Public Management in Intergovernmental Networks:
Matching Structural Networks and Managerial Networking

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In the United States, intergovernmental programs have become more the rule than the exception. Most “national” public initiatives are implemented with active involvement by states and/or localities, and a large portion of U.S.-based state programs – varying by state, to be sure – are in reality state-local efforts. The principle of federalism and the political realities of program adoption and execution provide a heavy tilt toward collaborative intergovernmental arrangements under most circumstances (O’Toole 2000a). Of course the significance of intergovernmental programs is not limited to the U.S., and many other nations also confront the challenges and opportunities of managing public purposes across governmental lines. In particular, with the gradual emergence of the European Union as an important contributor to governance in multilevel systems, the theme of public management in intergovernmental settings is acquiring renewed importance.

The crucial role of public management in such programs has been recognized by specialists in intergovernmental relations, who have emphasized the rise of “intergovernmental management” as the core of intergovernmental relations more generally (Wright 1990). This is not to say that management is everything in such programs. The politics of intergovernmental relations matter greatly, and the details of program design can be critical. With due caution regarding the hazards of overgeneralization, the management of intergovernmental programs should be of central interest to scholars of governance challenges in the 21st century.

While the theme of intergovernmental management has been emphasized as a key part of the contemporary policy environment, theoretical work on this topic has been slow to develop.
The specialty is descriptively rich, with many studies of the efforts and intricacies of what managers do when they work across governmental boundaries and how important the details can be (for instance Agranoff 1986; Gage and Mandell 1990; Agranoff and McGuire 2003); the field has not managed to integrate these insights into a theoretical perspective that can offer testable generalizations, some predictive power, and links to allied theoretical developments on the burgeoning subject of governance (Lynn, Heinrich and Hill 2001). A review of the subject of intergovernmental relations some time ago remains valid on this point: Beam, Conlan, and Walker (1983) point to the descriptive strengths but theoretical weaknesses of this line of work (see also O’Toole 1990).

Another limitation can be noted. While there is considerable consensus on the importance of intergovernmental management, presumably for the ultimate success or failure of public purpose, until recently there has been no systematic investigation of the specific contributions of public management per se to such performance. To be sure, some case studies and general discussion provide fairly persuasive arguments (for instance Ban 1995; Holzer and Callahan 1998; Riccucci 1995), but rigorous demonstration of the link between public management and intergovernmental program performance has been absent from research. This generalization in fact is not restricted to intergovernmental management; it has applied to the entire field of public management (see O’Toole and Meier 1999). Recently, some progress on this front has been made. In this article, we build on this line of work to begin a systematic examination of the role of public management in executing intergovernmental public programs.

Intergovernmental Ties as Networked Relations

An increasing body of scholarship argues, and in some cases demonstrates, that public
management often takes place in and on networks of actors rather than solely within the confines of a single, hierarchical public bureaucracy framed in a dirigiste state (Bogason and Toonen 1998; Bressers, O’Toole and Richardson 1995; Hufen and Ringeling 1990; Klijn 1996; Milward and Provan 2000; O’Toole 1998; Peterson and O’Toole 2001; Scharpf 1993). In networked settings, program success requires collaboration and perhaps coordination with other parties over whom managers exercise little formal control. By network we mean a pattern of two or more units, in which not all major components are encompassed within a single hierarchical array (O’Toole 1997). Actors in networks are often located in bureaucracies that are in turn connected with other organizations outside the lines of formal authority. Many of these complex arrangements are required or strongly encouraged by policy makers, others emerge through mutual agreement among organizational or other partners who find mutual interests served by working together on a regular basis.

Networked arrays may include some combination of: agencies (or parts of agencies) of the same government, links among units of different governments, ties between public organizations and for-profit companies, and public-nonprofit connections, as well as more complex arrangements including multiple types of connections in a larger pattern. Networks can range in complexity from simple dyads, at one pole, and bewilderingly complex arrays entailing dozens of units, at the other (for instance, Milward and Provan 1991). Beyond the issue of size or complexity, networks can vary greatly on many other dimensions. Clearly examining “networks” and public management in any comprehensive sense requires investigating a great number of research questions, network dimensions, and levels of analysis (for a beginning sketch of a research agenda, see O’Toole 1997).
One aspect of networks and public management that is worthy of close examination is the intergovernmental component. Several reasons justify such a focus. Intergovernmental ties are frequent, and intergovernmental links are among the most common form of networked connection during the execution of public programs (Hall and O’Toole 2000). Second, intergovernmental components of networks per se have generally not been a particular focus of empirical studies of networks and public management, so it is worthwhile to explore whether this aspect of networked public management offers particular insights. Third, given the generally atheoretical nature of much work conducted on intergovernmental management, an effort to consider the topic through the lens of recent studies of networks offers the prospect of some much-needed theoretical leverage.

Intergovernmental ties involving public organizations could take one or more of several forms. Service agreements and intergovernmental regulations, for instance, are reasonably common. Perhaps the most frequently occurring and clearly among the most important are regular ties triggered and sustained by intergovernmental aid, particularly grants-in-aid. Intergovernmental grant programs involve one or more “donor” governments, and governmental agencies, in regular interaction with one or more “recipient” governments and agencies (Pressman 1975). Donor units offer incentives for recipients to undertake certain initiatives with certain emphases, and typically attach some regulatory “strings” as a condition of aid. Recipient units may have their effective program costs trimmed substantially by grants, even though entering into the bargain means dealing with the preferences of the donor and the conditions of support, typically on a regular basis. Such programs create dependencies and also increased probabilities and scope for public action. Over time, the intricacies of program management require
diplomatic, fiscal, and other forms of managerial skill and effort (for a classic depiction of the subtle forms of intergovernmental influence in grant programs over time, see Derthick 1970). In short, examining networked patterns of intergovernmental aid provides an opportunity to begin an exploration of the intergovernmental dimensions of public management.

**Intergovernmental Networks and Public Education**

We explore intergovernmental management here in the field of public education. Public education in the United States is conducted primarily by the unique American governmental form, the school district. School districts in the U.S. generally and all districts in this study are independent local governments with their own taxing powers.¹ Although school districts are the most common public organizations in the United States, they have some distinct characteristics. They are highly professionalized organizations with elaborate certification processes for various occupations. The organizations themselves tend to be decentralized with a great deal of street-level (classroom) discretion.

