An Institutional Explanation for the Stickiness of Federal Grants

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Researchers have struggled to understand why federal block grants, contrary to economic theory, have a large stimulative effect on the spending of state and local governments. This article proposes and tests an institutional explanation for this effect. We argue that certain budgetary rules, by limiting the ability of subnational governments to respond to voter demands for increased spending, may systematically force lawmakers to under-provide public goods. When this occurs, governments are likely to treat grant revenue as a supplement to total expenditures and not return this money to voters in the form of a tax cut as suggested by existing theory. To evaluate our hypothesis, we use data on the Community Development Block Grant program and municipal tax and expenditure limitations. Results show that restrictive fiscal institutions significantly increase the stimulative power of federal grant revenue. (*JEL* H7, H4, R5)

1. Introduction

Beginning with the seminal work of Bradford and Oates (1971), economic theory has cast doubt upon the extent to which block grants from a central government can be used to stimulate local expenditures. Theory suggests that because grant income and private income are fungible, a lump-sum grant to a government will have the same effect on local government spending as an equivalent increase in the disposable income of the median voter. As a result, the overwhelming majority of unconditional grant money should be spent on private goods—returned to voters via tax cuts—and very little spent on the government sector.

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Despite its compelling logic, this prediction has not fared well in empirical testing. Numerous analyses find, quite convincingly, that lump-sum grants to state and municipal governments are associated with much larger increases in public expenditures than economic theory predicts (Inman 1971; Gramlich and Galper 1973; Bowman 1974; Chubb 1985; Case et al. 1993; Volden 1999; Nicholson-Crotty 2004; Evans and Owens 2007). These studies demonstrate that upon receipt of block grant funds, governments tend to increase total expenditures by 25% to over 100% of the value of the grant, figures which are significantly higher than most estimates of the marginal propensity to consume public goods.[1] This unexpected finding is commonly referred to as the "flypaper effect," meaning that grant money tends to stick where it hits.

The existence of this effect is difficult to reconcile with rational choice approaches to fiscal federalism since it suggests that state and local government spending is much more responsive to intergovernmental grant receipts than to increases in a community's private income (Oates 1999). That being said, there are numerous proposed explanations for the stickiness of federal grants.[2] Some "blame" the flypaper effect on voters residing within the jurisdictions of recipient governments. They argue that grant money creates for voters an illusion that the marginal cost of public goods has fallen, thereby increasing their demand and allowing officials to sustain a higher level of spending (Courant et al. 1979; Oates 1979; Logan 1986; Turnbull 1992, 1998). Others, employing a Leviathan model of local government, claim that budget maximizing bureaucrats and elected officials use complexities of the budget-making process to coerce or trick voters into allowing them to spend all or most unconditional grant money (McGuire 1975; Romer and Rosenthal 1980; Volden 1999).[3] Still others suggest that much of the empirical evidence of a flypaper effect has resulted from the failure of researchers to account for the potential endogeneity of intergovernmental funds (Knight 2002; Gordon 2004; Milligan and Smart 2005). Of course, it is possible that the flypaper effect may have multiple sources and may arise for different reasons in different settings.

Despite the insights provided by this literature, the search for additional and more definitive explanations continues. No empirical study has been able to fully account for the origins of the flypaper effect, and many existing explanations are incomplete. Leviathan models, for instance, typically fail to demonstrate how self-serving bureaucrats and elected officials acquire sufficient power to be able to override the wishes of the majority of voters. Likewise,

1. Most estimates of the marginal propensity to consume local public goods are on the order of 5–10 cents on the dollar (Hines and Thaler 1995).

2. For thorough reviews of this literature, see Gramlich (1989), Hines and Thaler (1995), and Bailey and Connolly (1998).

3. There is also an extensive implementation literature which, although not addressing the origins of the flypaper effect, has identified numerous factors, such as grant design and the intensity of congressional oversight, that shape the overall effectiveness of federal grant programs (c.f., Pressman and Wildavsky 1973; Derthick 1975; Craig and Inman 1982; Chubb 1985; Medgal 1987; Nicholson-Crotty 2004).

fiscal illusion models do not show why voters will consistently misjudge the costs and benefits of government programs, particularly in light of the many private reasons that voters have to be well-informed about public policy at the local level (Fischel 2001)[4] and the research indicating that voters can make reasoned political choices with very little information (Lupia 1994; Lupia and McCubbins 1998).

In this article, we propose and test a new explanation. Rather than focus on the actions of budget-maximizing officials, voter error, or econometric misspecification, we look toward the *fiscal institutions* of recipient governments. We argue that certain budgetary rules, by limiting the ability of elected officials to generate tax revenues or increase expenditures, may systematically force lawmakers to provide a lower level of public goods than that desired by the median voter. Governments that find themselves in this situation, instead of returning grant money to voters in the form of a tax cut, are likely to treat intergovernmental revenues as a supplement to total expenditures. Doing so will move policy closer to the ideal point of the median voter and produce the flypaper effect. Stated differently, we claim that the stickiness of federal grants results when the fiscal institutions of recipient governments limit democratic responsiveness.

Such institutions are familiar features of the budgeting process among state and local governments. Examples include tax and expenditure limitations (TELs), supermajority requirements for raising new revenues, and borrowing and debt limitations (Fuchs 1992; Krane et al. 2001). To empirically evaluate our hypothesis, we study TELs, specifically those that have been imposed upon cities by either the state legislature or by statewide voters through the initiative process. Municipal TELs now exist in a large majority of states and are intended to restrain the growth of city budgets, often by restricting property taxation or by limiting the extent to which the city's overall budget can grow from one year to the next (Sokolow 1998).

To evaluate our hypothesis, we examine the Community Development Block Grant (CDBG), the federal government's largest source of aid to cities. Each year since 1975, Congress has provided a lump-sum grant to entitled cities to be spent on a broad array of community development activities that are principally redistributive in nature. The CDBG is ideal for an analysis of the flypaper effect. Program grants are awarded through one of two possible formulae, each of which is based on a municipality's need *relative* to all metropolitan areas. This yields two useful features. First, the grant amount is determinant and not subject to change given a city's perceived level of need or lobbying effort. Second, the nature of the formula allows for useful exogenous variation. In our empirical work, we control for the local rates of the variables that determine the grant allocations. We assume that local expenditures are a function of these local rates and let the identifying variation come from

4. Because the successes and failures of a local government are reflected in the value of homes in the jurisdiction, home owners have the incentive to closely monitor and evaluate government policies.

the difference between the local and relative rates (i.e., those rates that are used to determine grant allocations). Our estimations thus avoid the problems of grant endogeneity described in Knight (2002).

