Chapter 2

A GENERAL THEORY OF INTERGOVERNMENTAL GRANTS

Having rejected the organic conception of the State and also the idea of class domination, we are left with a purely individualist conception of the collectivity. Collective action is viewed as the action of individuals when they choose to accomplish purposes collectively rather than individually, and the government is seen as nothing more than the set of processes, the machine, which allows such collective action to take place.

— James M. Buchanan & Gordon Tullock, *The Calculus of Consent*[7]

In order to understand the process by which public education is funded, it is important to begin by exploring the general nature of intergovernmental grants. Most money for public education is provided by state legislatures to local school districts in the form of intergovernmental grants and based upon some sort of funding formula. Such funding formulae are, in turn, the result of a complicated process in which legislators weigh alternative interests, some directly connected to education, others not connected at all but which compete for the money nonetheless.[8]

An extensive intergovernmental grants literature exists in economics.[9] However, this literature for the most part focuses only on individual grant programs and then only in terms of the effect that intergovernmental grants have on recipient behavior. While this is of value, it falls short of what is needed if we are to understand why legislatures provide intergovernmental grants and why they do so in the way that they do. In particular, it ignores the fact that intergovernmental grants policy is often formulated as an integrated package of grant programs rather than as isolated individual grant

[7] Buchanan and Tullock (1962).

[8] Witness, for example, the fall in the proportion of state budgets devoted to public education during the 1970s that was the result of a rise in state welfare programs (see *Table 1-1* in *Chapter 1*).

[9] Chapter 9 of Ronald Fisher's textbook on state and local public finance (Fisher (1996)) provides a nice overview of this material.

programs,[10] and it ignores the grantor legislator's motivation and behavior in the process, thus implicitly assuming that the grants are exogenous.[11] In part, this lack of attention to the donor side of intergovernmental grants can be attributed to difficulties in developing a simple language for describing the sometimes byzantine structures of individual grant programs.[12] Beyond that, however, this lack of attention to the donor side stems from limitations inherent in the typical model of intergovernmental grants. Decisions in these models are generally demand driven (see, for example, Fisher (1979)), and, where the grant structure is made endogenous, decisions continue to be made by the same pivotal recipient (see, for example, Slack (1980)). As a result, the endogeneity of the grant structure is limited and fails to account for the fact that intergovernmental grant systems are chosen by legislators whose actions are driven by a separate (though connected) sets of preferences (Wiseman (1989)).

The purpose of this chapter is to provide a general structure for understanding how a government's overall grants system, composed of numerous individual grant programs, is determined. Two tasks are required to fulfill this purpose. First, the salient details of individual grant programs must be distilled from the myriad of details which characterize actual programs and fit into a comprehensive whole. This task is accomplished below by noting the parallels between the structure of an individual tax and the structure of an individual grant program. Hence, a government's intergovernmental grants system can be described by a set of individual grant programs each of which is characterized by a rate structure, a base structure, and an intended purpose. Second, the choice of a particular structure for an intergovernmental grants system must be based on legislative preferences. While there is, of course, connections between the preferences of legislators and the preferences of their constituents, much potential explanatory power is lost if it is assumed that the preferences of

[10] For examples of the comprehensive nature of intergovernmental grants policy, see Timothy Conlan's (1988) description of the 1980s controversy over the transformation of the Federal government's grants system and Robert Peter's (1996) examination of New Jersey's struggle with reform of the state educational funding system and the impact of such changes on the funding of other programs.

[11] A partial exception to this observation can be found in Schwallie (1987, 1989a, 1989b) where the effects of grants from the US federal government on the overall size of the public sector is examined. Though not focused on the determinants of grants structure, the underlying theoretical model does include an independent, utility maximizing grantor government in which aggregate federal spending (net of grants), recipient expenditures, and personal per-capita disposable income enter as arguments.

[12] The wealth of detail that must be sifted through can be daunting. Vincent Munley (1990) provides a successful example of efforts to provide a comprehensive description of the workings of state grants for public education.

legislatures are identical with the preferences of their constituents. I therefore assume that legislative preferences are distinct from those who receive the grants. This assumption is actualized by characterizing a legislative decision-making process in which individual legislators seek to maximize the political support each receives from constituents. The notion of political support is left deliberately general so that it can capture a variety of political circumstances to explain how legislative preferences and the preferences of constituents are connected. Such connections may range from those in which political support is manifest only through the casting of votes, to more complex circumstances in which political support takes a variety of forms all of which eventually impact the probability of being reelected. The result of these modeling efforts is a decision-making process which in retrospect appears rather simple. The individual components of the optimal intergovernmental grants system are chosen by the donor government's legislature in a way that that assures that no additional net political benefit can be derived from increasing or decreasing the overall level of grant activities, from redistributing grant monies away from one grant program and into another, or from redistributing grant monies away from some constituents and toward others.[13]

This resulting model, used to understand how a government's overall intergovernmental grants system is determined, is presented in the next section, and that presentation is done in three steps. First, the salient details of individual intergovernmental grant programs are described and used to construct a relatively simple description of an overall intergovernmental grants system. Second, the political benefits that accrue to the donor government's legislature as a result of providing intergovernmental grants are described. And finally, the legislature's fundamental problem and the characteristics of an optimal solution to that problem are described. Because the resulting solution implies unrealistically that intergovernmental grants will take the form of general revenue sharing grants and not be provided to jurisdictions whose representatives are not part of the controlling political coalition in the legislature, the chapter concludes with an examination of why we see, in practice, intergovernmental grants often being provided to all lower-level jurisdictions whether their representatives are part of the ruling political coalition and why many (if not most) intergovernmental grants are categorical in nature. The answer, in brief, is the presence of spillovers (that is, what happens when individuals in one jurisdiction get benefits from grants provided to a different jurisdiction), fiscal illusion (that is, what

[13] Readers familiar with microeconomics will recognize this as the standard marginal analysis used to determine the conditions associated with the maximization of some objective under various resource constraints.

happens when individuals overestimate the benefits of intergovernmental grants or underestimate the cost of providing those grants), and political asymmetry (that is, what happens when political power is skewed in favor of some and away from others).

1. THE DETERMINATION OF A SYSTEM OF INTERGOVERNMENTAL GRANTS

The essential components involved in the process of creating an intergovernmental grants system is a donor government, a number of lower-level recipient governments, and decision makers for each government who seeks to achieve an (as of yet unspecified) objective. The model below incorporates these components through the use of a two-tiered federal governmental structure composed of a donor government with decisions made by that donor government's legislature, and a number of lower-level recipient governments in which decisions are made by a plebiscite of its citizens. The analytical foundations for this model are derived from Walter Hettich and Stanley Winer's (1988) model of the determination of the overall structure of taxes employed by a government, and Robert Inman's (1988) empirical analysis of US intergovernmental grant spending levels.[14] Although neither article focuses on the structure of intergovernmental grants, Hettich and Winer's use of a systemic approach to fiscal decision making and Inman's explicit treatment of the political decision-making process are well put and are consequently adopted here.

1.1 Characteristics of a System of Intergovernmental Grant Programs

Although specifics vary considerably in practice, individual intergovernmental grant programs have three basic characteristics that define their structure. First, every intergovernmental grant program has a purpose for which it is intended. This purpose may be general, as in the case of revenue-sharing grants, or it may be quite specific, as, for example, an intergovernmental grant program designed to help towns with a population less than 20,000 purchase computer systems for traffic control in their central business districts. Second, every individual intergovernmental grant program allocates money on the basis of one or more criteria that we can

[14] Hettich and Winer's (1988) work on the overall structure of taxes has provided a foundation for other work as well. See, for example, Kiesling (1990) which argues that tax structures may be dependent on the pattern of governmental expenditures.