Public managers increasingly manage in a setting that requires that they gain cooperation and support from external actors who are not their subordinates. Public education is not among the most highly networked public service production and delivery sectors – indeed, the use of the special district form in this sector was motivated by the objective of insulating public education from politics as usual and from dependence on or competition with other forms of public services (Tyack 1974). Nevertheless, this policy arena has developed into a significantly more complex and interdependent setting. Schools are now venues for the delivery of a host of associated

¹“Independent” in the case of school districts means that the district selects its own governing board (as opposed to having another jurisdiction appoint the board) and it possesses independent taxing power.
services or regulatory programs, from public health (vaccination programs, prevention of sexually transmitted diseases), to substance abuse, to the prevention and control of child abuse, to the achievement of nutritional objectives, to the reduction of adolescent violence, to civil rights, and to the improvement of life chances for disabled children. The “core” educational function has been surrounded by and insinuated into a panoply of other public objectives, and in turn a host of other organizations have become involved in the day-to-day functioning of school district activities. Funding and curriculum strength as well as program innovations depend in part upon school district support from, and in some circumstances coproduction with, other important stakeholders in other school districts, in the business community, among community groups, and from elsewhere. School districts, in short, typically operate within a network of other organizations and actors who influence their students, resources, programs, goals, and reputation. And school district managers face the challenge of producing educational outcomes in this complex institutional setting.

In earlier studies we have conducted systematic empirical work on the public management of school districts, with particular attention to the networking behavior of top managers in such governments. The findings of that work deserve brief summary to place the current effort in context. First, we have found that public management matters, matters in a variety of nonlinear ways, and interacts with organizational resources. Network management activities by school system superintendents (top managers) are able to improve the outputs of public schools by as much as an additional five percent; the quality of overall management has a similar magnitude of impact (Meier and O’Toole 2001; 2002). Second, structural stability matters, perhaps more than management; and it matters a great deal in network-like situations (O’Toole and Meier 2003a).
The need for some personnel stability is also evident (O’Toole and Meier 2003b). Third, multiple levels of governance have influences on the system; street-level personnel, management-level personnel, agency heads, and political overseers all often influence program performance (Meier, O’Toole, and Nicholson-Crotty 2002).

Although in this earlier work we have acknowledged the intergovernmental dimension of public education, we have not investigated it systematically. We do so in this article. While we concentrate on the most important intergovernmental links in school districts’ networked environments, we do not ignore the important components of managers’ networking activity involving other external parties as well. Managerial networking more generally is taken account of in the analysis reported below, but the regular ties of school districts with their other governmental partners receives systematic attention. One can view this study, then, as an extension of earlier theoretical and empirical work with the addition of an explicitly intergovernmental (and, as will be explained, structural) component.

School districts can have regular ties with a variety of external parties. Among the most important are links with other levels of government. The key intergovernmental link for school districts in most states is with the state-level Department of Education. State education agencies do not typically become directly involved in the provision of most educational services. In recent years, however, they have overcome the political support for local independence of the educational function and begun establishing and monitoring accountability standards (Wong 1999). States – through their state education agencies – are a critical source of funding for most school districts (again, the extent and type of state support varies considerably from state to state), and they also have jurisdiction to structure and enforce some regulations, primarily about
the content of local districts’ curricula as well as the certification of teachers. More frequently
they administer state-wide standardized tests and evaluate districts based on them. The reliance
of school districts on state departments of education for significant funding and also some
direction on the educational function mean that state education agencies are a particularly central
actor in districts’ intergovernmental networks on a continuing basis.

Nationwide, state agencies provide significant funding for public education. This function
receives the largest slice of state-level expenditures: 32.1 percent of all state dollars nationwide in
2000 (Wulf 2002: 271) with 60 percent of this amount provided intergovernmentally to local
governments, primarily school districts. The proportion of local educational spending deriving
from state sources varies between virtually all (Hawaii, where no local taxes are used and a tiny
fraction of the overall total comes directly from the federal government) and barely more than 10
percent of the total (New Hampshire) (The Book of the States 2002: 486-87).

One additional intergovernmental fiscal link can be significant: school districts’
interdependence with the federal government, particularly the U.S. Department of Education.
Unlike some countries, the national government in the United States is involved in the public
education function only in relatively peripheral ways. Still, the Department of Education is not a
trivial player in the environments of at least some school districts. Overall, approximately 12
percent of the total national budget for elementary and secondary public education derives directly
or indirectly from the federal government through the Department of Education.2 While this

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2Total revenue for public school systems in U.S. for 1998-99 was more than $200 billion,
of which approximately $24 billion derives from the national government. The vast majority of
the nationwide elementary and secondary education dollars are raised directly by local districts,
primarily from their own taxes, with some coming from other local governments and some from
charges imposed by the districts. See Book of the States vol. 34 (2002).
figure is not overwhelming, neither is it trivial. More importantly, the degree of national support varies considerably from district to district. In some cases, particularly districts with large federal military bases, attending to national funding can provide an important supplement to state-level aid and local own-source revenue.

In this article, we focus on these fiscal ties between school districts, on the one hand, and the state and national educational funding agencies, on the other. In effect, we examine the fiscal networks of school districts. Districts raise a major portion of their own revenue, but most school districts also depend on ties with other levels of government – particularly state education departments – for an important slice of their budget. Management in the school districts receives primary attention. We are interested in seeing how the degree of fiscal reliance on these other parties in the educational network of school districts is related to management and its relationships to educational performance.

**The Network Theme: Structure and Behavior**

Sometimes, the term “network” has been used as a loose metaphor for the interdependence characteristic of governance. Other analysts mean the term to refer to relatively stable interorganizational structures, and they use some of the concepts and tools of sociology to dissect these and seek to build empirical theory. Still additional researchers focus primarily on networking: the actual connections made between or among actors operating in some social space.

We avoid the metaphorical use of the term here, but we are interested in the other two aspects of the network theme. Relatively stable arrays of interdependent organizational actors are characteristic of the intergovernmental system, where grant programs often continue over
multiyear periods, units develop elaborate formal understandings with each other, and the networked sets of institutional actors approximate a structurally identifiable cluster. (Note the use of images such as “picket fence federalism” to describe U.S. vertical links between or among donor and recipient agencies that jointly administer public programs; see Wright 1988.) For present purposes, in our treatment of intergovernmental relations and the management of public education, we refer to this feature as the structural network. Regardless of whether and how often one can observe actual interaction between the linked entities, an ongoing fiscal link clearly defines part of a structural relationship between the units involved.

In addition, managers may be active in their networked environment in efforts to build support for programs, attract partners for cooperative effort, and fend off challenges from other actors. Some of these efforts may in fact take place in concert with others involved in a structural network, some may involve other dyads and other network actors – sporadically or regularly. We refer to the set of these moves, which are in principle observable, as the behavioral network, and the efforts of managers to be active in this way as managerial networking.

Typically, researchers do not distinguish carefully between structural features of networks and behavioral manifestations of networking. Both signal some connection, perhaps interdependence, with other actors in a public organization’s environment. These aspects may operate somewhat independently of each other; however, and we view it as important to take both into account in any comprehensive understanding of the network theme in public management. Intergovernmental management, in particular, involves a consideration of both.

**Intergovernmental Networks and Public Management:**

**A Formal Treatment**
Network-theoretical ideas are not in short supply, but little systematic effort has been made to model the impact of public management on public program performance, let alone for networked settings. In recent years, we have inductively developed a formal model of such relationships – a model constructed from an analysis of the mass of theoretical and empirical (mostly case-study) material on public management and performance, as well as on some of the prominent notions of how management might matter in complex, or networked, institutional settings (see O’Toole 2000b). The model can be outlined briefly, and its application to the intergovernmental context of current interest explained.