Combining annual grants for the 30-year history of the program with census data on municipal attributes and budgetary data from the Annual Survey of Government Finances, we first estimate whether increases in CDBG monies are associated with larger municipal expenditures. We find that they are: for every one dollar of grant money received, cities increase total expenditures by an additional $0.77. In other words, we find evidence of a large flypaper effect. Using data on state-imposed TELs, we then test our hypothesis that restrictive fiscal institutions, TELs in this case, are responsible for this effect. In doing so, we find evidence that supports both the internal logic of our argument and our hypothesis. Our estimations show that TELs constrain city spending, lowering total expenditures by $60 per capita. This finding is robust to alternative specifications of our econometric model and demonstrates that TELs have a more significant effect on the overall size of the local public sector than the existing empirical literature suggests. One implication of this finding is that TELs, by constraining the ability of local officials to respond to the demands of their constituents, are undermining fiscal federalism. Additionally, when we interact TELs with grant receipts and allow the effects of TELs to vary temporally we find that, over time, tax, and expenditure limitations cause recipient cities to keep and spend a greater share of their CDBG money. TELs do not fully account for the existence of the flypaper effect, but they suggest a new institutional pathway.

In the following section, we present the theoretical framework of our analysis. We discuss the logic and assumptions of the model developed by Bradford and Oates and utilize their theory to illustrate how fiscal institutions may lead to the flypaper effect. Next, we describe TELs and the CDBG program in greater detail. In particular, we highlight the usefulness of municipal TELs and the CDBG program for testing our hypothesis. Following this, we discuss our estimation strategy, the data, and the results our estimations generate. We conclude by presenting the implications of this analysis for our understanding municipal fiscal behavior and debates within the fiscal federalism literature.

2. Theoretical Framework

In the original Bradford and Oates (1971) model, a lump-sum grant is given from one level of government, in the present case the federal government, to a lower level of government. The model depends crucially upon the assumption that the recipient government, prior to its receipt of the grant, is satisfying the preferences of the pivotal voter.[5] This entails setting the size of the public

5. Bradford and Oates (1971) implicitly assume a median voter model. Although median voter models can be criticized for their naive appreciation of political processes, there is evidence that they perform reasonably well with respect to modeling local government expenditures (Holcombe 1989).

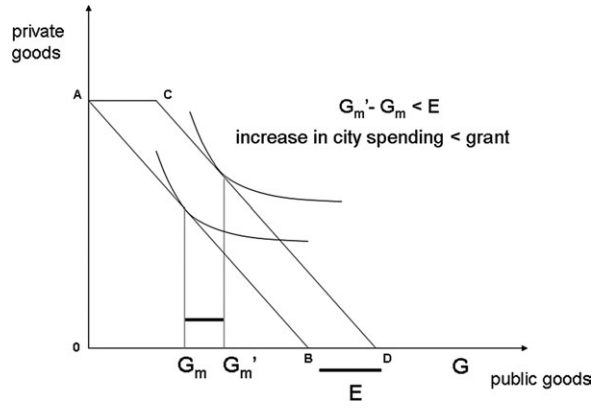

Figure 1. The Bradford and Oates Model of Intergovernmental Grants.

sector such that it matches the balance between public goods provision and private income desired by this voter, given her budget constraint. After the arrival of the grant, the pivotal voter would like the city to increase spending only as much as the income shock she experiences times her marginal propensity to spend on public goods. She prefers to see the rest of the grant returned to her as a tax cut. As most estimates place the marginal propensity to consume public goods at 5%−10% of income (Hines and Thaler 1995), the pivotal voter would prefer that 90% or more of grant revenue not be used by the government.

In its most basic form the Bradford and Oates model can readily be expressed graphically, as in Figure 1. Here the indifference curves represent the pivotal voter's preferences over a private good and a public good. Before the arrival of the grant, the recipient government chooses to provide the public good at $\mathbf{G_M}$, subject to the initial budget constraint, **AB**. The budget constraint requires that local government spending on public output be equal to locally raised revenues plus any external aid. When a new lump-sum grant of size **E** arrives, the relative prices of the public and private good remain constant, but the pivotal voter's budget line shifts outward to the right. Though this rightward shift increases provision of the public good from $\mathbf{G_M}$ to $\mathbf{G_M}'$, this increase is smaller than the full amount of the grant $\mathbf{G_M} - \mathbf{G_M}' < \mathbf{E}$. This can be expressed more precisely. The difference in government expenditures before and after the grant should equal the amount of the grant times the pivotal voter's marginal propensity to spend on public goods $\mathbf{G_M} - \mathbf{G_M}' = a^*\mathbf{E}$. As discussed above, **a** is likely to be equal to 0.05–0.1.

Within this framework, fiscal rules may be shown to account for the flypaper effect.[6] Remember, the Bradford and Oates model begins with the premise that the recipient government is meeting the pivotal voter's preferences for public

6. The possibility that fiscal restrictions may undermine the predictions of their model is mentioned in passing at the end of Bradford and Oates' (1971) seminal article. To the best of our knowledge, we are the first to formalize and test this contention.

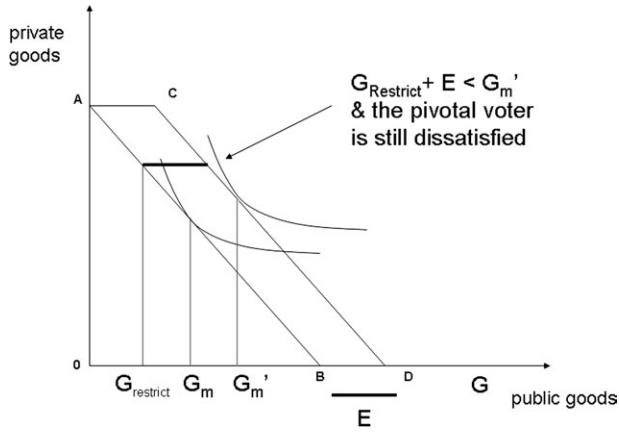

Figure 2. The Bradford and Oates Model with a Restrictive Fiscal Rule.

goods prior to the arrival of the lump-sum grant. In other words, the government is perfectly responsive to voter preferences. However, if a recipient government is faced with an institution that limits the size of its budget and thus places an indirect cap on the quantity of public goods that it can provide, the Bradford and Oates assumption may be incorrect. This will certainly be the case when the cap is below the pivotal voter's preferred level of public goods. In this event, the recipient government is likely to use a share of the grant as a supplement to its budget in an attempt to reach the pivotal voter's ideal point. Although this share will be greater than the median voter's propensity to consume public goods, its size will ultimately depend upon the disparity between the public good provision allowed under its restrictive fiscal rules and the preferences of the median voter. Indeed, it is plausible that a city could spend its entire grant and still not satisfy the taste of this voter.