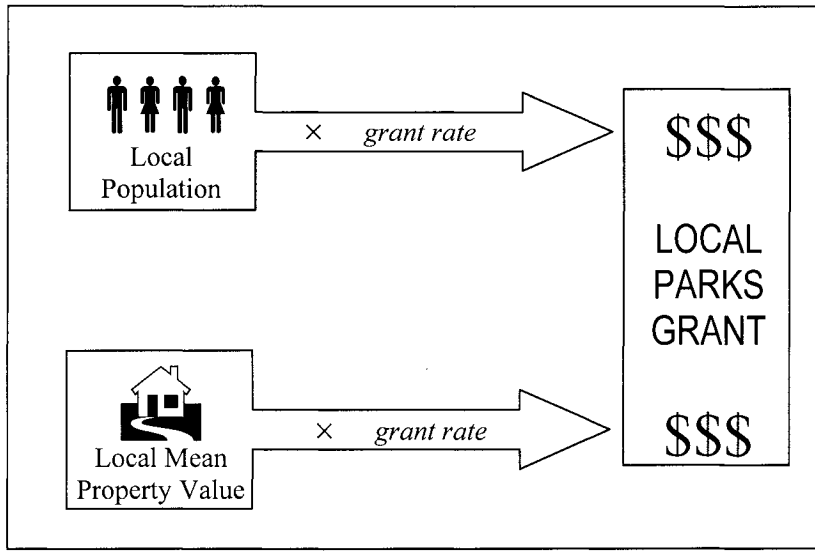

Figure 2-1. Structure of an Individual Intergovernmental Grant Program

call, in analogy with the analysis of tax structures, a grant base. Such grant bases may be simple, as in the case of an intergovernmental grant based solely on the number of people residing within the recipient government's jurisdiction. However, such grant bases can also be quite complicated so that, for example, one can imagine a particular intergovernmental grant based on a recipient jurisdiction's aggregate assessed property value times its poverty rate divided by its per-capita income. Finally, an individual intergovernmental grant program is characterized by one or more parameters that we can call, again in analogy with the analysis of tax structures, grant rates. Grant rates determine how much money a recipient government receives based on the values of its grant bases. The values of these grant rates will, of course, depend on how the various grant bases are measured and what the values of the various grant bases are.

Figure 2-1 illustrates this structure for some hypothetical state government interested in providing its local governments with an intergovernmental grant in order to stimulate the building of local public parks by those same local governments. Suppose that the state legislature wishes to give grants to all its local governments, but that it wishes to give more money to local governments with a larger population or with a larger number of poor people. Given that supposition, a simple grant structure that achieves those ends can be designed by having the grant calculated using two bases – local population and local mean property value. Then, by

choosing the appropriate grant rate for each base (a positive grant rate associated with the local population grant base and a negative grant rate associated with the local mean property value grant base), every locality will receive a grant with the larger and the poorer localities receiving more than those localities that are smaller or more wealthy.

Mathematically, this structure can be represented using matrix notation. Let the vector $\mathbf{\Gamma}_j$ represent the set of activities that some grant j is intended to support, and let the levels of such activities for the ith recipient government be noted by the vector $\boldsymbol{\gamma}_j^i$. Such activity may be measured in a variety of ways, and thus may include such diverse items as levels of local governmental spending on particular activities, physical measures of local tangible assets, or measures of student performance on skills tests. Define the set of grant bases used to allocate the grant by the $K_j \times 1$ vector $\mathbf{X}_j$, and let the values of these grant bases for the ith recipient government be noted by the vector $\mathbf{x}_j^i$. Finally, define the set of grant rates for the ith recipient government to be some $K_j \times 1$ vector $\mathbf{r}_j$. The set of grant rates $\mathbf{r}_j$, in turn, translate the set of grant bases into a total level of funding G_j^i. Thus, a typical intergovernmental grant to jurisdiction i used to stimulate the activities $\mathbf{\Gamma}_j$ can be represented by a sum of terms each of which represents the degree to which the various local grant bases $\mathbf{x}_j^i$ contribute to the overall size of the grant:

$$G_j^i = \mathbf{r}_j' \mathbf{x}_j^i. \qquad (2\text{-}1)$$

Given this structure for an individual intergovernmental grant program, the overall structure of a donor government's intergovernmental grants system can be defined as the aggregation of all such individual structures. Letting J be the total number of individual intergovernmental grant programs, the set of grants going to the ith recipient government can be described by the $J \times 1$ vector $\mathbf{G}^i$ composed of J individual grants G_j^i:

$$\mathbf{G}^i = [G_1^i \, G_2^i \ldots G_J^i]. \qquad (2\text{-}2)$$

Because each grant is a function of K_j bases, the total number of rates which the donor government must set is $K = K_1 + K_2 + \ldots + K_J$. A donor government's intergovernmental grants structure is therefore characterized by the number of grant programs, J, the set of activities for which each program is designed, $\{\mathbf{\Gamma}_j\}_{j=1}^J$, the number and types of bases to be used for each program, $\{\mathbf{X}_j\}_{j=1}^J$, and the set of grant rates for each program, $\{\mathbf{r}_j\}_{j=1}^J$, that is, by the set $\mathbf{\Omega}$:

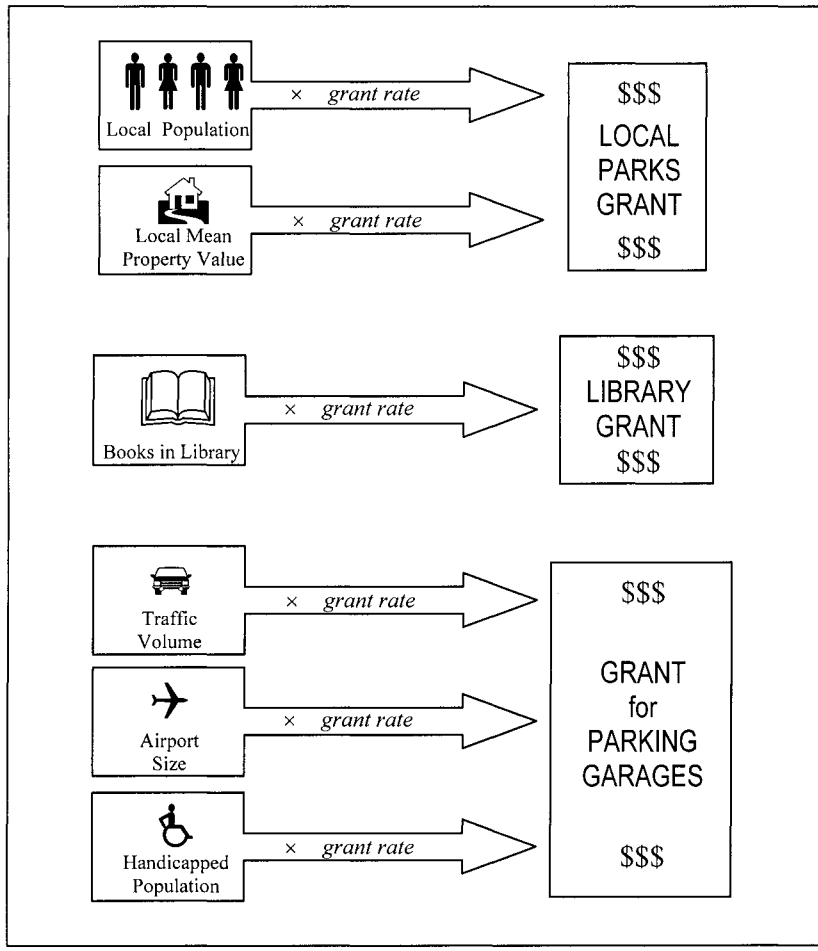

Figure 2-2. A Complete System of Intergovernmental Grants

$$\mathbf{\Omega} = \left\{J, \{\mathbf{\Gamma_j}\}_{j=1}^{J}, \{K_j\}_{j=1}^{J}, \{\mathbf{X_j}\}_{j=1}^{J}, \{\mathbf{r_j}\}_{j=1}^{J}\right\}. \qquad (2\text{-}3)$$

Schematically, this can be represented by *Figure 2-2* where our hypothetical state government provides an intergovernmental grant for local public parks based on the local population and local mean property value (as noted in *Figure 2-1*), an intergovernmental grant for local public libraries with larger libraries receiving greater aid, and an intergovernmental grant for local public parking garages based on local traffic volume, local airport

volume, and the number of handicapped. The result is a complex intergovernmental grant system composed of three individual intergovernmental grant programs each with its own set of bases and grant rates.