Our general model of public management and performance is:

\[ O_t = \beta_1 (S + M_1)O_{t-1} + \beta_2 (X_t/S)(M_3/M_4) + \epsilon_t \]  \[1\]

where

\( O \) is some measure of outcome,

\( S \) is a measure of stability,

\( M \) denotes management, which can be divided into three parts

- \( M_1 \) management's contribution to organizational stability through additions to hierarchy/structure as well as regular operations,
- \( M_3 \) management's efforts to exploit the environment,
- \( M_4 \) management's effort to buffer environmental shocks,

\( X \) is a vector of environmental forces,

\( \epsilon \) is an error term,

the other subscripts denote time periods, and

\( \beta_1 \) and \( \beta_2 \) are estimable parameters.
Modeling the performance of overall networks of organizations, including efforts to manage the network, is considerably more complex than modeling the performance of an organization operating within an interdependent setting. We are at work on aspects of the first-mentioned subject as well, although this work goes beyond the reach of the present article.

The model is autoregressive, nonlinear, and contingent. The autoregressive component is captured by the lagged dependent variable, thus requiring time-series data for estimation purposes. The nonlinear elements are represented by various interaction effects, some designated as reciprocal functions. The model is contingent simply because the stability term can be considered one end of a continuum, with fluid arrays on the opposite pole. As the stability variable moves toward zero, the model estimates how management affects programs in settings marked by great and unpredictable changes over time.

In the model, S can be considered a composite of the various kinds of stability in an organizational setting. Stability means constancy in the design, functioning, and direction of an administrative system over time. Five types were identified in an earlier study: structural stability, mission stability, production or technology stability, procedural stability, and personnel stability (O’Toole and Meier 2003b). In that study, we investigated the impact of personnel stability on the performance of administrative systems and developed evidence that personnel stability makes a positive contribution. We incorporate those findings into the present analysis. We also retain two management measures developed in earlier work (Meier and O’Toole 2001; 2003b): a measure of managerial quality, which can be conceived as contributing to the several M’s in the model sketched above, and a measure of behavioral networking, or M₂. (M₂ is defined as M₃/M₄.) In this article, we concentrate on only the second term in the model by deliberately underspecifying the full set of relationships we have hypothesized, as follows:

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3Modeling the performance of overall networks of organizations, including efforts to manage the network, is considerably more complex than modeling the performance of an organization operating within an interdependent setting. We are at work on aspects of the first-mentioned subject as well, although this work goes beyond the reach of the present article.
The intergovernmental structural dimension can be considered part of the environment, designated as $X_i$, and included as a separate term:

$$O_i = \beta_2(X_i/X)_iS(M_2) + \epsilon_i$$  \[3\]

Here $X_i'$ simply refers to the portion of the $X_i$ vector besides the intergovernmental structure. We simplify further by not designating the stability relationship as a reciprocal one:

$$O_i = \beta_2X_iX_i'M_2 + \epsilon_i$$  \[4\]

This leaves us with a highly complex four-way interaction of the environment, intergovernmental structure, stability and management. The best test to determine if the relationships actually fit a four-way interaction is with a set of nested hypothesis tests that contrast various interactions with strict linear additive models. Doing so would require us to include not just the four additive terms and the four-way interaction, but also four three-way interactions, and six two-way interactions.

Such a set of tests puts a great deal of stress on a data set by generating massive collinearity and would likely make pinpointing the precise relationships extremely difficult. To provide a first step in assessing the linkage between the intergovernmental environment and the various forms of management and stability, we further simplify the model to one with interactions between intergovernmental structure and the remaining terms only.

$$O_i = \beta_2X_i(X_i' + S + M_2) + \epsilon_i$$  \[5\]

which can be transformed to the following equation to be estimated:

$$O_i = \beta_2X_iX_i' + \beta_3X_iS + \beta_4X_iM_2 + \epsilon_i$$  \[6\]

In terms of actual testing, we will have two measures of intergovernmental structures, two measures of management, and two measures of stability in addition to several environmental
variables. This simplified model likely gives up a fair amount of explanatory power by omitting
the lagged dependent variable in particular.

Although the model has been simplified in equation [6], the relationships continue to
incorporate a number of features we expect to find for public management in networked settings.
Behavioral networking is explicitly incorporated, and in the analyses that follow we add our
measure of managerial quality as well. (Any management function presumably includes both a
quantity, or activity, and a quality component. Our measure of $M_2$ taps degree of activity, so we
also include a measure of managerial quality.) In addition, the $S$ term, as indicated above,
represents a set of stability-inducing forces. Earlier we incorporated personnel stability, and we
retain that element here. The $X_t$ term represents a vector of environmental forces, and we include
several of the most important of these in the analyses as well. From the $X_t$ term that had been
relatively undifferentiated before, we extract two aspects of the intergovernmental system for
closer examination and denote them with $X_i$. Both variables represent financial dimensions of the
intergovernmental environment. The first is the dependence on funds from other levels of
government, in particular those from state governments, and the second is the diversity of school
district funding sources. The degree of dependence on state and national funders renders a school
system’s environment more network-like in structural terms. We interpret school systems with
high dependence on intergovernmental aid as being situated in a more networked setting than
those that are self funded. State aid is the primary kind of such support, and we incorporate a
measure of dependence on state aid into our treatment of structural stability in the analyses
We use state funds rather than state and federal funds because for most districts the percentage of federal funds is relatively small. For a small number of districts with major federal facilities such as military bases, federal aid is the largest source of funds. These federal impact districts are fundamentally different from districts that depend on state sources in that federal funds essentially substitute for local monies. Including federal funds in the analysis results in generally similar results as those reported here, but the federal impact districts tend to muddy the findings. The diversity measure also picks up the federal impact districts.

The particular focus of the present investigation of public management is on the intergovernmental network itself. Beyond the dependence on state aid, another feature of the intergovernmental network for school districts that should tap the degree of complexity facing districts and their managers is the degree that a school district’s financial support is provided by a diversity of sources in the network rather than merely one funder. Some districts might derive virtually all their financial resources from their own-source revenues. These, presumably, are the most independent of other networked partners (they exert their own taxing authority rather than being dependent on decisions of others). Others might derive considerable financing from the state or the federal government. These may be advantaged, in a sense, in having an additional source of funds; but the management challenges in dealing with own-source and intergovernmental funding streams, and the uncertainties connected to the latter, render managerial networking and perhaps other managerial functions more important. Those school districts with financial support stemming in substantial measure from more than one intergovernmental funding stream would seem to face more challenging and potentially more uncertain network environments. For these reasons, the sheer diversity of funding across the intergovernmental network can also be expected to be related to the requisites of

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intergovernmental management. Dependence on state aid, in short, as well as dependence on a more diverse and thus complex intergovernmental network are features of the interdependent environment that should be related to school district management, and also to performance.