This scenario is displayed in Figure 2. Here, as in Figure 1, the median voter would prefer the government to provide the public good at $\mathbf{G_M}$. Unlike in Figure 1, however, the government is unable to do so because of the existence of a restrictive fiscal rule, that is, a rule that indirectly limits democratic responsiveness. Instead the government provides the public good at $\mathbf{G_{restrict}}$, which is well to the left of $\mathbf{G_M}$ on the *x*-axis. When a lump-sum grant of size **E** arrives, the median voter prefers that the entire grant be spent on the public sector. Production of the public good is now equal to $\mathbf{G_{restrict} + E}$, but this still leaves public goods provision short of her ideal point, so $\mathbf{G_{restrict} + E < G_m{}'}$.

This extension to the Bradford and Oates model suggests that we should observe the strongest response to grant funds (i.e., the largest flypaper effect) among those recipient governments that face a fiscal institution that limits government expenditures. Specifically, the model indicates that such institutions matter only when they bind, that is when they deter a city from satisfying the pivotal voter. Not all cities faced with a restrictive fiscal institution will find themselves in this situation. When the rule sets maximum spending relatively

high or when the median voter prefers very few public goods, elected officials may still be able to satisfy her preferences. We would not expect to observe the flypaper effect under such circumstances.

3. Tax and Expenditure Limits

One set of fiscal institutions that have the potential to restrict government spending and thereby responsiveness are municipal TELs. TELs are statutory or constitutional restrictions on the ability of a government (in this case cities) to generate revenue or increase expenditures. These limits are imposed upon cities either by the state legislature or by statewide voters through the use of the citizen initiative. The legal restrictions embodied in a TEL are extremely difficult to circumvent. In a few cases, cities are allowed to override a state-imposed TEL; however, this almost always requires a supermajority vote of the electorate.[7]

Importantly, municipal TELs are an ideal fiscal institution for testing our hypothesis. Because TELs are imposed upon cities by state legislatures or the statewide median voter, the budgetary regime embodied in a TEL is likely to diverge from the preferences of the median voter in any given municipality. To the extent that these regimes do, state-imposed TELs are exogenous to cities and the estimated coefficient on our key institutional variable should not be biased. Indeed, there is strong evidence suggesting that municipal TELs are exogenous to local preferences. Vigdor (2004) convincingly argues that the basic purpose of state-imposed TELs is to allow voters to influence tax and expenditure decisions in jurisdictions where they do not reside. According to Vigdor, voters may have preferences over these policies because they receive rents from employment or own taxable assets in these jurisdictions. Alternatively, they may be concerned that policies adopted by other communities may influence their own residential location decisions. To support his claim, he shows that support for Massachusetts's Proposition 2, which required that local governments cap property taxes at 2.5%, was significantly greater among voters who lived near, rather than in, high tax jurisdictions.

Furthermore, TELs are contemporary fiscal institutions, having been adopted over the past three decades. Figure 3 graphs the number of CDBG recipient cities, by year, with a TEL that is potentially binding (i.e., a TEL or combination of TELs that has the potential to force the local government to underprovide public goods). It also displays the number of cities by specific TEL type, which we discuss in greater detail below. As is illustrated in the figure, most potentially binding TELs were imposed upon cities in the late 1970s through the early 1980s, the period in American politics that is most strongly associated with the voter revolt against taxation (Hansen 1983). There was also a smaller, but still significant, burst of TEL adoption and repeal during the mid to late 1990s. Because TELs are time varying, a TEL fixed effect (which we use) can be separately identified from city and year fixed effects.

7. In states that allow cities to circumvent the restrictions embodied in a TEL, there is usually a time limit on the non-TEL period.

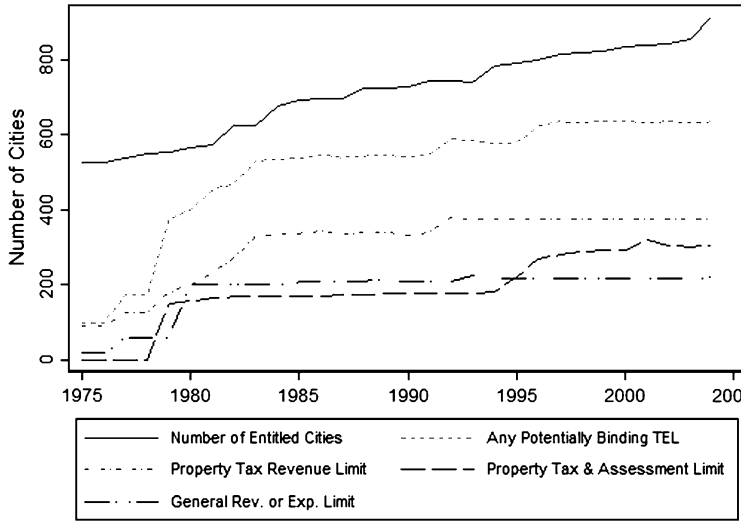

Figure 3. The Number of CDBG Recipient Cities with Potentially Binding Tax and Expenditure Limitations (ACIR 1995; Mullins and Wallins 2004).

As suggested by previous discussions, not all TELs are created equal. First, different types of TELs work through different mechanisms, with some restricting property taxation and others attempting to limit overall revenue collections or expenditures. Second, and more importantly, not all TELs have the potential to alter the fiscal behavior of local governments. Some may have the capacity to do so on their own, whereas others are only likely to have an effect in combination with another TEL. Here we exclusively care about those TELs that have the potential to lead to the under-provision of public goods, either by themselves or when adopted alongside another TEL. We refer to these as "potentially binding." Note that these limits bind on locally collected revenues; in general, expenditures of other peoples' money is exempt from these caps.