1.2 The Political Decision-Making Structure and the Preferences of Individual Legislators

The decision-making structure within which this intergovernmental grants system Ω is determined is typically complex, involving at a minimum both an executive and a bicameral legislature, and additionally often including various governmental agencies as well as lobbyists representing recipient governments and private-sector interests who potentially may benefit or be hurt by the provision of intergovernmental grants and the imposition of taxes needed to fund those intergovernmental grants. A full model of such a structure is beyond the scope of this book. However, because different decision-making arrangements can sometimes result in different outcomes,[15] it is important to be explicit about the structure employed.

I assume that decisions of the donor government are made by a unicameral legislature and that each member of the legislature represents a single recipient jurisdiction. I further assume that each representative seeks to maximize the probability of reelection, and for simplicity assume that the donor government funds its intergovernmental grants system with a proportional tax levied on its constituents at some rate s on an exogenous tax base B^i in each jurisdiction i. Finally, I assume that the donor government must balance its budget.

The probability of reelection for each representative is assumed to be a positive (monotonic) function of the political support ψ^i that is provided by the representative's constituents. Hence, each representative seeks to maximize ψ^i. Political support may manifest itself in a variety of ways. Examples include active campaigning, volunteer work, cash contributions, and favorable voting. The value of a constituent's political support will generally depend on the form of the political support as well as who

[15] Chapter 11 of James Buchanan and Marilyn Flowers's (1987) textbook provides a relatively simple introduction to the importance of decision-making structures by contrasting the choices made by three individuals under different majority-rule voting arrangements. For an in-depth introduction to the approach used by Buchanan and Flowers and an examination of the effect that a variety of institutional structures have on decisions made in the political arena, see James Enelow and Melvin Hinich's (1984) textbook on spatial voting theory or Kenneth Shepsle and Mark Bonchek's (1997) textbook on rational political choice theory.

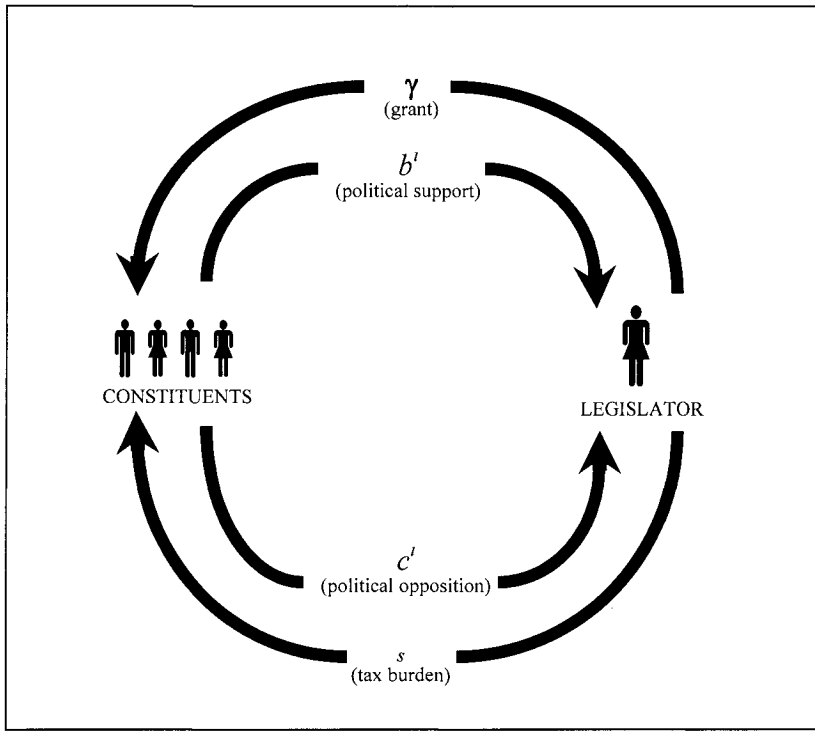

Figure 2-3. Net Political Benefit to an Individual Legislator

provides it. Thus, for example, an hour of volunteer work by a local politician or interest-group leader may result in greater political support than a similar effort by an ordinary constituent.

The level of political support which each representative receives is determined by two conflicting forces. On the one hand, intergovernmental grants increase the level of activities provided by recipient governments,[16] and thus increase the utilities of individual constituents. As a result, as *Figure 2-3* illustrates schematically, these individuals are willing (holding all other things constant) to provide a greater level of political support when the levels of intergovernmental grants are higher. On the other hand, individual constituents are made worse off by the taxes they pay to the donor government because of its effect on the amount of disposable income that these individuals will have available to purchase goods and services in the

[16] The degree to which the *j*th grant program affects recipient-government behavior will depend on both the grant program's rate structure $\mathbf{r}_j$ as well as the program's grant base $\mathbf{X}_j$. See Fisher (1988).

private sector. As a result, holding all other things constant, they will provide a lower level of political support. Thus, given a particular grants structure $\mathbf{\Omega}_1$ and assuming that individual constituents do not perceive a connection between the level of activities that their recipient government engages in and the taxes they pay to the donor government,[17] the net political support which some individual α residing in the ith jurisdiction is willing to provide can be written as the (additively separable) function:

$$\psi_\alpha^i = b_\alpha^i(\gamma) - c_\alpha^i(s) \qquad (2\text{-}4)$$

where γ is the $(J \cdot N) \times 1$ vector of activity levels across all N jurisdictions, where $b_\alpha^i(\cdot)$ is assumed to be a positive, concave function of γ, and where $c_\alpha^i(\cdot)$ is assumed to be a positive, convex function of s.[18] Note that $b_\alpha^i(\cdot)$ is a function of the vector γ and not just γ_α^i, thus allowing for the possibility of spillover effects across recipient jurisdictions. These spillover effects may be due to either direct consumption by the individual (for example, a suburbanite using roads in the central city) or more indirectly as might occur if an individual receives utility from knowing that the residents of another jurisdiction have government supported health-care programs.

Thus the net political support that the legislator representing jurisdiction i will receive in total from her constituents can be defined as the sum ψ^i of all the net political supports ψ_α^i across all individuals α in jurisdiction i:

$$\psi^i = b^i(\gamma) - c^i(t) = \sum_\alpha b_\alpha^i(\gamma) - \sum_\alpha c_\alpha^i(s). \qquad (2\text{-}5)$$

A simplified schematic representation of the link between the choices of the legislator and the level of aggregate net political support ψ^i is provided

[17] Hettich and Winer (1988) argue that although these decisions are formally connected through the imposition of the donor government's budget constraint, "the separation of taxes and expenditures is an important characteristic of modern fiscal systems." Jack Citrin (1979) in his examination of the motivations for the passage of California's Proposition 13, which imposed state constitutional restrictions on the ability of local governments to level property taxes above certain levels, provides empirical evidence of this dichotomy in the minds of voters.

[18] The assumption of a positive, concave political benefit function $b_\alpha^i(\cdot)$ is intended to reflect the observation that political benefits to the legislator typically rise with increases in intergovernmental grants but that they do so at a gradually decreasing rate. Likewise, the assumption of a positive, convex political cost function $c_\alpha^i(\cdot)$ is intended to reflect the observation that the political costs to the legislator associated with higher taxes typically rise at an ever increasing rate as tax rates increase. Such assumptions, which are common in economic models of behavior, turn out to be important to assuring the existence of an equilibrium, that is, to assuring that decision makers can make determinate choices.

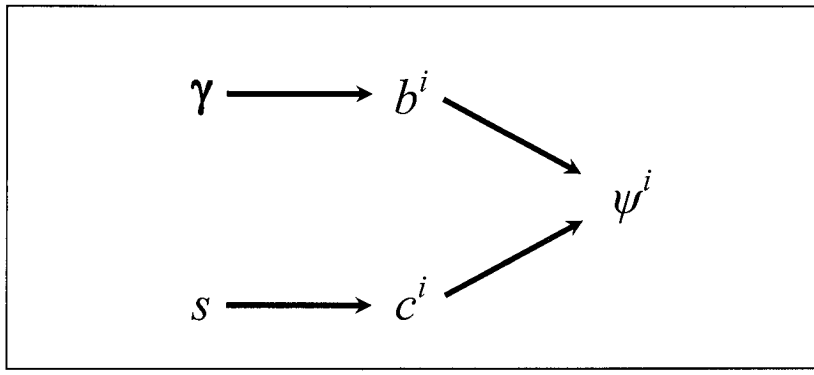

Figure 2-4. Determination of Net Aggregate Political Support for an Individual Legislator

in *Figure 3-4*. Through the choice of the various intergovernmental grant system parameters represented by the set Ω (see *Equation 2-3*), the representative essentially has control over the amounts and distribution of intergovernmental grants γ provided to all jurisdictions as well as the tax rate s that is used to fund the entire intergovernmental grants system. The amounts and distribution of the intergovernmental grants γ across all jurisdiction generates some level of aggregate positive political support b^i, while the level of the tax rate s generates some level of aggregate political opposition c^i. Together, b^i and c^i sum to yield the net aggregate political support ψ^i.

