timing of Spanish autonomous communities' fiscal autonomy to investigate how voter knowledge differs in changes over time between communities. In the Basque Country and Navarre, fiscal autonomy is high, because these communities levy and collect taxes proportionate to their expenditures. In Catalonia, Galicia, and Andalusia, fiscal autonomy began low but has risen somewhat over time. In the

other autonomous communities (León has survey data from Castile and León), fiscal autonomy began high because expenditure competencies were initially centralized, but it has declined over time as those competencies have been increased, funded by transfers and shared revenue.

León also finds that the Basque Country, Navarre, Castile, and León began with higher voter knowledge about regional policy responsibilities than did Catalonia, Galicia, and Andalusia, as expected. Between the 1998 and 2007 surveys, voter knowledge declined in Castile and León, as expected; rose a little in the Basque Country and Navarre, which León interprets as an effect of voter learning; and remained about the same in Catalonia, Galicia, and Andalusia, contrary to an expectation of growing knowledge.

On balance, the results suggest that, indeed, the marble-cake model of transfer-funded expenditure decentralization undermines voter knowledge about which level of government is ultimately responsible for policy and thus presumably prevents voters from holding politicians accountable for the provision of public services.

Per Capita Income

Does vertical fiscal imbalance affect economic growth? This question is difficult to study, because the potential causal channels between the two phenomena are numerous and the empirical modeling of economic growth presents special challenges.

Although there is a large literature on fiscal decentralization and growth, only Gemmell, Kneller, and Sanz (2013) investigate the gap between expenditure and revenue decentralization (i.e., vertical fiscal imbalance). These authors use distal lags of the key independent variable as instruments in a study of 18 OECD countries and find strong evidence ($t = 5.07$ in the key specification) that VFI reduces subsequent GDP per capita growth. This result is consistent with

prior evidence that VFI increases government spending, debt, and public-sector inefficiency and makes it more difficult for voters to hold government accountable for economic policies.

Discussion

Much remains to be learned about vertical fiscal gaps. Until 10 years ago, there was not even a valid cross-national measure over time of the vertical fiscal gap, because the standard measure of revenue decentralization included shared revenue, over which subcentral governments had no control. With cross-national data, it has been impossible to find strong instruments or discontinuities for causal identification. Therefore, the methodologically soundest studies face the most serious concerns over external validity, particularly because almost all of them focus on municipalities rather than sovereign units in a federation, like American states. Some studies have oversaturated empirical models (e.g., including expenditure and revenue decentralization and VFI in the same equation) or underspecified empirical models (e.g., using only VFI but not revenue decentralization), thereby making it difficult to disentangle and interpret marginal effects.

Nevertheless, the promise of a meta-analysis is that multiple independent studies of the same subject are more likely to yield an accurate picture of statistical relationships than is any one study. Table 6 presents a summary of the evidence on each of the dependent variable concepts treated in this paper. The table makes no distinction between higher- and lower-quality studies.

The political economy expectations of each hypothesis are best supported. When central governments give more grants to subcentral governments, particularly when the subcentral governments enjoy borrowing autonomy, which is de rigueur in federations, and particularly when those grants take a cost-sharing or equalizing form, the results are higher government

spending (especially government consumption), higher government debt, worse public-sector efficiency, lower voter knowledge about government responsibility, and lower economic growth. The voter knowledge and economic growth questions deserve further study. The only questions on which there is insufficient evidence are whether all transfers (including shared revenue) are associated with higher taxes cross-nationally and whether cost-sharing (matching) transfers specifically increase subcentral tax burdens. The only study that distinguishes between past and present transfers finds that transfers increase the recipient government tax burden in the long run (Sobel and Crowley 2014). It would be interesting to see whether this result holds more for cost-sharing transfers than for unconditional transfers.