TELs can be placed into the five categories listed in Table 1 (ACIR 1995; Mullins and Wallins 2004). The first two of these, property tax rate limits and levy limits directly address property taxation which has historically been the largest source of revenue for local governments. Rate limits set a maximum ceiling on the city's property tax rate, whereas levy limits constrain the total amount of money that can be generated from the property tax, independent of the overall tax rate. By themselves, rate limits can easily be circumvented by increasing the assessed value of property. Such a maneuver raises new revenues without actually raising tax rates. However, if combined with a limit on property assessment increases (a separate type of TEL), it has the potential to restrict the size of the local public sector. Levy limits are potentially binding, even if not paired with a second TEL.[8]

8. A city can reduce the effects of levy limits by diversifying municipal revenue sources.

Table 1. Tax and Expenditure Limitations

Name of limitation	Definition	Potentially Binding?
Property tax rate limit	Establishes a maximum property tax rate	Yes, if combined with a limit on assessment increases
Property tax levy limit	Constrains the total revenue that can be raised from property taxation	Yes
General revenue limit	Caps total revenue	Yes
General expenditure limit	Caps total expenditures	Yes
Limit on assessment increases	Limits the reassessment of property values	Yes, if combined with a property tax rate limit

This table is based upon ACIR (1995) and Mullins and Wallin (2004).

The next two types of TELs are general revenue and expenditure limits. These exist in only a small number of states but are the most comprehensive and restrictive TELs. Revenue limits cap the amount of own-source revenue that can be collected, whereas expenditure limits attempt to constrain government spending. Both are typically expressed as an annual allowable percentage increase. The state of Colorado, for instance, imposes a limit on cities that restricts the revenue raised to be the previous year's allowed collection with an adjustment equal to the percent of population growth plus the inflation rate. General revenue or expenditure limits are both potentially binding and extremely difficult to circumvent.

The final category is limits on assessment increases. These TELs are intended to restrict a city's ability to "automatically" garner increased revenues from rising property values or through administrative reassessments of value. These limits are usually expressed as an allowable annual percentage increase in assessed value. By themselves, these constraints are nonbinding. In the face of a restriction on assessment increases governments can generate additional property tax revenue by simply keeping the assessed value of property constant but increasing the overall property tax rate. When combined with a tax rate limit, however, they may bind the fiscal choices of municipal governments.

Thus far, we have assumed that TELs bind by preventing municipal governments from providing the level of public goods desired by the median voter. An alternative possibility is suggested by the public choice literature. TELs may bind by preventing governments from spending *more* than the pivotal voter desires. If this is the case, grants may actually have a larger stimulative effect on government spending in the absence of a TEL—when Leviathan-style governments are able to spend as much as they want. However, it seems unlikely that existing state-imposed TELs are operating in the manner anticipated by public choice theory. If the aim of TELs were to prevent city governments from spending more than the municipality's pivotal voter prefers, it is likely they would be adopted at the local as opposed to the state level. Additionally, as discussed above, Vigdor (2004) shows that state-imposed TELs are

principally utilized by voters to restrict the tax and expenditure decisions made by other nearby jurisdictions.

4. The CDBG Program

In order to test our hypothesis, we also need data from a federal block grant that provides revenue to municipalities. We use the CDBG program, the federal government's single largest source of aid to cities. The program is administered by the Department of Housing and Urban Development and originated as part of the New Federalism reforms of President Richard Nixon.[9] CDBG combined seven previously established federal assistance programs, including Urban Renewal and Model Cities, into a single new block grant.

The primary objective of the program is to transform distressed urban neighborhoods into viable communities (§101(b)1)). Funds can be spent on any one of three national objective categories: benefiting low- and moderate-income people, eliminating slums and blight, and meeting urgent community development needs. The categories cover a large number of municipal activities. For example, in a recent year, the city of Chicago spent money on studying the establishment of a tax increment financing district, purchasing 26 properties with the goal of "sparking economic development," and supporting after-school tutoring, recreation, and leadership-building opportunities among other activities (HUD IDIS database, 2006).

As we discuss in more detail later, CDBG is a formula-based program that awards funds to entitled cities, counties, and states. Cities become entitled once they reach a population of 50,000 or more, or when they become the principal city of a metropolitan statistical area (Richardson et al. 2003).[10] At its peak in 1978, Congress allocated $10.4 billion (in 2006 dollars) to the program. Since then, the CDBG has witnessed a noteworthy decline in funds. In 1978, the largest recipient city, New York, received $685 million in program money, and the smallest recipient, Colonial Heights, Virginia, received $462,000 in funds; by 2004 these numbers fell to $231 million for New York and $102,000 for Punta Gorda, Florida. Correspondingly, per-capita grants to municipalities have fallen from an average of $80 to less than $20.

As is demonstrated by Figure 4, however, this decline is not constant across the period of time covered by our analysis. Congressional appropriations to the program decreased most precipitously during the Reagan era, increased again during the early 1990s, and began a second steady decline with the Republican takeover of Congress in 1994. The overall reduction in program money is a function of both Congressional reductions in program funding and the near-doubling of the number of cities receiving grants, from 522 to 900 entitled recipients.

9. The CDBG program was authorized by the Community Development Act of 1974.

10. Counties become entitled when their population, excluding existing cities, is larger than 200,000. County funds are to be spent on unentitled or unincorporated jurisdictions; state funds are to be spent on communities that qualify under neither the city or county programs. In this article, we focus exclusively on entitled municipalities.

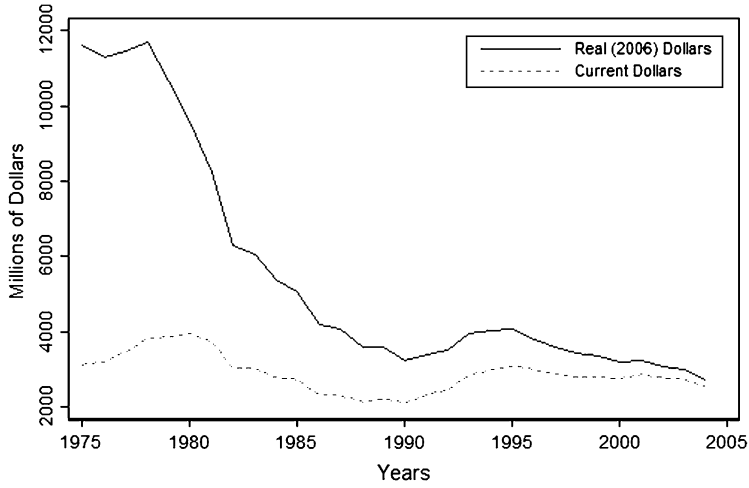

Figure 4. The Total Amount of CDBG Allocations for All Entitled Cities (U.S. Department of Housing and Urban Development).