The Units of Analysis

Our data are drawn from the 1000+ Texas school districts. District superintendents were sent a mail questionnaire on management styles, goals, and time allocations (return rate 55% with 507 useable responses).5 We pooled five years (1995-99) of data on performance and control variables to produce a total of 2535 cases for analysis. All nonsurvey data were from the Texas Education Agency.

Measures

Our measures can be discussed in terms of parts of the model: management (M); elements of stability (S); the vector of environmental forces (X'); intergovernmental structures (X_i) and program outcomes (O), or performance. These items are covered in this order.

M Management

Two measures of public management are included as potential explanatory variables in this analysis: managerial quality and managerial networking. We treat them both here as elements of the M_2 term in our simplified model in [6] but leave them distinct in our efforts to develop estimations. For both measures, we are interested in management at the very top level in the school districts. School districts use several levels of management, and a case can be made that a

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5Districts responding to the survey, conducted during 2000, were no different from nonrespondents in enrollment, enrollment growth, students’ race, ethnicity and poverty, or test scores. There were slight differences in a few other factors. Respondents had 0.48 more students per class, paid their teachers $200 more per year, but had annual operating budgets of about $100 per student less.
number of these are likely to be interesting (Meier, O’Toole and Nicholson-Crotty 2002). For reasons of feasibility and importance, however, we focus here solely on district superintendents as the lead managers. Managerial quality is a notoriously difficult concept to measure. In earlier work, we validated a measure based on the residual from a model explaining salaries of district superintendents. The salary-setting process in Texas school districts approximates a competitive labor market with full information. As a result, management skills should be positively rewarded by the market. To isolate this quality component, we predict logged superintendent salaries with 11 variables measuring job size, human-capital factors, personal characteristics, and prior school-district outputs similar to common salary models in the literature (see Ehrenberg, Chaykowski and Ehrenberg 1988). Details of this analysis are reported elsewhere (Meier and O’Toole 2002).

The resulting model predicts 78 percent of the variance in salaries, thus comparing favorably to other models in the literature. The objective is to remove as many “non-quality” factors as possible from the superintendent’s salary. The remaining residuals are then standardized (converted to a mean of 0 and a standard deviation of 1) for use in the subsequent analysis as a rough indicator of management quality. This measure is clearly a messy one, since the residual...

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6District characteristics included as predictors are the district’s total budget, tax rate, and average revenue per student; these district characteristics are logged. Four human-capital characteristics are included: experience as a superintendent, tenure in the current job, age, and possession of a doctorate. Personal characteristics included are whether the superintendent is female, black, or Latino. The adjustment for prior year’s test scores is also included because we think managerial quality is affected by prior performance, and quality then affects future performance. Over time, in other words, there is reciprocal correlation. The adjustment for this endogeneity is handled via an instrumental variables technique. Six student characteristics and district resources are used as instruments; the purged measure of prior performance is then included in the model.

7This process permits us to compare the impact of management quality with the impact of managerial networking which is also measured as a standardized scale (see Meier and O’Toole...
A systematic validation for this variable produced encouraging results. The measure contributed positively and in a statistically significant fashion to school-district performance in regression analyses using 10 different dependent variables.8 (The complete set of analyses are available in Meier and O’Toole 2002.)

A second measure of management is included, as well: managerial networking. This measure taps what we have referred to earlier as “behavioral networking,” since it gets at the reported behavior of school district top managers as they interact with the important parties in the district’s environment. Because school districts operate within a network of other organizations and actors who influence their students, resources, programs, goals, and reputation, the extent a superintendent can manage in the school district’s network should be related to school district performance (Meier and O’Toole 2001; 2003).

To measure the behavioral networking activity of school superintendents, we selected five sets of actors from the organization’s environment: school board members, local business leaders, other school superintendents, state legislators, and the Texas Education Agency. In our mail survey, we asked each superintendent how often s/he interacted with each actor, on a six point scale ranging from daily to never. Superintendents with a networking management approach

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8Controls in that set of analyses are identical to those employed in the present investigation. In the case of an eleventh dependent variable, there was no relationship.
should interact more frequently with all five actors than should a superintendent with an approach focused on internal management. A composite network management-style scale was created via factor analysis. All five items loaded positively on the first factor, producing an eigenvalue of 2.07; no other factors were significant.\(^9\) Factor scores from this analysis were then used as a measure of network management, with higher scores indicating a greater network orientation. The network management measure and the managerial quality measure are uncorrelated with each other (\(r = -0.01\)).\(^{10}\)

S Stability

We incorporate two aspects of personnel stability in this study, as developed in an earlier analysis (O’Toole and Meier 2003b). Managerial stability is simply the number of years the superintendent has been employed by the district in any capacity.\(^{11}\) Teacher stability is measured as the percentage of teachers employed by the district during the preceding year who continue to work for the district. For both measures, then, higher scores mean more stability. Data on managerial stability were obtained from the survey respondents; data on teacher stability was provided by the Texas Education Agency. While these measures are treated as stability features here and in the subsequent discussion, they can also be considered aspects of management: what is usually referred to as personnel management. While not totally under the control of school district

\(^9\)The network management factor correlates at -.27 with time spent managing the district (in contrast to time spent in contacts outside the organization).

\(^{10}\)Management quality is also uncorrelated with both measures of personnel stability (-.02 for each), as is network management (.04 correlation with teacher stability, -.08 with management stability).

\(^{11}\)The measure as a result taps both stability and capacity — the latter in the sense of knowledge about the organization.
leaders, these variables are susceptible to influence by the individuals who make decisions about how such organizations are run. In a real sense, therefore, all four variables tap aspects of public management.

**X₁ Environment: The Intergovernmental Dimension**

School districts differ substantially in terms of their structural network contexts, and we focus on the intergovernmental aspect of this structure: their dependence on state aid and their dependence on a diversity of funding. Dependence on state aid is measured by the percentage of total school district funds that originate from the state. The average district receives 51.5% of its funds from the state but the range is from 0 to 100% (allowing for rounding error). We dichotomize this variable with a median split, designating districts with more than 58% of state aid as highly dependent on state aid. For the diversity of funding measure, we took the percentages of state, local, and federal funds and squared them. This number was then subtracted from 10,000. A score of zero means that the district received all its funds from a single source; higher scores indicate greater diversity with a maximum possible score of 6733 (if funds came equally from each of the sources). The mean diversity measure was 4334 with a standard deviation of 1217, range 198 to 6358. We again used a median split with district scores above 4735 designated as more diverse. A district with score of 4735 might have approximately 4% federal funds, 66% state funds, and 30% local funds, although many other combinations are possible.