Table 6. Overview of the Evidence

Dependent variable	Significantly increase	No effect	Significantly decrease
Spending	General transfers: 8 (GG) General transfers: 3 (SCG) Cost-sharing transfers: 1 (GG) Cost-sharing transfers: 3 (SCG) Equalization: 1 (GG)	Cost-sharing transfers: 1 (GG) General transfers: 1 (SCG)	Cost-sharing transfers: 1 (SCG)
Tax burden	Past transfers: 1 (SCG) Equalization: 2 (SCG) General transfers: 1 (GG)	Equalization: 1 (SCG) General transfers: 1 (GG)	Current transfers: 2 (SCG) General transfers: 1 (GG)
Debt	Transfers + expenditure decentralization: 2 Transfers + borrowing autonomy: 2		General transfers: 1
Public-sector efficiency			General transfers: 3 Equalization: 1
Voter knowledge		General transfers: 1	General transfers: 1
Per capita income			General transfers: 1

Note: GG = general government; SCG = subcentral government.

The voracity hypothesis seems especially consistent with the data as they now stand. Under the voracity hypothesis, intergovernmental transfers serve as a kind of windfall to

subcentral governments that incentivize narrow interest groups to lobby for their share of the gains. The voracity hypothesis explains why transfers cause higher spending, even when grants are unconditional; why measured output of public goods per unit of spending declines with transfers; why cuts and boosts to grants might have asymmetric effects (Volden 1999); why past-period transfers raise present-day tax burden (Sobel and Crowley 2014); and why direct voter control of policy or involvement in local elections limits grants and their baleful effects (Feld and Schaltegger 2005; Geys, Heinemann, and Kalb 2010). The voracity hypothesis could not explain the link between transfers and indebtedness, but a combination of the collusion and moral hazard hypotheses could.

It is important to distinguish the effects of grants as such from the effects of the form grants take. Equalization programs seem particularly problematic, especially when they involve high effective marginal tax rates on regions' tax-base growth. Under such conditions, the evidence is clear that the local government is incentivized to tax and spend more and that public-sector efficiency tends to worsen (Kalb 2010). This is not to say that equalization goals cannot be served by other means, such as Weingast's adequacy transfers. It is possible that existing equalization programs are simply set up poorly, perhaps for political reasons such as discouraging secessionism in poorer regions.

Conclusion: Implications for the United States

Evidence from the United States and abroad suggests that when subcentral governments derive a significant share of their funding from intergovernmental transfers (the vertical fiscal gap), their performance and accountability decline and tax burdens go up. Today, the United States suffers from relatively modest vertical fiscal gaps between the central and subcentral levels, compared to

other advanced democracies. According to the US Census Bureau's state and local government finance data, the most transfer-dependent state is Mississippi, where state and local governments derive just one-third of their general revenue from federal intergovernmental transfers; for most states, the figure is less than 25 percent. Moreover, federal grants are largely not equalizing, avoiding the perverse incentives fostered by interregional redistribution in Canada, Germany, Spain, and elsewhere. By and large, state governments in the United States are fiscally responsible despite their high borrowing autonomy, perhaps because the federal government has established a record of not bailing out bankrupt states, and states have bound themselves with balanced-budget requirements (Rodden 2006).

Still, the US-specific evidence shows that intergovernmental transfers are a particularly wasteful form of government spending (Knight 2004). As states and localities come to rely on transfers, voters may hold them less accountable for performance. Over time, states and localities have become more dependent on transfers. In many states, localities depend heavily on transfers from state governments, especially for public education. The evidence suggests that these transfers undermine public-sector efficiency.

An unexpected finding from the literature is that voter control of local government enhances its productive efficiency. One way to reduce the damage from intergovernmental transfers is to increase the role of direct democracy in local government, as in the quintessential New England town meeting. Another is to amend electoral institutions to encourage voter turnout in local elections—holding them alongside state elections, for instance. Decentralizing more power to localities might also encourage more voters to turn out for these elections.

Above all, theory and evidence both suggest that matching grants, such as the grants that the federal government uses for public welfare and Medicaid programs, are inefficient. Matching

grants encourage excessive state and local spending and in the long run may also encourage a higher tax burden. They also contribute to *kludgeocracy*—the use of convoluted policy means for simple ends—and undermine government transparency (Teles 2013).

Instead of funding states to administer these programs, the federal government could either centralize its administration in Washington, DC, or turn all its programs over to the states to run—and fund—however they see fit. If especially generous state governments wish to discourage tax and welfare competition arising from higher benefit levels, they could still pay other states to enact similar benefits. However, efficiency is not the only social value. Some policymakers may wish to continue to use grants to encourage states to adopt policies for reasons of justice quite distinct from efficiency.

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