Note finally that net aggregate political support ψ^i is defined given a *particular* intergovernmental grants system. The ability to target those grants and thus generate political support is limited by the number of individual intergovernmental grant programs as well as by the number of criteria used to allocate those grants. Increases in either the number of individual grant programs or the number of allocation criteria (that is, the grant bases) will, in general, increase the ability to target grants to particular constituencies. Hence, a more complex intergovernmental grants system can be expected to result in a greater level of political support b^i, although, as discussed in the next section, such increased complexity will also result in increased costs. Thus, *Equation 2-5* can be restated as:

$$\psi^i = b^i(\gamma, J, K_1, K_2, \ldots, K_J) - c^i(s) \qquad (2\text{-}6)$$

where b^i is a positive, strictly concave function of its arguments.

1.3 Characterization and Solution to the Legislature's Problem

An individual member of the legislature is, of course, unable to put into place a system of intergovernmental grant programs unilaterally. As a result, the ability of an individual legislator to maximize net aggregate political support ψ^i requires the cooperation of a majority of legislators. How the legislator achieves that majority, is, however, a rather complicated process. As Inman (1988) points out, the outcome of legislative choice problems is in large part determined by the particular legislative decision-making structure in place.[19] A legislature dominated by a single political leader who represents a coalition of the whole (what Inman calls a "cooperative legislature")[20] will behave quite differently from either a legislature that is dominated by a majority coalition (Inman's "majority-controlled legislature") or a legislature that approves any proposal put forth by any of its members (Inman's "fully decentralized regime").

Let the legislative decision-making structure be characterized by a dominant political coalition which has sufficient power to design and adopt an entire system of intergovernmental grant programs. Hence, only the preferences of those legislators who are members of the dominant political coalition will be considered in the design of the grants structure. If we let $\mathcal{C}$ represent the set of representatives in the dominant political coalition, the objective of the coalition will be to maximize the coalition's aggregate net political support Ψ defined as the sum of the individual legislators' aggregate net political ψ^i across all members of the coalition:

$$\Psi = \sum_{i \in \mathcal{C}} [b^i(\gamma, J, K_1, K_2, \ldots, K_J) - c^i(s)]. \qquad (2\text{-}7)$$

Schematically, this process is represented in *Figure 2-5* with the legislature assumed, for simplicity, to be composed of three representatives, the first two of which belong to the dominant political coalition. Note that the political benefits and costs that accrue to the third representative are of no relevance to the dominant political coalition's decision making because

[19] In the context of game theory (see Rasmussen (1989; pp. 26-7), a legislative decision-making structure can be thought of as an equilibrium (or solution) concept employed by the legislature and which maps member strategies and payoff functions into an equilibrium.

[20] For an interesting example of empirical work implicitly based on the assumption of a cooperative legislature see Gavin Wright's (1974) analysis of the New Deal where he argues that the distribution of federal spending across states in the 1930s was determined by a desire to maximize the electoral votes for Franklin Roosevelt.

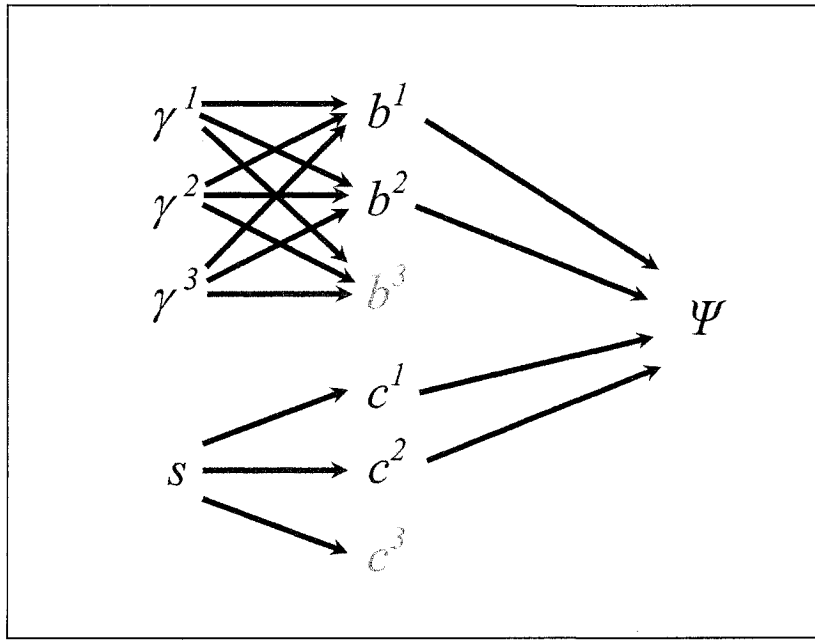

Figure 2-5. Determination of Aggregate Net Political Support for the Dominant Political Coalition

that representative is not a member of the dominant political coalition. Despite that, however, the grants that are provided to that third representative's jurisdiction are in general of importance to the dominant political coalition because all intergovernmental grants may have spillover effects, that is, individuals in the first two jurisdictions may get benefits from grants provided to jurisdictions even though they do not live in those jurisdictions.

As noted earlier, the legislature, and therefore the dominant political coalition, is constrained by the requirement that it balance the donor government's budget. Revenues are derived from the proportional tax already mentioned. Expenditures, however, while including the sum of all intergovernmental grants disbursed, also include costs associated with the enacting and administering of the entire intergovernmental grants system. Administrative costs A reduce the ability of the grantor government to distribute all of each tax dollar to recipient governments in the form of intergovernmental grants. These administrative costs include the cost of the legislative debate over the appropriate structure for each

intergovernmental grant program that makes up the entire grants system,[21] the cost of gathering information on the political preferences of individual constituents and fellow legislators, the cost of measuring the various grant bases, the cost of processing grants, and the cost of enforcing restrictions on such grants to assure that recipients are using the grants in ways intended by the legislature. While the determination of these costs is a complex process, they will in general rise with the complexity of the grants structure. We can, therefore, think of these administrative costs as a positive, strictly convex function of the number of grant programs J as well as the number of criteria K_j used to disburse each grant:

$$A = A(J, K_1, K_2, \ldots, K_J). \tag{2-8}$$

Mathematically, then, the grantor's budget constraint can be written as an equation that requires that the sum of all grants G_j^i disbursed to individual recipient jurisdictions plus the amount of administrative costs A must equal the total amount of tax revenues tB collected:

$$\sum_{i=1}^{N}\sum_{j=1}^{J} G_j^i + A(J, K_1, K_2, \ldots, K_J) - sB = 0 \tag{2-9}$$

where B represents the aggregate tax base across all constituents and across all jurisdictions:

$$B = \sum_{i=1}^{N} B^i. \tag{2-10}$$

The general problem for the dominant political coalition, then, is to figure out (subject, of course, to the balanced budget constraint noted in *Equation 2-9*) what set of intergovernmental grant system characteristics and what associated state tax rate (which is needed to fund the intergovernmental grants) will maximize the dominant political coalition's net aggregate political benefit Ψ. More specifically, it entails determining:

- the optimal set of grant programs to have,
- the optimal set of grant bases K_j to employ for each individual grant program,
- the optimal set of grant rates $\mathbf{r}_j$ to employ for each individual grant program, and
- the optimal state tax rate s.

[21] Robert Gordon (1975) emphasizes these costs in his study of the determinants of inflation.

Although these choices must be made in a way that makes sense when taken together, we can think of them as four independent decisions.