**Xᵢ’ Control Variables**

Any assessment of public program performance must control for both task difficulty and program resources. For school districts, neither of these types of elements are under the substantial control of the districts themselves, and therefore they can be considered key parts of the
vector of environmentally influenced $X'$ forces represented in the model. Fortunately, a well-developed literature on educational production functions (Hanushek 1996; Hedges and Greenwald 1996) can be used for guidance. Eight variables, all commonly used, are included in our analysis – three measures of task difficulty and five measures of resources.

Schools and school districts clearly vary in how difficult it is to educate their students. Some districts have homogeneous student populations from upper middle-class backgrounds. Students such as these are quite likely to do well in school regardless of what the school does (see Burtless 1996). Other districts with a large number of poor students and a highly diverse student body will find it more difficult to attain high levels of performance because the schools will have to make up for a less supportive home environment and deal with more complex and more varied learning problems (Jencks and Phillips 1998). Our three measures of task difficulty are the percentages of students who are black, Latino, and poor. The last-mentioned variable is measured by the percentage who are eligible for free or reduced-price school lunch. All three measures should be negatively related to performance.

While the linkage between resources and performance in schools has been controversial (see Hanushek 1996; Hedges and Greenwald 1996), a growing literature of well-designed longitudinal studies confirms that like other organizations, schools with more resources generally fare better (Wenglinsky 1997). Five measures of resources are included. The average teacher salary, average instructional expenditures per student, and class size are directly tied to monetary resources. The average years of teaching experience and the percentage of teachers who are not certified are related to the human resources of the school district. Class size and noncertified
teachers should be negatively related to student performance; teacher experience,\textsuperscript{12} teacher salaries, and average instructional expenditures should be positively related to performance.

\textbf{O Performance Measures}

Finally, we introduce measures for O, or performance (outcomes) for the school districts in our analysis. Although virtually all programs have multiple goals and thus are subject to multiple performance indicators, some objectives are defined as more important by the political environment than are others. This study incorporates ten different performance indicators in an effort to determine if intergovernmental network structures influence how public management and personnel stability affect a variety of organizational processes.

Although each performance indicator is salient to some portion of the educational environment, the most salient by far is the overall student pass rate on the Texas Assessment of Academic Skills (TAAS). The TAAS is a standardized, criterion-based test that all students in grades 3 through 8 and 11 must take. The grade 11 exam is a high-stakes test, and students must pass it to receive a regular diploma from the state of Texas. TAAS scores are used to rank districts, and it is without question the most visible indicator of performance used to assess the quality of schools. Our measure is the percentage of students in a district who pass all (reading, writing, and math) sections of the TAAS.

Four other TAAS measures are also useful as performance indicators. The state accountability system assesses performance of subgroups of students, and districts must perform well on all these indicators to attain various state rankings. TAAS scores for Anglo, black, Latino
\footnote{This measure — mean number of years in the profession for a district’s teachers — captures something quite different than does our teacher stability measure, which focuses on year-to-year turnover within a district. The correlation between the two is .39.}
The various pass rates do not correlate as highly as one might imagine. The intercorrelations between the Anglo, black and Latino pass rates are all in the neighborhood of .6, thus suggesting the overlap is only a bit more than one-third.

The relationship between the percentage of students taking the tests and the test scores in Texas is actually positive but explains less than two percent of the variance.

School districts often have annual student turnover of 20% or greater. School districts do not necessarily know where students have gone unless they receive a request for a transcript. In addition, school districts have few incentives to find out why any given student has not returned for a new academic year.

Many parents and policymakers are also concerned with the performance of school districts regarding college-bound students. Three measures of college-bound student performance are used – average ACT score, average SAT score, and the percentage of students who score above 1100 on the SAT (or its ACT equivalent). Texas is one of a few states where both the ACT and the SAT are taken by sufficient numbers to provide reliable indicators of both. As with statewide samples where there is no correlation between these scores and the number of students taking them if the proportion of tested students is more than 30 percent of the total eligible to be tested, Texas scores are uncorrelated with the percentage of students taking the exams.

The final two measures of performance might be termed bottom-end indicators — attendance rates and dropout rates. High attendance rates are valued for two reasons. Students are unlikely to learn if they are not in class, and state aid is allocated to the school district based on average daily attendance. Attendance, as a result, is a good indicator of low-end performance by these organizations; the measure is simply the average percentage of students who are not absent. Dropout rates, while conceded to contain a great deal of error, are frequently also used to evaluate the performance of school districts. The official state measure of dropouts is the annual
percentage of students who leave school from eighth grade onward.

Findings

Our strategy for testing the model as depicted in equation [6] is to conduct regression analyses that seek to explain the performance measures across the districts for all ten performance measures available while also distinguishing simple and complex intergovernmental networks for each analysis. This latter step allows us to see how all the sets of relationships differ between more and less interdependent intergovernmental network settings (and more and less diverse intergovernmental funding sources). This last aspect of the approach helps, in particular, to probe for nonlinear relationships, a central aspect of the model and one often difficult to analyze systematically. Nonlinear impacts can be assessed either via interaction terms or by examining relationships with different subsets of the sample. The former, while elegant, is often plagued by severe collinearity problems that prevent interpretation of coefficients. Accordingly, we explore nonlinear relationships among several of the management and intergovernmental-structure variables here via physical controls, that is, by partitioning the data set. Given the large number of regression analyses required to examine the full range of educational performance (that is, ten dependent variables) and the fact that we are using two different measures to tap intergovernmental network structure, we partition the sample in a straightforward fashion: Each specification is run with estimations developed separately for the top and bottom halves of the sample, based upon intergovernmental network structure.

Forty separate regressions have been run. First, using dependence on state aid as our measure of intergovernmental structure, we have sought to explain outputs and outcomes on each of the ten performance measures. Since the sample is split into high and low state-aid districts for
each of the ten measures, these analyses represent 20 estimations. The state-aid measure of intergovernmental structure was then replaced with the measure tapping diversity of funding, and all 20 analyses were re-run. These 40 sets of results are displayed in Tables 1-8; to provide overviews of the patterns embedded in the accumulation of so many results, we have summarized the most important tendencies in Tables 9 and 10. For the sake of emphasis on the sets of relationships of interest, we report here only the results for the management and stability variables; the same control variables were used in each analysis – all eight controls explained earlier were included, as were dummy variables for each year of the time series.

[Tables 1-10 about here]

With regard to the management and personnel stability-related variables, a first general point is that the hypothesized positive relationships between management and personnel stability, on the one hand, and performance, on the other, are clearly supported. While the relationships and their strength vary depending on which aspect of performance is considered, the overall pattern is unambiguous for settings reflecting both higher and lower quantities of intergovernmental network structure. Tables 1 through 4 report on the 20 regression analyses that included state aid as the measure of intergovernmental network structure. Of the 80 coefficients reported in these Tables – 20 each for behavioral networking by top managers, top-managerial quality, teacher stability and management stability – 50 are statistically significant and in the expected direction, and only two are statistically significant in the opposite direction. Based on the binomial probability distribution, the probability of a set of relationships this consistent is less than one in a million.