One possible concern regarding the use of the CDBG to test our theory is that it may be difficult to generate a precise estimate of the flypaper effect using a relatively small grant program. Although the CDBG is the federal government's largest grant to localities, it now constitutes a small share of the total spending of entitled cities (1.63%). This, however, was not always the case. During the early years of the CDBG program, funds constituted approximately 8% of municipal budgets, a fact which should facilitate accurate estimation of its stimulative effects. Additionally, and perhaps more importantly, other studies have been able to generate estimates of the flypaper effect using similarly sized or even smaller grants (c.f., Chubb 1985; Nicholson-Crotty 2004).

The CDBG is also useful to analyze for a number of other reasons. The large number of cities that receive CDBG money provides us with a considerable number of observations and allows us to examine the fiscal behavior of governments under a wide variety of geographic, economic, institutional, and demographic circumstances. Additionally, the program's longevity allows us to test our hypothesis using within-city variance in TEL adoption, as all but a handful of potentially binding TELs were adopted during the 30 years after the CDBG program was authorized by Congress.

From the perspective of scholars of public policy, the CDBG program is also worth studying in its own right. The CDBG has channeled a great deal of money into America's urban areas and remains a crucial source of aid to cities. As such it has the potential to improve America's struggling urban communities, assuming, that it is used by municipal governments for its intended purposes.[11] Furthermore, the program has been the subject of budgetary controversy. As recently as fiscal year 2006, the President and some members

11. This potential is well documented in existing analyses (c.f., Walker et al. 2002).

of Congress have proposed eliminating the CDBG, in large part because they are not convinced that local officials are using grant funds properly.[12] Our study sheds light on this question.

5. Estimation

In order to evaluate whether TELs are a source of grant stickiness, we first estimate whether CDBG funds supplement local expenditures (i.e., whether there is a flypaper effect to be explained). To do so, we utilize the following equation

$$\begin{aligned}\text{city expenditure } pc_{c,t} = {} & \beta_0 + \beta_1 \text{CDBG } pc_{c,t} + \beta_2 \text{TEL}_{c,t} + \beta_3 X_{c,t} \\ & + \beta_4 \text{city}_c + \beta_5 \text{trend}_t + \beta_6 \text{year}_t + \varepsilon_{i,t}, \end{aligned} \quad (1)$$

where *pc* stands for per capita, *c* denotes city, *t* denotes years 1975 through 2004, and $X_{c,t}$ is a vector of demographic and economic controls. City fixed effects are city_c. These capture the significant unchanging functional and institutional variations between cities. For example, in some states, cities are responsible for schools, whereas in others schools are the responsibility of separate districts; some cities provide their own water and sewer facilities, whereas others rely on outside authorities. We also include trend_t that is a simple time-trend variable that is assigned a value of one during the first year in our data set and 30 during the most recent year. We utilize this variable because our outcome measure of interest, per capita municipal expenditures, exhibits a marked increase over time, which we do not want to falsely attribute to changes in the block grant. Finally, we employ year fixed effects that control for variation in grant size by year and for macroeconomic factors affecting all cities. This equation is estimated using standard errors clustered at the city level.[13]

In equation (1), the coefficient of greatest interest is β_1. Since this is the coefficient on per-capita CDBG receipts, it measures the extent to which grant money supplements local expenditures. Theoretically, the coefficient should be between zero and one. A value of zero would mean that grant revenue has no supplementary effect on total spending, that is, that grant funds are crowding out existing expenditures. A value of one, on the other hand, would indicate that each additional dollar of grant money received leads to an additional dollar of government expenditures. Generally, a coefficient higher than 0.10 is thought to be indicative of a flypaper effect, since the marginal propensity to consume local public goods is between 5 and 10 cents on the dollar.

The term β_2 is also worth special attention. This is the coefficient on our variable that captures the existence of a state-imposed TEL. In equation (1), this variable is coded dichotomously, remember, we are not interested in all TELs, but only those that are potentially binding. A value of one indicates

12. Critics of the CDBG allege that local elected officials use program funds as political pork (c.f., Katz 2005; Malanga 2005).

13. Moulton (1990) demonstrates that the failure to adjust for clustering in panel data leads to standard errors that are significantly biased downward.

the presence of such a TEL, whereas the value of zero indicates either no TEL or the presence of a TEL that we would not expect to bind (see Table 1). Since our hypothesis is premised on the assumption that TELs constrain total city spending, we expect β_2 to be negative and statistically significant.

A concern that arises when estimating a model such as equation (1) is the potential endogeneity of grant revenue (Knight 2002; Gordon 2004; Lutz 2005; Milligan and Smart 2005). If the size of a city's grant is determined by a combination of lobbying efforts and the city's taste for public goods, β_1 is likely to be biased upward. For example, cities that lobby for and receive grants for public housing demonstration projects such as Hope VI should be more interested in spending on public housing than cities that do not. This lobbying pathway should not cause problems for our estimates of the effects of the CDBG program because CDBG funds are determined strictly by formula. Since the inception of the program in the 1976, this formula has only been changed once.

However, even a formula grant could pose estimation problems if the elements that determine the formula also determine municipal expenditures. In the case of the CDBG, grants are awarded via a nonlinear function of five variables that each measure a city's need *relative* to all metropolitan areas. That is, local expenditures may well be a function of the city's poverty rate, but, net of the local poverty rate, they are not a function of a city's poverty relative to all other cities. Thus in our estimation, we control for relevant local rates and let the identification come from the relative rates and the nature of the formula.[14]

What does it mean that a grant allocation is determined by relative rates? CDBG grants are awarded through one of two formulae that are based upon a city's relative amounts of population, poverty, old housing structures, housing overcrowding, and population growth. The first formula allocates money as a function of a city's population relative to the population of all metropolitan areas, the number of people living below the poverty line in a city relative to the total number of such people in all metropolitan areas, and a city's share of the total number of overcrowded housing units. The second formula also allocates CDBG funds using a city's relative poverty rate but adds to this the number of housing units built in a city prior to 1940 relative to the total number of such units in all metropolitan areas, and a city's relative "growth lag."[15] A city's grant allocation is determined by the formula which provides it with the largest sum of program funds.