The determination of the set of grant programs involves both choosing the number of grant programs, J, and assigning activities to the particular programs, that is, choosing the $\mathbf{\Gamma}_j$. Assuming that the latter problem is solved for any given number of categories,[22] the choice of the number of individual grant programs can be made by balancing the political benefits and costs associated with increasing the number of grant programs. The addition of one more intergovernmental grant program generates political benefits (noted by the b^i in *Equation 2-7*). However, putting into place an additional intergovernmental grant program requires that additional revenues be raised to cover the additional administrative costs associated with this additional grant program (recall *Equation 2-8*). As a result, the addition of another intergovernmental grant program will require a higher tax rate s and that higher tax rate will result in additional political costs (noted by the c^i in *Equation 2-7*). Hence, the dominant political coalition will find it advantageous to increase the number of individual grant programs only as long as the additional political benefits are not exceeded by the additional political costs. As the number of individual grant programs increases, the political benefit of still another grant program will fall as more and more constituents become satisfied by the set of grant programs already in place. Likewise, as the number of individual grant programs increases, the political cost of still another grant program will rise as constituents become increasingly irritated by the ever higher tax rate needed to fund all the intergovernmental grant programs. Thus, the dominant political coalition will reach a point where the political benefit of adding another individual grant program will be exceeded by the political cost of doing so. It is at that point that it will stop.

The determination of the set of grant bases for each individual grant program involves a similar logic. Choosing the set of grant bases for each individual grant program involves choosing the number of grant bases for each grant program, K_j, as well as deciding what each grant base should be, that is, choosing the $\mathbf{X}_j$. Assuming that the latter problem is solved for any given number of categories,[23] increasing the number of grant bases allows

[22] The assignment problem can be thought of as being guided by the desire to minimize the loss of political support which comes from not having the ideal number of grants associated with zero administrative costs. Hettich and Winer (1988) discuss this problem in the context of tax rate brackets in their appendix. In brief, a solution can be found by minimizing the loss-of-support variance within each category.

[23] The assignment problem here takes on a more mechanical flavor. Given a grant program, the problem is one of choosing some minimum set of bases that will allow the state legislature to discriminate among recipient governments in a politically optimal manner.

the dominant political coalition to more finely target the grant to the constituents from whom it wishes to get political support. Thus, an increase in the number of grant bases K_j generates additional political benefits b^i as before. However, the increase in the number of grant bases K_j also increases the additional administrative costs A associated with that grant program. As a result, the addition of another grant base will also require a somewhat higher tax rate s and that higher tax rate will result in additional political costs c^i. Because the political benefit of using still another grant base falls as the total number of grant bases rises, and because the political cost of using still another grant base rises as the total number of grant bases employed rises, the dominant political coalition will increase the number of grant bases employed for any particular grant program only up to the point where the additional political benefits are not exceeded by the additional political costs.

The choice of the optimal set of K grant rates $\mathbf{r}_j$ (one for each grant base chosen) is made in a somewhat more subtle manner. On the one hand, one can think of the choice much like the choice of the optimal number of grant programs. An increase in the value of a particular grant rate increases the political benefits b^i that the dominant political coalition receives because some constituents (those associated with higher values of the particular grant rate's associated base) receive a larger grant. However, because this requires a higher tax rate s, the dominant political coalition will find there are limits to the advantage of raising a particular grant rate, and will set the value of the grant rate at that point where the political benefit of increasing the grant rate is just offset by the associated increase in political costs c^i. On the other hand, one can think of the choice of the optimal set of grant rates $\mathbf{r}_j$ as an issue of finding the right distribution of grants across recipient jurisdictions. Given a fixed pool of funds available to distribute in the form of intergovernmental grants (that is, given a fixed s), an increase in the value of one grant rate requires that some other grant rate be reduced. Hence, the optimal set of grant rates will be the one for which the political benefit of increasing any particular grant rate by some small amount (and thus increasing the grant for some jurisdictions) is the same regardless of the grant rate chosen. If this political payoff were not the same across all grant rates, then the dominant political coalition could increase its aggregate net political benefit Ψ by raising some grant rate for which the political payoff is relatively high and lowering the grant rate for some grant for which the political payoff is relatively small.

Note also that if stimulating an activity is desired in order to correct for spillover effects, the bases should be correlated with the level of desired stimulation.

Finally, the choice of the tax rate s, and hence the choice of the total amount of money to be distributed through the intergovernmental grants system, is embodied in the obverse of the above conditions. The ideal tax rate for the dominant political coalition is one at which the political cost of raising the rate by some small amount is just equal to the political benefit of distributing some additional small amount of money optimally.

Mathematically, these conditions can be expressed by a set of $K + J + 2$ first-order conditions plus the balanced budget constraint described by *Equation 2-9* that are associated with solving the implied Lagrangian problem:[24]

$$\sum_{i \in \mathcal{C}} \frac{\partial b^i}{\partial J} - \lambda \frac{\partial A}{\partial J} = 0 \qquad (2\text{-}11)$$

$$\sum_{i \in \mathcal{C}} \frac{\partial b^i}{\partial K_j} - \lambda \frac{\partial A}{\partial K_j} = 0 \qquad j = 1, 2, \ldots, J \qquad (2\text{-}12)$$

$$\sum_{i \in \mathcal{C}} \sum_{n=1}^{N} \frac{\partial b^i}{\partial \gamma_j^n} \cdot \frac{\partial \gamma_j^n}{\partial r_{jk}} - \lambda \sum_{n=1}^{N} x_{jk}^i = 0 \qquad \begin{matrix} j = 1, 2, \ldots, J \\ k = 1, 2, \ldots, K_j \end{matrix} \qquad (2\text{-}13)$$

$$\sum_{i \in \mathcal{C}} \frac{\partial c^i}{\partial s} - \lambda B = 0 . \qquad (2\text{-}14)$$

The connection between these first-order conditions and the problems of choosing the optimal number of grant programs, the optimal number of grant bases, and the optimal values for the grant rates can be more easily seen by manipulating the above equations.

Consider first the issue of choosing the optimal number J of grant programs. A rewriting of *Equations 2-11* and *2-14* and defining T to be total tax revenue, sB, reveals the conditions associated with the optimal

[24] The Lagrangian approach allows one to convert a constrained maximization problem (in this case maximizing the dominant political coalition's aggregate net political benefit function Ψ) in an equivalent unconstrained form. The first-order conditions represent the first derivatives of this unconstrained problem with respect to λ, the Lagrangian multiplier associated with the constraint, and the decision variables.

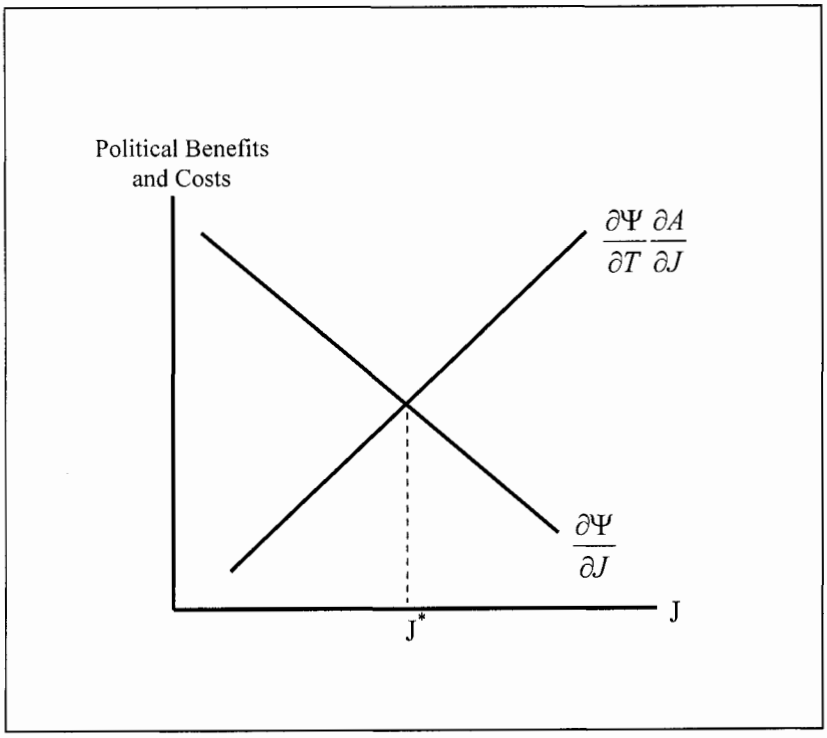

Figure 2-6. Optimal number of intergovernmental grant programs

number of individual grant programs J to be:

$$\frac{\partial \Psi}{\partial J} = \frac{\partial \Psi}{\partial T} \cdot \frac{\partial A}{\partial J} \qquad (2\text{-}15)$$

that is, as was discussed verbally before, the optimal number of grant programs J is one in which the marginal political benefit that the dominant political coalition gets from increasing the number of grant programs is equal to the marginal political cost of raising taxes sufficiently to fund the added administrative costs that result from the increased number of grant programs. See *Figure 2-6* for a visual representation of these conditions.