When state funding is replaced by our measure for funding diversity, 56 of the 80 relationships are statistically significant and in the expected direction. Of the 28 non-significant relationships, 19 are in the predicted direction.

16
significant in the predicted directed, four in the opposite direction. Again the probability of this pattern of relationships if the actual data were random is less than one in one million. Overall, management – measured via both behavioral networking and also quality – as well as personnel stability certainly improve educational systems’ performance. These findings are basically parallel to other analyses conducted earlier but without considering any measure of intergovernmental network structure (see O’Toole and Meier 2003b).

Second, although there are clearly general patterns, the degree of explanation varies across the performance measures. This point holds whether the sample is split by state aid or funding diversity. Our ability to explain the variance in a number of performance measures is quite good although the level of explanation for the so-called “low-end” performance measures is modest. For equations explaining attendance and dropout rates, the $R^2$ ranges between .15 and .29. The equations concerning dropouts are particularly unimpressive (recall that unlike for the other performance measures, this one looks better as scores decline; accordingly, coefficients indicating contributions to performance should be negatively signed), and a probable reason is the quality of dropout data, as explained above. For both low-end measures, additional factors are surely important in driving results. Keeping students in school and getting them to attend on a regular basis are particularly challenging issues when students are beset with other problems, like substance abuse, family difficulties, and the like. That the low-end equations leave most variance unexplained is not surprising. We include and discuss these results below but concentrate particular attention on the other eight equations.

Third, the relationships in different intergovernmental settings clearly differ; in short management interacts with intergovernmental structures to generate nonlinear relationships just as
the model predicts. In the remainder of this discussion, we concentrate on how managerial and personnel-stability impacts vary by intergovernmental network type.

We consider the results in Tables 1-4 first. An interesting finding is that behavioral networking is more important for performance in districts that receive more state aid. The criterion for judgement of a difference was simply whether one coefficient was larger than the other subject to the constraint that at least one of the pair of coefficients had to be statistically significant. In eight of the ten measures the coefficients for managerial networking are greater for the high-aid half of the sample; in one case – TAAS pass rates for black students – is the opposite the case. Even if it were, the slope is substantially smaller.

In some of the cases the difference is substantial. The effect size for networking in improving Latino students’ state-exam pass rates in high-aid districts is a maximum of more than four points, whereas the impact for low-aid districts is not statistically significant. An impact of four points might seem relatively small, but over the long term increases of this magnitude can make a real difference. The impact of managerial networking is even greater on pass rates for Anglo students in the high-aid part of the sample: a maximum of about 5.7 percent; in the other half of the sample the relationship is still positive but is less than half the size.

Networking efforts on the part of managers generally pay greater dividends if another government, in this case the state, is a major source of resources. Higher state aid means that districts are more dependent on a key partner in their structural network. Major financial benefits for the district may be contingent on managers’ treating the issue of intergovernmental support

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17 For one performance measure, TAAS pass rates for low-income students, neither coefficient was statistically significant.

18 Even if it were, the slope is substantially smaller.
seriously, and external managerial effort does contribute more to results. In this case good behavioral networks mimic structural networks.

A second pattern is discernable in Tables 1-4. Personnel stability also tends to matter more for performance in those settings more dependent on state aid. The relationship is particularly clear for teacher stability. For seven performance measures, teacher stability contributes more in the high-aid districts, whereas for only one – high SAT performance – is the pattern reversed. For two performance measures, ACT scores and dropout rate, teacher stability is significant for neither half of the sample. In some instances, like the all-students’ TAAS pass rate, the teacher-stability impact for the high-aid districts is twice as large.

The pattern across the performance measures is similar for management stability, although the results are a bit less straightforward. For five cases, the high-state aid half of the sample gets a bigger impact on performance from superintendents’ stability than does the low-aid half; in two cases, the pattern is reversed. Three cases do not involve statistically significant impacts of management stability on performance although two of these are the instances focused on the low-end measures.

Personnel stability helps educational performance more in the more heavily networked settings, at least as measured by districts’ dependence on the primary source of intergovernmental aid. This pattern is especially interesting. Often the characterization of networks and network management suggests that stability and networking are somehow opposed. Either stability impedes the entrepreneurial networking often endorsed by network enthusiasts, or networking promises to break through the rust of overly entrenched bureaucracy. The findings reported here point toward a more intriguing pattern: stability – at least of personnel – and intergovernmental
Their focus is on another aspect of stability: constancy of the key network organizational members – in contracted relations for service provision – over a several-year period. Another way of characterizing the findings is that personnel stability may compensate for, and be especially important in, some of the disruptiveness of structurally less stable (more networked) settings. A second possibility is that personnel stability allows the manager to turn network interactions into repeat games, thus allowing each side to build trust and make credible commitments. If so, to treat stability in general and networked patterns as somehow at odds would be a distortion. It may be especially important for public managers in networked intergovernmental settings to work to build sufficient stability into their contexts so as to be able to operate effectively – or to find ways of balancing the compensating advantages and disadvantages of various kinds of stability and instability for delivering results. This set of findings is generally consistent with a theme articulated by Milward and Provan (2000: 370), who have emphasized that in networked settings stability in certain senses may be valuable for effective performance.19

One other pattern is worth noting from Tables 1-4. Management quality matters most in settings with less fiscal dependence on the intergovernmental network. This relationship obtains in seven of the ten pairs of regressions; in three, including the two sets of low-end performance analyses, the relationship is reversed. It is not immediately clear why management quality should matter more in the more structurally homogeneous districts. Nonetheless, the relationship is striking in some instances. Note the results for standardized state test performance for Anglo students; quality matters here for both high- and low-aid districts, but for the latter its impact is

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19Their focus is on another aspect of stability: constancy of the key network organizational members – in contracted relations for service provision – over a several-year period.
Nearly triple. (The maximum effect of quality for districts heavily reliant on state assistance is about 2.2 points on districts’ pass rate but about 6.1 percent for the other half of the sample.)

Top managers of high quality may be particularly influential in more “standard” settings, those contexts best approximating the hierarchical and structurally stable environments that public management scholars and practitioners have been assuming for decades. If so, perhaps if quality managers become trained for the more networked world of many contemporary public programs, they could have greater impact in more challenging program contexts. Considering these results in conjunction with the personnel stability findings discussed above also suggests that as settings become more network-dependent, sheer managerial (and others’) stability – longevity in the system, chances to learn the lay of the land – starts to trump managerial quality. Such a conclusion is plausible when one considers that in less structurally stable surroundings, knowing the contacts and history of how to get things done may be a particularly prized (and scarce) asset for managers, as well as others.

Another possibility is that more diverse networked program contexts are inherently less manageable, so the impact of managerial quality is tempered in such circumstances. If so, the structural context for public management may be important in ways that need to be considered by analysts and practitioners. The findings reported in Tables 1-4 are summarized in Table 9. Overall, these findings support the theoretical notions contained in our simplified specification.