Our estimation is also aided by the fact that while each city's grant is a function of things possibly known to a city, such as the local poverty rate or local changes in population, it is also determined by factors that are difficult for the city to

14. For example, instead of controlling for relative poverty (total number of poor people in city *c*/total number of poor people in all metropolitan areas), we control for the local poverty rate (total people in poverty in city *c*/total population of city *c*).

15. To construct growth lag, HUD calculates the total growth of all entitled cities since 1960. If a city has grown more than the average, then growth lag equals zero. If a city has grown less than the average, growth lag is equal to the extra population that city would have had, had it grown like the average since 1960. The denominator for calculating a city's relative growth lag is the total of all growth lags for all entitled cities.

observe, such as total poverty in all other metropolitan areas and the total number of cities eligible for CDBG funds. Municipal officials in any given city are not likely to be well informed about these nuances and should be unable to manipulate them.

Since our initial estimations (reported below) find evidence of a flypaper effect, we also test our hypothesis by probing the determinants of β_1. Here we test whether the existence of a TEL accounts for the stimulative effect that grant receipts have on municipal spending. We do this by estimating a second equation in which we interact the main effect with a variable indicating the existence of a potentially binding TEL. In particular, we estimate

$$\begin{aligned}\text{city expenditure } pc_{c,t} = {} & \alpha_0 + \alpha_1 \text{CDBG } pc_{c,t} + \alpha_2 \text{TEL}_{c,t} \\ & + \alpha_3 \text{TEL}_{c,t} * \text{CDBG } pc_{c,t} + \alpha_4 X_{c,t} + \alpha_5 \text{city}_c \\ & + \alpha_6 \text{trend}_t + \alpha_7 \text{year}_t + \varepsilon_{i,t}. \end{aligned} \quad (2)$$

If potentially binding TELs do act to create a flypaper effect, we expect that the stimulative effect of CDBG should now be split between α_1 and α_3.

Additionally, we estimate a version of equation (2) that allows the effects of TELs to vary over time. In the years immediately after TEL adoption, cities may have a number of relatively easy means of accommodating the limitation without reducing public goods provision. For instance, a city may be able to eliminate inefficiencies or waste in service provision that will allow it to meet the requirements of the TEL while having little effect on the quantity and quality of public goods provided. As time passes, however, these tactics may no longer suffice and substantial cuts in service provision may be needed. Furthermore, the impact of certain types of TELs may compound over time as the base to which the limit applies is lower in each future year than it might otherwise have been (Dye et al. 2005). If the impact of a TEL grows over time, so might its affect on the magnitude of the flypaper effect.

6. Data

Data for our empirical analysis come from a number of sources. Budgeting information was culled from the Census Bureau's Annual Survey of Government Finances and assembled into time-consistent data on municipal expenditures.[16] From these data we utilize, as our dependent variable, total city expenditures. To these data we add annual program allocations obtained from the Department of Housing and Urban Development.[17] Our empirical analysis includes all cities that have ever received CDBG funds and begins in 1970

16. Each year the Census Bureau gathers budgetary data from all cities with populations greater than 75,000. Data are also gathered on a large random sample of the remaining municipalities. The result is an unbalanced panel. This panel includes 90% of CDBG cities for all but 4 years of our analysis and 85% of CDBG cities in all but 2 years.

17. CDBG allocation data for 1975 through 2001 were provided courtesy of the HUD Office of Planning, Development, and Research. Data for the years following 2001 come from HUD's Web site.

rather than in the year of the CDBG's inception so that we can capture the fiscal responses of cities to the program's initial distribution of funds. However, since the CDBG was created in part by combining funds from existing federal grant programs, this means that we need to also control for all non–CDBG federal grant receipts. All financial variables are expressed in the thousands and converted to 2006 dollars.

From the decennial census, we gathered the data for our economic and demographic controls. The basic controls used here are the real median family income, the local unemployment rate, the percent of the population under 18 years of age, the percent of the population that is 65 years of age or older, per-capita non–CDBG federal grant receipts, and the share of the population with a college degree.[18] These controls are typical of studies that examine the fiscal behavior of local governments. To ensure that our results are not contaminated by the potential endogeneity of CDBG receipts, we also include the local rates of the measures that are used by HUD to determine grant allocations. These are the poverty rate, the log of total population,[19] the share of housing constructed prior to 1940, the share of housing units experiencing overcrowding,[20] and the city's growth lag as a share of its population. Data used here are obtained from the 1960, 1970, 1980, 1990, and 2000 censuses. We linearly interpolate all decennial census variables between survey years.

Lastly, we add data on state-imposed TELs. These data are obtained from the Advisory Commission on Intergovernmental Relations (1995) and Mullins and Wallins (2004). Both of these sources contain information on the type of TEL, the date of its adoption, and the details of its specific requirements. Using these data we identify states with potentially binding TELs. These are limited to states that have general revenue or expenditure limits, property tax levy limits, or the combination of a property tax rate limit and a limit on assessment increases. We create a dummy variable for these cities (which is coded one after TEL adoption) as well as a count and squared count of the number of years a city has faced a TEL. Table 2 reports summary statistics and sources for all the variables used in this analysis.

7. Results

7.1 Does a Flypaper Effect Exist in the CDBG Program?

We begin by determining whether CDBG grants are used as supplements to municipal budgets, that is, whether a flypaper effect exists. To do this, we estimate equation (1) using total real expenditures per-capita as our dependent variable. The results of this initial estimation are reported as Model 1 in Table 3. The uppermost set of coefficients are those that are of substantive interest,

18. Results are robust to the inclusion of additional explanatory variables, such as the share of the population that is black, the share Hispanic, and the share with a high school diploma.

19. Because we express municipal spending in per-capita dollars, our specification of equations (1) and (2) controls for the impact of the relative population on grant receipts. We add the log of population in the likely event that the effect of population is not linear.