Likewise, the choice of the optimal number of grant bases can be illuminated by rewriting *Equations 2-12* and *2-14* to reveal the conditions associated with the optimal number K_j of grant bases for each intergovernmental grant program to be:

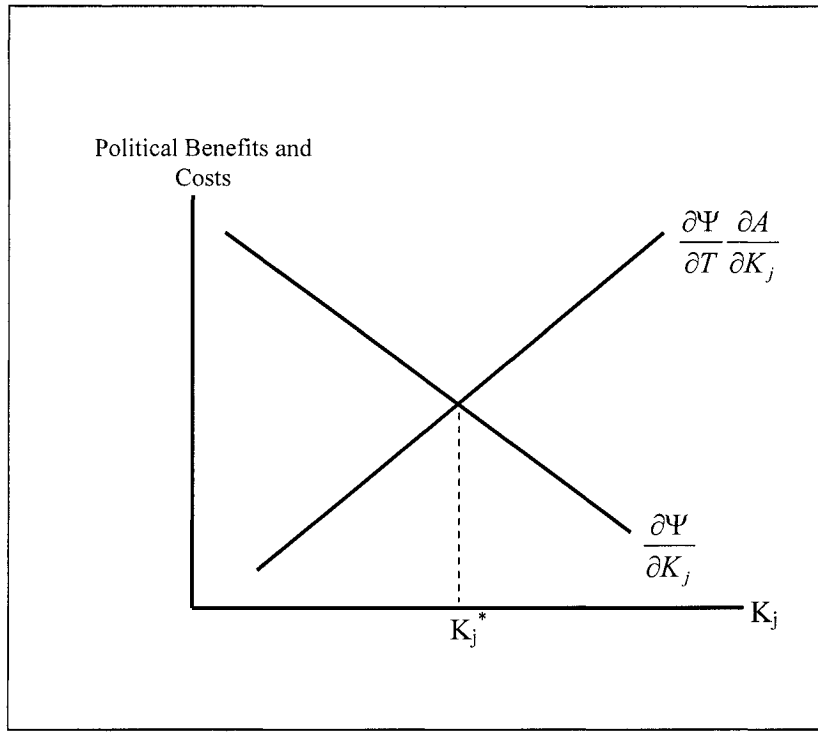

Figure 2-7. Optimal number of bases

$$\frac{\partial \Psi}{\partial K_j} = \frac{\partial \Psi}{\partial T} \cdot \frac{\partial A}{\partial K_j} \qquad (2\text{-}16)$$

that is, the optimal number of grant bases K_j for any individual grant program is one in which the marginal political benefit that the dominant political coalition gets from increasing the number of grant bases for any individual grant program is equal to the marginal political cost of raising taxes sufficiently to fund the additional administrative costs that result from the increased number of grant bases. *Figure 2-7* provides a visual representation of these conditions.

Finally, the choice of the optimal values for the grant rates can be illuminated by manipulating *Equations 2-13* and *2-14*. Given a fixed number J of intergovernmental grant programs and a fixed number K of grant bases, the marginal political benefit to the dominant political coalition

of increasing grant spending by one dollar through an increase in the rate r_{jk} should be equated across all bases and all programs.

$$\frac{\sum_{i\in\mathcal{C}}\sum_{n=1}^{N}\frac{\partial b^i}{\partial \gamma_j^n}\cdot\frac{\partial \gamma_j^n}{\partial r_{jk}}}{\sum_{n=1}^{N}x_{jk}^i}=\frac{\sum_{i\in\mathcal{C}}\sum_{n=1}^{N}\frac{\partial b^i}{\partial \gamma_l^n}\cdot\frac{\partial \gamma_l^n}{\partial r_{lm}}}{\sum_{n=1}^{N}x_{lm}^i}\qquad \text{for all } i,j,l,m. \qquad (2\text{-}17)$$

Moreover, such marginal benefits should also be equated to the marginal political cost of raising a dollar through taxes.

$$\frac{\sum_{i\in\mathcal{C}}\sum_{n=1}^{N}\frac{\partial b^i}{\partial \gamma_j^n}\cdot\frac{\partial \gamma_j^n}{\partial r_{jk}}}{\sum_{n=1}^{N}x_{jk}^i}=\frac{\sum_{i\in\mathcal{C}}\frac{\partial c^i}{\partial s}}{B}\qquad k=1,2,...,K_j. \qquad (2\text{-}18)$$

Note that the double sum in *Equation 2-13* reflects the existence of spillover effects. An increase in r_{jk} has two effects on members of the dominant coalition – directly through its effect on the grants going to the member's district and indirectly through spillover effects due to grants going to other districts. In the absence of spillovers, *Equation 2-13* would reduce to:

$$\sum_{i\in\mathcal{C}}\frac{\partial b^i}{\partial \gamma_j^i}\cdot\frac{\partial \gamma_j^i}{\partial r_{jk}}-\lambda\sum_{n=1}^{N}x_{jk}^i=0 \qquad \begin{matrix} j=1,2,\ldots,J \\ k=1,2,\ldots,K_j \end{matrix} \qquad (2\text{-}19)$$

The first sum in *Equation 2-19* is less than the first sum in *Equation 2-13*. Thus, there will be less marginal benefit to raising any r_{jk} if there are no spillovers. Given *Equation 2-14*, this suggests that, in the absence of spillovers, grant rates will generally be lower as will the overall level of grant funding where there are no spillovers.

This, then, characterizes the optimal system of intergovernmental grant programs for the dominant political coalition. As can be seen, the optimal intergovernmental grant system is rather complex. However, that complexity is the result of two simple forces – a desire for more complexity and a desire for less complexity. The diversity of economic and political circumstances across districts and across constituents argues for greater complexity so that as much net political benefit can be extracted from constituencies as possible. And indeed, in the absence of administrative

costs, the conditions associated with the optimal number of individual grant programs and the optimal number of grant bases for each individual grant program (*Equations 2-11* and *2-12*) reveal that the complexity of the intergovernmental grants system would only be limited by the condition that complexity not be pushed to the point where marginal political support becomes negative. It is only the presence of administrative costs that keeps the system of intergovernmental grant programs from being even more complex than it is. This has the interesting implication that to the degree technology improves and to the degree that such improvements result in a reduction in the costs associated with running and monitoring intergovernmental grant programs, we should expect to see an increase in both the number of intergovernmental grant programs and an increase in the complexity of each of those programs.

2. THE ROLE OF SPILLOVERS, FISCAL ILLUSION, AND POLITICAL ASYMMETRIES

Intergovernmental grants come in a variety of forms. Interestingly, however, the vast majority of such programs are categorical, that is, their use is prescribed by the donor government. At the state level, the bulk of intergovernmental grants are clearly categorical as witnessed, for example, by the dominance of state grants for local public education. At the Federal level, evidence is more difficult to come by since Congress shut down the Advisory Commission on Intergovernmental Relations (ACIR) in the mid-1990s. However, as *Table 2-1* reveals, data generated in 1994 by the ACIR reveals that even at the Federal level categorical grants have dominated total grant activity for the past several decades, regardless of whether one measures such dominance in terms of the number of programs or the number of dollars distributed. Indeed, though there was a small but seemingly permanent fall in percentage of categorical grant programs that began in the early 1980s, the percentage of dollars (as well as absolute number of dollars) distributed through categorical grants has steadily risen since the mid-1980s. Thus, it would appear that restricted grant giving is virtually ubiquitous in the world of intergovernmental grants. From the model developed in the previous section, it is clear that these restrictions must exist because they allow the dominant political coalition in the donor government's legislature to maximize political support. Yet what makes such restrictions beneficial to the dominant political coalition?