Tables 5-8 summarize the results, excluding the control variables, for the same set of analyses with our measure of funding diversity replacing that for the extent of reliance on state aid.

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20 Given the findings analyzed here, this may be the case not only for $M_1$, the internal management of operations that has been omitted altogether in the simplified model, but also for overall managerial quality.
Recall that funding diversity measures how much a school district turns to multiple sources of aid (federal, state, and own-source) to support itself. The measure taps not the extent of reliance on funding from the intergovernmental network or any of its components – which would be a measure of fiscal dependence – but rather the extent to which a district has to juggle a multiplicity of significant funding streams. Here, then, we are measuring something like the complexity of the intergovernmental funding network. Splitting the sample between low and high funding diversity segments reflects a structural distinction between simpler and more complex structural settings for trying to manage the education of students.

Tables 5-8 contain the coefficients for the funding diversity regressions, while Table 10 summarizes the findings. The more a district’s funds are concentrated in one source – any source – the more important managerial networking and managerial quality are to performance. For networking, eight of the 10 pairs of regression results point in this direction. For managerial quality, seven sets of regressions indicate greater impacts of quality are associated with less diverse funding arrangements.\(^2\) In a number of cases, the differences are quite large. In one, the Latino student pass rate on the statewide test, quality is actually negatively related to performance for “complex” districts although the slope is small, while it has a substantial positive impact for the low-funding diversity half of the sample (maximum impact of approximately 8.5 percent).

Funding homogeneity seems to allow top managers to focus their networking and have a chance to produce better results. When funding diversity is high – that is, when the funding network is complex – managers presumably have to be effective in spreading themselves and their

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\(^2\)For both networking and quality, the dropouts performance equation contained anomalous results. Given the quality of the data, therefore, the pattern can be considered even stronger than the summary numbers suggest.
efforts over more nodes. As a result, the actual impact of any given level of networking is lessened overall. It is also likely that having to deal with several important sources of funding means managers have to handle higher levels of goal conflict, a circumstance that would also complicate the task. Whereas some literature implies that operating in a networked world is something that adept managers should be able to master (for example Mandell 2001), these findings raise the question of whether networks of a certain complexity and perhaps degree of goal conflict strain or surpass even active networkers’ abilities to perform their managerial role effectively. The answer to this question carries implications not only for those interested in networks and the performance of public programs, but also those who care about intergovernmental programs and their management.

This sort of logic, combined with the findings on state aid, might lead one to expect that personnel stability should matter more in the high funding-diversity school districts. These are the ones in more complex and perhaps conflictual intergovernmental networks, at least in a fiscal sense. If the earlier discussion can be applied here, the more complex settings should also be ones in which stability of personnel can contribute more to performance. The results provide some support for this idea. Here management stability seems clearly more important in the high-diversity settings; seven sets of equations point in this direction, only one (for the state-exam pass rate for black students) in the opposite direction. In several of the cases, the differences in slopes for management stability was considerable between the two parts of the sample. Again, this finding makes sense in that experienced top managers are more likely to be effective in navigating

22 The equations for the two low-end performance measures all show insignificant results for managerial stability.
the complex and conflictual world of intergovernmental funding to produce effective performance. The impacts of teacher stability on performance do not vary consistently between high- and low-diversity settings. For five of the ten measures, teacher stability matters more where funding is spread among several sources. For four measures, it matters more where funding is concentrated as to source. \(^{23}\) Since teachers themselves are virtually never involved in negotiating intergovernmental aid or dealing with the complexity of a school district’s intergovernmentally networked surroundings, the mixed results here are not very surprising.

If we treat funding diversity, then, as a measure of network complexity, the findings overall are rather straightforward. More concentrated funding streams mean that top-managerial networking and quality are more important. Managerial stability becomes consistently more important with diverse funding sources. Managers matter for performance in intergovernmentally networked settings, but they appear to have larger impacts when the networks are not too complex and conflictual so that they are presumably able to concentrate their external efforts where it will do some good. Where the setting is more complex, managerial longevity helps more.

**Conclusions**

Among the most important kinds of networked contexts is the set of situations where the intertwining of interdependent actors is a product of conscious design rather than evolution or chance. The most explicit and longstanding kind of designed interdependence is the intergovernmental governance system. In some contexts, such as the emerging forms of the European Union, such multilevel governance is a fairly recent and immensely important product of expanding networked action. In other contexts, like a range of intergovernmental programs in

\(^{23}\)For dropout rate the teacher coefficient was insignificant for both halves of the sample.
federal systems like the United States, intergovernmental patterns are many, variegated, constitutionally legitimated, and of longstanding operation. All such settings deserve systematic analytical attention, and the burgeoning interest in networks portends increasing focus on intergovernmental governance and management.

This trend is propitious, not only because the topic is important and will likely grow in salience, but also because the subject of intergovernmental management, while critically important, remains in need of theoretical approaches. Developments on the subject of networks may be able to help in this regard. Our effort to explore this notion has been constructed from a general theory of networks and public management developed without particular attention to intergovernmental program management but with potential applicability there.

We have applied a simplified version of our model to an enduring and distinctively American set of cases, school-system management, that nevertheless should be instructive regarding the role and importance of public management in intergovernmentally networked settings. The model provides help in unpacking an exceedingly complex set of relationships. It, and the findings of this study, can offer both hypotheses and guidance for further research on intergovernmental management in networked settings.

The evidence is clear that managerial networking, managerial quality, and selected stabilizing features (most systematically, personnel stability) contribute positively to program performance, at least for many measures associated with education in Texas. The evidence is also overwhelming that nonlinear interactions among structure, management, and environmental forces are commonplace in the world of networked public programs.

Further, discussions of networks and networking can benefit from more conceptual clarity.
In particular, the networking behavior of managers (and others) is not the same thing as is the structural interdependence that often binds elements of networks together. Our model helps to elucidate this distinction by labeling the behavioral aspect as a component of management – $M_2$ – and the structural part as one aspect of the environmental vector – $X_i$. We have measured these separately; in fact, we have tried to tap the latter in two ways regarding the intergovernmental fiscal interdependence of school districts and sought to explore how these are related. While managers may do a lot of networking in either high or low-dependence settings, their efforts pay off more when the structural environment reflects more reliance on external resources. Yet when managers face dependencies from several directions, their networking efforts are less effective than when they can concentrate their efforts on limited sources. Behavioral networking helps, but it helps more in certain kinds of networks; and the intergovernmental structure is part of the explanation.

Rather than treating stability as an enemy of networks and networking, and the converse, this study shows that in intergovernmental settings, some kinds of stability may actually be a help or precondition to more effective networked action. When school districts operate in more fiscally interdependent and complex settings, managerial and personnel stability seem to provide greater contributions to more effective performance. Stability as a platform for risk-taking, entrepreneurial action in networks: this idea deserves further careful exploration, especially as governance systems expand and multilevel intergovernmental arrays are increasingly developed. How to deliver performance in such settings becomes a critical issue, and the findings here suggest that certain subtleties may be part of the answer.