20. This is the share of housing units with more than 1.01 persons per room.

Table 2. Summary Statistics

	Mean	Standard deviation	Data source
Per capita CDBG receipts	0.027	0.036	(1)
Per capita expenditures	1.599	1.11	(2)
TEL (potentially binding)	0.500	0.500	(3)
Years TEL (potentially binding)	5.110	7.770	(3)
Median family income	55.095	14.809	(4)
Unemployment rate	0.063	0.027	(4)
% Under 18	0.286	0.099	(4)
% Over 65	0.148	0.064	(4)
% College degree	0.160	0.082	(4)
Per capita other (non–CDBG) federal intergovernmental revenue	0.070	0.159	(2)
Poverty rate	0.130	0.067	(4)
Pre-1940 housing (as a share of all local housing)	0.221	0.195	(4)
Overcrowded housing (as a share of all local housing)	0.052	0.053	(4)
Log population	11.062	0.850	(4)
Growth lag (as a share of local population)	0.437	0.480	(5)

All dollar values are expressed in thousands. Sources: (1) U.S. Department of Housing and Urban Development, (2) Annual Survey of Government Finances, (3) ACIR (1995) and Mullins and Wallins (2004); (4) U.S. Census; and (5) Created by authors using Department of Housing and Urban Development formula.

the second grouping are the coefficients on our economic and demographic controls, and the final set are the coefficients for the local rates of the measures that are used by HUD to determine grant allocations.

As can be seen below, the coefficient on per-capita CDBG receipts is 0.77 and statistically significant at the 95% level. This means that for each additional dollar in CDBG money received, cities on average make an additional \$0.77 in total expenditures.[21] Because this number is significantly larger than the marginal propensity to consume public goods, it suggests the presence of a substantial flypaper effect.[22] Additionally, the coefficient on the TEL dummy variable is significant and negative. This indicates that municipalities faced with a potentially binding TEL spend less than their counterparts without such restrictions. In particular, the coefficient indicates that total expenditures average \$60 less per-capita in TEL cities, ceteris paribus.[23] This result supports

21. It would be interesting to ask whether cities grow accustomed to CDBG funds after spending a number of years in the program. Unfortunately, our data are not well suited to answer this question. As shown in Figure 4, the first years of the program are the highest spending years, whereas later years are generally low spending. Fortunately, however, the major changes in CDBG funds are concomitant with major changes in TEL adoption, which allows us to estimate the interacted effect of CDBG and TELs.

22. The coefficient on the other intergovernmental revenue variable is greater than one. This may be because many federal grants require matching funds (though the CDBG does not).

23. The size of the TEL effect estimated here is larger than that found in the existing literature. Most empirical studies find that TELs have little effect on the overall size of the local public sector. For a review of this literature, see Mullins and Wallin (2004).

Table 3. TELs and the Flypaper Effect Per-Capita Municipal Expenditures

	Model 1	Model 2	Model 3	Model 4
CDBG receipts	0.77** (0.39)	0.66** (0.31)	0.74** (0.34)	0.71** (0.33)
TEL	−0.06** (0.03)	−0.09** (0.04)	—	−0.04 (0.03)
Years TEL	—	—	−0.017* (0.009)	−0.01 (0.01)
Years TEL^2	—	—	0.0001 (0.0002)	0.0001 (0.0002)
TEL × CDBG	—	1.10 (1.13)	—	0.42 (0.56)
Years TEL × CDBG	—	—	0.12 (0.39)	0.06 (0.37)
Years TEL^2 × CDBG	—	—	0.019* (0.011)	0.021* (0.011)
Median family income	0.01** (0.003)	0.01** (0.003)	0.01** (0.003)	0.01** (0.003)
Unemployment rate	1.94** (0.86)	1.86** (0.82)	2.11** (0.84)	2.12** (0.84)
% Under 18	0.83 (0.62)	0.85 (0.61)	1.12** (0.56)	1.13** (0.56)
% Over 65	−0.79* (0.47)	−0.79* (0.46)	−0.21 (0.51)	−0.24 (0.51)
% College degree	0.67 (0.46)	0.66 (0.46)	0.81* (0.46)	0.81* (0.46)
Other intergovernmental revenue	1.21** (0.10)	1.22** (0.10)	1.21** (0.10)	1.21** (0.10)
Trend	0.04** (0.01)	0.04** (0.01)	0.04** (0.01)	0.04** (0.01)
Poverty rate	−0.20 (0.60)	−0.25 (0.59)	−0.15 (0.59)	−0.14 (0.59)
Pre-1940 housing	0.43 (0.32)	0.45 (0.32)	0.69** (0.35)	0.70** (0.35)
Overcrowded housing	−0.99** (0.43)	−0.96** (0.41)	−1.01** (0.49)	−1.02** (0.45)
Log population	−0.31** (0.06)	−0.31** (0.06)	−0.22** (0.07)	−0.22** (0.07)
Growth lag	−0.11** (0.05)	−0.12** (0.06)	−0.10** (0.05)	−0.10** (0.05)
Constant	3.17** (0.71)	3.16** (0.71)	1.79** (0.73)	1.82** (0.73)
R^2	0.30	0.30	0.31	0.31

Standard errors are clustered at the city level. All financial variables are measured in thousands of dollars and are inflation adjusted. City and year fixed effects are included in all regressions. *Significant at the 10% level and **significant at the 5% level or higher. $N = 27{,}199$ with a total of 916 unique cities

the internal logic of the argument presented in Section 2. Specifically, it provides evidence that state-imposed TELs constrain municipal expenditures and thus have the potential to the limit a government's ability to respond to the median voter's preferences for public goods provision.

7.2 Does the Size of the Flypaper Effect Increase in the Presence of a TEL?

Model 2 is the first estimation of equation (2). In this model, the dummy variable capturing the existence of a potentially binding TEL is interacted with per-capita CDBG receipts. If the stimulative power of federal grants is affected by the existence of restrictive fiscal institutions, as we have hypothesized, the coefficient on this term should be statistically significant and positive. However, this is not the case. The term is positive, but both its magnitude and standard error are quite large.

We suspect that this estimation may not be accurately modeling the potential effects of TELs. As discussed above, it is reasonable to expect that the impact of these institutions may grow over time and may do so in a nonlinear manner, possibilities which are supported by the existing TELs literature (c.f., Dye et al. 2005). To allow for this, we replace the TELs dummy variable with both

a count and squared count of the number of years that a city has faced a potentially binding TEL. These new terms are each interacted with per-capita CDBG receipts. The new estimation is reported as Model 3.[24]

These results provide support for our hypothesis. First, the existence of a potentially binding TEL is again shown to exert meaningful downward pressure on the overall size of municipal budgets. The positive and significant coefficient on the year count variable demonstrates that this effect grows in a linear fashion over time, reducing per-capita expenditures by approximately $17 per year. The positive (though statistically insignificant) coefficient on Years TEL^2 indicates that the pace at which the effect increases decelerates over time. Second, in this estimation TELs are shown to increase the stimulative effect of federal grants. The coefficients on both of the new interaction terms are positive, though only the coefficient on the interaction between the squared number of years since TEL adoption and CDBG receipts is statistically meaningful. The TEL-CDBG interaction terms are jointly significant at the 95% level.