Three possible explanations suggest themselves – spillovers, fiscal illusion, and political asymmetry. Spillovers deal with the perception of benefits and costs across recipient jurisdiction lines and occur when the

Table 2-1. Federal Government Grant Programs (2002 dollars), 1975 to 1993

	1975	1978	1981	1984	1987	1989	1991	1993
Number	427	497	539	404	435	492	557	593
- % categorical	98.8%	99.0%	99.1%	97.0%	97.0%	97.2%	97.5%	97.5%
Amount (billions)	137.7	178.8	168.0	151.2	154.6	162.1	187.6	242.9
- % categorical	76.7%	73.0%	82.2%	79.7%	86.0%	87.6%	87.8%	88.3%

Note: Real values calculated from nominal values using a GDP chain-type price deflator. 1993 dollar values are estimates.

Sources: US Department of Commerce, Bureau of Economic Analysis (2003), Table 7.1; and Advisory Commission on Intergovernmental Relations (1994), Tables 1 and 2.

activity levels of one recipient government affect the constituents of another recipient government. Special interest groups, for example, often come into existence because of the existence of spillover effects and the desire by those who perceive those spillovers to coordinate their advocacy across local jurisdictions. Thus, for example, environmentalists from throughout the country derive benefits from knowing that the Alaska wilderness is protected, regardless of whether they ever visit that state.

Fiscal illusion, by contrast, deals with the *mis*perception of benefits and costs and can be defined as the overestimation of benefits received from intergovernmental grants by constituents in the recipient jurisdiction or the underestimation of the burden of donor-government taxes paid by those same constituents.[25]

Finally, political asymmetry deals not with an imbalance in perceptions but an imbalance in political influence. Essentially, political asymmetry exists if those who dominate lower levels of government have preferences that are different from those who dominate the higher-level government, which in the context of intergovernmental grants means that the preferences of those who make the decisions for the recipient governments are different from the legislators who control the donor government. For the donor-government, in particular, the political preferences of each representative are directly connected to the political support ψ^i that each representative receives. Hence, political asymmetry implies that the recipient government has a ψ^i function that is different from that defined for the donor government representative. Political asymmetry might occur if, for example,

most constituents only participate in elections to choose representatives in the donor government's legislature, leaving local decisions to a small minority of the set of total voters. As a result, the local government would

[25] There is no single definition of fiscal illusion. See Fisher (1982), Logan (1986), and Mueller (1989) for critiques of the various characterizations. For examples of empirical studies which investigate the existence of fiscal illusion, see Winer (1983) and Grossman (1990).

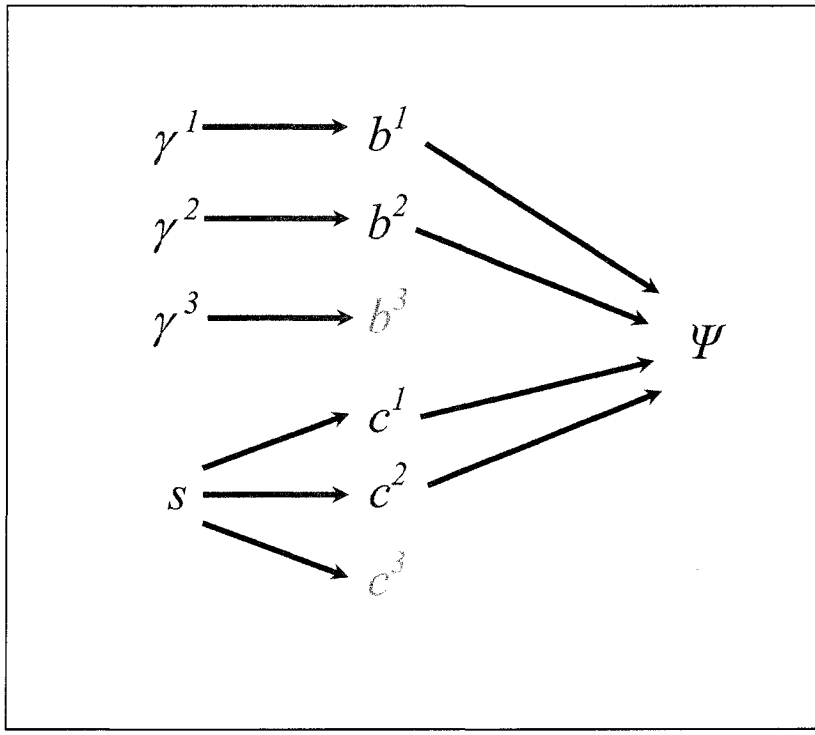

Figure 2-8. Political support for the dominant political coalition without spillovers

be dominated by an essentially different population than that which elects the donor-government representative.

When there are no spillovers, intergovernmental grants to jurisdictions whose representatives are not members of the dominant political coalition (see jurisdiction 3 in *Figure 2-8*) do not contribute to the dominant political coalition's net aggregate political support Ψ. As a result, there is no incentive for the dominant political coalition to provide grants to these non-member jurisdictions. However, when spillovers are present (contrast *Figure 2-5* to *Figure 2-8*), the dominant political coalition receives political benefits from providing intergovernmental grants to every jurisdiction.

When there is no fiscal illusion or political asymmetry, there is no particular advantage in having categorical grants. Categorical grants are valuable because they allow the donor government to target the benefits associated with an intergovernmental grant program to a particular set of constituents who would get benefits from the targeted activity. However, as *Figure 2-9* illustrates, without fiscal illusion or political asymmetry, a single, unconstrained grant will result in the same output effects at the recipient

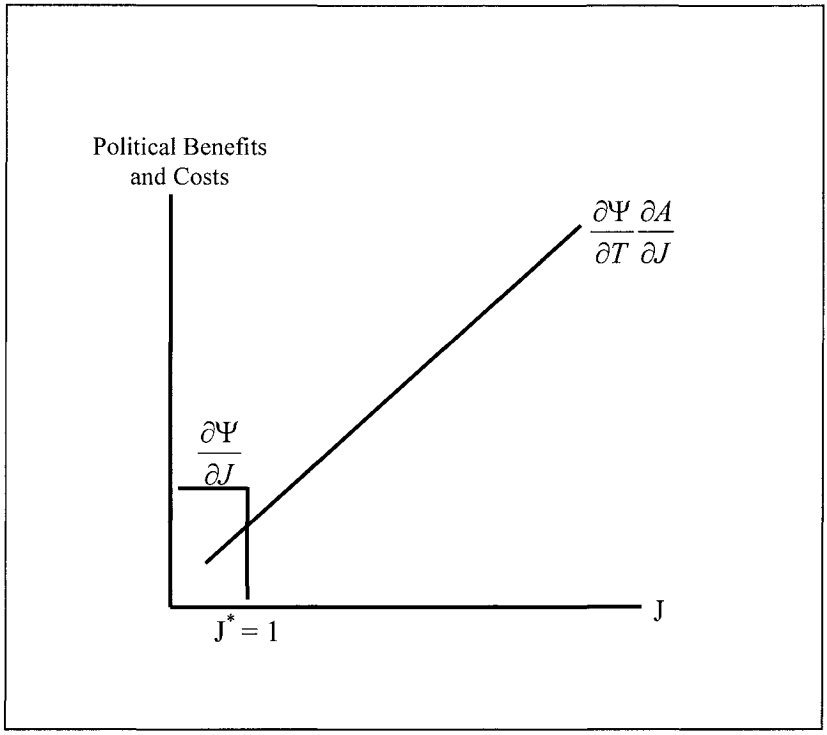

Figure 2-9. Optimal number of intergovernmental grant programs with no fiscal illusion or political asymmetry

level (that is, changes in the levels of γ_j^i) as an optimal categorical grants structure of the same total value, that is, $\partial\Psi/\partial J$ equals zero for J greater than 1 (see *Equation 2-15*). Hence, because added grants-structure complexity increases administrative costs (that is, $\partial A/\partial J > 0$) and thereby reduces the pool of funds available, the donor government will prefer a single, unrestricted grant, that is, a system of intergovernmental grants composed of one grant program (that is, $J = 1$) and the set of target activities, Γ, equal to the set of all activities.

Thus, in the absence of spillovers, fiscal illusion, and political asymmetry, we would expect to see a very simple intergovernmental grants system in which a single, general revenue-sharing grant would be provided only to jurisdictions whose representatives belong to the dominant political coalition. In fact, we can observe still further that even this system of a single intergovernmental grant will only exist if administrative costs A are less than the tax revenues $B^{\neg\gamma}$ taken from non-member districts, that is, not

even a single intergovernmental grant will exist in the absence of spillovers, fiscal illusion, and political asymmetry if:

$$A > B^{\neg \in} \tag{2-20}$$

where:

$$B^{\neg \in} = \sum_{i \notin} B^i \tag{2-21}$$

Thus, for a world with no spillovers, fiscal illusion, and political asymmetry, intergovernmental grants serve simply as a mechanism for redistributing resources from jurisdictions that are not members of the dominant political coalition and to jurisdictions that are members of the dominant political coalition. As the number of jurisdictions in the dominant coalition increases, the likelihood that administrative costs will be less than the tax revenue taken from non-member districts will decrease, and certainly if the legislature is dominated by a coalition of the whole and there are no spillovers, fiscal illusion, and political asymmetries, the legislature would choose to eliminate the intergovernmental grants structure.

But of course, spillovers, fiscal illusion, and political asymmetry do exist, and these forces have effects on the optimal intergovernmental grants structure.

With spillovers, constituents in each jurisdiction whose representative is a member of the dominant political coalition receives benefits from the activities of other jurisdictions including those that are not members of the dominant political coalition. As a result, the general revenue sharing grant structure described above will no longer be optimal for the donor government's dominant political coalition. As a result, the structure of the intergovernmental grants system will need to be modified in two ways. First, because spillovers will typically include both jurisdictions that are members of the dominant political coalition and jurisdictions that are not, the optimal structure of an intergovernmental grants system will now include grants to non-member districts.[26] Second, although there is no political asymmetry, local decisions will not take into account the benefits that spillover to other districts. (Thus, for example, localities in Alaska deciding

[26]. This is essentially a multi-person prisoners' dilemma game in which the categorical grants allow the players to coordinate their actions. Take, for example, a three-person prisoners dilemma in which two of the prisoners are friends and the third a stranger. If the two friends wish to form a conspiracy to beat the game, it may pay for them to include the stranger out of self interest.

on how much to protect the Alaska wilderness will not take into account the desires of environmentalists elsewhere in the nation who get benefits from the protection of that wilderness.) Hence there is a need for categorical grants to provide the proper stimulation of those local activities that result in spillovers. Thus, the expected intergovernmental grants structure will be a mixture of intergovernmental grants designed to compensate for spillovers and intergovernmental grants designed to redistribute wealth from jurisdictions that are not members of the dominant political coalition and toward jurisdictions that are members of that political coalition. If the donor-government's legislature is dominated by a coalition of the whole, the intergovernmental grants designed to compensate for spillovers will continue to exist. However, as before, the intergovernmental grants designed to redistribute wealth will not.

Much the same will occur when fiscal illusion is present. If constituents underestimate the cost of the taxes that they pay to the higher-level, donor government, or overestimate the benefits that they receive as a result of intergovernmental grants, the effect is likely to be limited to an increase in size of the system of intergovernmental grant programs, that is, taxes paid to the donor government will be higher than they would be otherwise and the total amount of money distributed through intergovernmental grants programs will be larger. However, because there are no spillover effects or political asymmetry, there would be no other change in the single, general-revenue sharing nature of the intergovernmental grants structure. However, it is possible that this fiscal illusion is not general but varies among government activities. In that case, a single, general revenue sharing grants structure will no longer be optimal. Consider, for example, a case in which constituents accurately perceive the benefits they get from fire protection services but overestimate the benefits associated with police services. In that case, the dominant political coalition can increase its net aggregate political benefits Ψ by increasing the funding of police services. Hence, the donor government can benefit by creating a categorical grant for police services. As with spillovers, a donor government whose dominant political coalition is a coalition of the whole will continue to enact intergovernmental grants that come about as a result of fiscal illusion. If that illusion is general, the result will be a general-revenue sharing structure funded at a higher level than would be the case if there were no fiscal illusion. If that fiscal illusion differs from activity to activity, the dominant political coalition, even if composed of a coalition of the whole, will find it advantageous to create a system of categorical intergovernmental grants that increase funding for those activities whose benefits are overestimated.

Finally, the presence of political asymmetry provides another rationale for the existence of categorical intergovernmental grants. The argument is

much the same as for the case of differential fiscal illusion. If there is political asymmetry, the group that dominates the lower-level, recipient government's decision-making process will be different from the group that provides support to the representative in the higher-level, donor government. The latter group will not be satisfied with the decisions of their lower-level recipient government and will therefore provide political support for their representative in the higher-level donor government to create an intergovernmental grants structure that changes the mix of recipient-government activities to something more to their liking. But such differential manipulation requires the use of categorical grants so that the lower-level, recipient governments have less discretion. This structure will continue to exist if the donor government's legislature is dominated by a coalition of the whole.[27]

3. CONCLUSIONS

This chapter has provided a conceptual framework for understanding what motivates higher-level, donor governments to provide intergovernmental grants and why intergovernmental grants systems take the forms that they do. Key to this understanding is:

- an ability to reduce individual grant program structures to a simple structure of rates, bases, and purposes;
- the underlying assumption that individual grant programs must not be analyzed separately but rather as components of a comprehensive, overall system of grant programs;
- that the donor government's choice of a structure for its system of intergovernmental grant programs is made by a group of individual legislators who belong to a dominant political coalition, that the preferences of these individual legislators are based on a desire for reelection, and that (as a result) the preferences of those who make decisions for the donor government are distinct from the preferences of the individuals who reside in the various recipient jurisdictions, and

[27] Daniel Schwallie's (1987, 1989a, 1989b) argument that higher-level, donor governments tend to discount the value of lower-level recipient-government expenditures not funded out of intergovernmental grants provided by the donor government is similar to the notion of political asymmetry developed here. For Schwallie, intergovernmental grants exist whenever the donor government is dissatisfied with either the amount or the mix of recipient-government expenditures. Though not concerned with the form of these grants, his parametric treatment allows him to quantify the degree of discounting and its effect on public sector size.

- a recognition that administrative costs are an important factor in explaining why we do not see even more complicated systems of intergovernmental grants programs.

The traditional motivation/justification for the existence of intergovernmental grants lies in correcting for spillovers and inequities (Fisher (1996)). In contrast, more recent work in the field of public choice has generally emphasized the importance of political self-interest and rent seeking, that is, the pursuit of private benefits not associated with an increase in benefits for society as a whole. The model in this chapter shows how those two rather different traditions can be reconciled. Spillovers, which often include equity concerns, are felt by constituents in the various recipient jurisdictions. Politicians as self-serving agents place no intrinsic value on spillovers per se. However, to the extent that their constituents provide political support to their higher-level donor government representatives and to the extent that these representatives have an effect on decisions made by the donor government's legislature, spillovers will be embodied in the structure of the donor government's system of intergovernmental grant programs. A legislature dominated by a particular political coalition will incorporate spillover effects only to the extent that such spillovers affect the constituents residing in jurisdictions that belong to that dominant political coalition. The preferences of constituents represented by members of the legislature who are not members of the dominant political coalition are not taken into account. Only if the legislature is dominated by a coalition of the whole will all constituent preferences be taken into account. Categorical grants exist in order to increase the levels of lower-level recipient-government activities to levels that they otherwise would not attain under more general, unrestricted intergovernmental grants. Political support for bringing about this distortion may be due to the presence of spillovers, fiscal illusion, and/or political asymmetry.

http://www.springer.com/978-0-387-23360-4

Adequacy, Accountability, and the Future of Public Education Funding

Leyden, D.P.

2005, X, 224 p., Hardcover
ISBN: 978-0-387-23360-4