When interpreted in tandem, the coefficients on these new interaction terms may initially strike readers as unreasonably large. Back-of-the-envelope calculations (using the coefficients on CDBG Receipts, Years TEL $\times$ CDBG, and Years TEL^2 $\times$ CDBG) indicate that only 2 years after TEL adoption the amount of program money spent by the "average" city rises from approximately 74% to just over 100%. They also indicate that in all subsequent years the share of CDBG money spent is (implausibly) well over 100%. We caution against making too much of such point estimates. The standard error on the coefficient for Years TEL $\times$ CDBG is quite large—almost twice the size of the coefficient itself, and most of the increase in the size of the flypaper effect is attributed to this variable. Since this coefficient fails to approach statistical significance, we are skeptical that there is much (if any) linear effect. The significant and positive coefficient on the interaction between the squared number of years since TEL adoption and CDBG is much more plausible and is robust to alternative specifications of econometric model. We believe that this strongly suggests that retaining intergovernmental grant revenue (as opposed to passing it on to voters) is one of the mechanisms municipalities employ to compensate for lost tax revenue in the years closely following TEL adoption and that this effect is nonlinear.

The final column in Table 3 tests the proposition that a TEL, in interaction with grant funds, could cause either (or both) an intercept shift or a slope shift in municipal expenditures. We do so by adding to Model 3 the stand-alone TEL dummy variable and TEL $\times$ CDBG. This specification is very demanding on the data and shows little evidence that TELs cause an intercept shift in expenditures. Again, however, only the interaction between CDBG receipts

24. We also experimented with specifications that used a series of dummy variables to capture the amount of elapsed time since TEL adoption. Since the effect of TELs in interaction with the grant on municipal fiscal behavior is measured with a fair amount of noise, the multiple interaction terms cannot be precisely estimated.

and the squared count of the number of years that a city has faced a potentially binding TEL is statistically meaningful, suggesting that (Model 3) is a better fit for the data.[25] All three of the TEL-CDBG interaction terms are jointly significant at the 90% level.

Although the inclusion of the TEL-CDBG interaction terms in Models 3 and 4 does shrink the magnitude of the coefficient on the stand-alone measure of CDBG receipts per-capita, it does not eliminate its statistical significance.[26] This means that TELs, while contributing to the size of the flypaper effect, do not fully account for its existence. Why don't we observe a larger reduction in the coefficient on total CDBG receipts? The flypaper effect may simply have multiple origins. It is likely that explanations offered elsewhere in the fiscal federalism literature as well as some not yet proposed help account for the flypaper effect. This possibility has long been acknowledged by authors of articles on intergovernmental grants (c.f., Bailey and Connolly 1998; Oates 1999).

Measurement error may also play a role. Our theory argues that TELs will lead to a flypaper effect when they bind—that is, when they prevent city officials from satisfying the median voter's preferences for public goods provision. This should only occur once a city has reached it maximum allowable tax rate. Since we cannot observe tax rates for all cities in all years, the best we can do is use the existence of a potentially binding TEL as an imperfect proxy for such circumstances. Given that our measure of institutional constraint is noisy, our results should be biased toward zero and understate the effect of truly binding TELs.

Finally, there may be something unique about the CDBG that causes a large base flypaper effect. One possibility has to do with the size of the average grant. As discussed earlier, the money most entitled communities receive through the program amounts to a relatively small share of their total revenues. It may be that voters are unlikely to organize around the issue of returning such a small sum of money via reductions in taxation. That being said, the results do ultimately provide empirical support for our hypothesis.

8. Conclusions and Implications

It is both compelling and intuitive that cities facing restrictive fiscal institutions should be more likely to spend federal grant funds than their unconstrained counterparts. Here, we have presented supporting empirical evidence using one such institution: municipal TELs. We show that not only do TELs significantly constrain the size of the local public sector but that over time they cause recipient cities to keep and spend a greater share of their CDBG money.

25. We also estimated a specification with the dependent variable in log form. The nonlogged measure, however, is a better fit for the data and is more consistent with the existing literature.

26. Between Models 1 and 3, the coefficient on CDBG receipts falls from 0.77 to 0.74. Although a Hausman test across models show that this differences approaches statistical significance at the 90% level, this decline is smaller than we had anticipated.

Although TELs do not fully account for the existence of the flypaper effect among local governments, they do appear to have a meaningful role in shaping its magnitude.

Not only do the results here complement the existing fiscal federalism literature by suggesting a new institutional pathway for the flypaper effect but they also present some of the strongest evidence to date that the flypaper effect actually exists. A handful of recent analyses in the public finance literature have called into question the reliability of previous studies of federal grants (Knight 2002; Gordon 2004; Milligan and Smart 2005). In particular, they suggest that many of these studies, by examining grant programs for which receipts may be endogenously determined, have mistakenly concluded that intergovernmental revenue stimulates local expenditures. By focusing on a grant program for which we can control for the mechanism of receipt, our analysis is a strong test for the flypaper effect, one which produces robust evidence that federal block grants supplement local expenditures, even prior to the adoption of TELs.

Finally, the results presented here reveal that TELs distort the budgetary choices of governments. We present empirical evidence that these institutions, by constraining the ability of elected officials to grow the size of the public sector, limit democratic responsiveness in the area of budgetary policy. This result is not only troubling from the perspective of democratic theory, but it also undermines one of the principal advantages of fiscal federalism. Federalism, by allowing locally elected officials to tailor the output of public goods to the specific preferences and circumstances of their constituents, increases overall social welfare above that which results from the uniform provision of services by a national government (Oates 1999). Restrictive fiscal institutions, by undermining democratic responsiveness, lower aggregate welfare. Interestingly, this suggests a rationale for employing intergovernmental block grants: federal grant funds, by circumventing institutions such as TELs, should increase aggregate welfare.

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