Our findings about managerial quality also deserve mention and are related to this theme.
Quality matters, but not the same way and to the same extent in all settings. Finding and retaining first-rate managers clearly pays off in performance; the analyses reported here indicate support for this point. In the more interdependent and more complicatedly networked intergovernmental contexts, however, the impact of good managers, ceteris paribus, is somewhat less. A number of implications might flow from this finding, especially if further support is found in other settings and other policy fields.

Rather than tease these out in detail here, however, we end by emphasizing some of the tasks yet to accomplish. The general model of public management continues to show promise, and the role of management, directly (networking, quality) and indirectly (in the recruitment and retention patterns of personnel), is clearly a crucial feature of successful performance for public education in Texas. The complex set of managerial influences deserves analysis in other places, other policy sectors, and other countries. Additional dimensions of intergovernmental structure, including those beyond the fiscal, are worth attention as well. Other stabilizing forces should also be explored. Finally, the tradeoff between internal and network-oriented aspects of public management have been omitted in this study but eventually must be examined. So while the results here are complex and promising, they point toward still more puzzles and should encourage still more research.
References


Table 1. Management and the Dependence on State Aid

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<td>State Aid</td>
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All equations control for teachers’ salaries, instructional funding, percent black students, percent Latino students, percent poor students, class size, teacher experience, noncertified teachers, and individual year dummy variables.

Numbers in parentheses are standard errors.

*Not significant, .10 level one tailed test
### Table 2. Management and Dependence on State Aid II

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N: 1226 1214 1246 1212

All equations control for teachers’ salaries, instructional funding, percent black students, percent Latino students, percent poor students, class size, teacher experience, noncertified teachers, and individual year dummy variables.

Numbers in parentheses are standard errors.

*Not significant, .10 level one tailed test
Table 3. Management and Dependence on State Aid: College Aspirations Indicators

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<td>1216</td>
<td>1138</td>
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</tbody>
</table>

All equations control for teachers’ salaries, instructional funding, percent black students, percent Latino students, percent poor students, class size, teacher experience, noncertified teachers, and individual year dummy variables.

Numbers in parentheses are standard errors.

*Not significant, .10 level one tailed test
Table 4. Management and the State Aid: Low End Indicators

<table>
<thead>
<tr>
<th></th>
<th>Attendance</th>
<th></th>
<th>Dropouts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State Aid</td>
<td>State Aid</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Networking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.007*</td>
<td>-.042</td>
<td>-.080</td>
<td>-.007*</td>
</tr>
<tr>
<td></td>
<td>(.021)</td>
<td>(.023)</td>
<td>(.031)</td>
<td>(.029)</td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.064</td>
<td>.061</td>
<td>- .108</td>
<td>-.099</td>
</tr>
<tr>
<td></td>
<td>(.024)</td>
<td>(.024)</td>
<td>(.036)</td>
<td>(.031)</td>
</tr>
<tr>
<td>Employee Stability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.017</td>
<td>.004*</td>
<td>- .006*</td>
<td>.004*</td>
</tr>
<tr>
<td></td>
<td>(.003)</td>
<td>(.004)</td>
<td>(.005)</td>
<td>(.005)</td>
</tr>
<tr>
<td>R-squared</td>
<td>.29</td>
<td>.23</td>
<td>.16</td>
<td>.20</td>
</tr>
<tr>
<td>N</td>
<td>1246</td>
<td>1223</td>
<td>1246</td>
<td>1203</td>
</tr>
</tbody>
</table>

All equations control for teachers’ salaries, instructional funding, percent black students, percent Latino students, percent poor students, class size, teacher experience, noncertified teachers, and individual year dummy variables.

Numbers in parentheses are standard errors.

*Not significant, .10 level one tailed test
Table 5. Management and Funding Diversity

<table>
<thead>
<tr>
<th>Diversity</th>
<th>All Students</th>
<th>Black Students</th>
<th>Latino Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Networking</td>
<td>.586</td>
<td>.912</td>
<td>.111*</td>
</tr>
<tr>
<td></td>
<td>(.196)</td>
<td>(.229)</td>
<td>(.447)</td>
</tr>
<tr>
<td>Quality</td>
<td>.567</td>
<td>1.144</td>
<td>-.591*</td>
</tr>
<tr>
<td></td>
<td>(.233)</td>
<td>(.231)</td>
<td>(.488)</td>
</tr>
<tr>
<td>Employee</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stability</td>
<td>.159</td>
<td>.132</td>
<td>.487</td>
</tr>
<tr>
<td></td>
<td>(.038)</td>
<td>(.033)</td>
<td>(.105)</td>
</tr>
<tr>
<td>R-squared</td>
<td>.63</td>
<td>.58</td>
<td>.44</td>
</tr>
</tbody>
</table>

| N         | 1279        | 1220           | 865            | 681            | 1185           | 1095           |

All equations control for teachers’ salaries, instructional funding, percent black students, percent Latino students, percent poor students, class size, teacher experience, noncertified teachers, and individual year dummy variables.

Numbers in parentheses are standard errors.

*Not significant, .10 level one tailed test
Table 6. Management and Funding Diversity II

<table>
<thead>
<tr>
<th></th>
<th>Anglo Students</th>
<th></th>
<th>Low Income Students</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diversity</td>
<td></td>
<td>Diversity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Networking</td>
<td>.514</td>
<td>1.112</td>
<td>.058*</td>
<td>0.685</td>
</tr>
<tr>
<td></td>
<td>(.200)</td>
<td>(.224)</td>
<td>(.246)</td>
<td>(.294)</td>
</tr>
<tr>
<td>Quality</td>
<td>.635</td>
<td>.920</td>
<td>.679</td>
<td>1.052</td>
</tr>
<tr>
<td></td>
<td>(.238)</td>
<td>(.226)</td>
<td>(.293)</td>
<td>(.298)</td>
</tr>
<tr>
<td>Employee Stability</td>
<td>.137</td>
<td>.142</td>
<td>.141</td>
<td>.135</td>
</tr>
<tr>
<td></td>
<td>(.038)</td>
<td>(.033)</td>
<td>(.047)</td>
<td>(.044)</td>
</tr>
<tr>
<td>Management</td>
<td>.47</td>
<td>.42</td>
<td>.57</td>
<td>.45</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>N</td>
<td>1226</td>
<td>1199</td>
<td>1278</td>
<td>1209</td>
</tr>
</tbody>
</table>

All equations control for teachers’ salaries, instructional funding, percent black students, percent Latino students, percent poor students, class size, teacher experience, noncertified teachers, and individual year dummy variables.

Numbers in parentheses are standard errors.

*Not significant, .10 level one tailed test
### Table 7. Management and Funding Diversity:  
College Aspirations Indicators

<table>
<thead>
<tr>
<th></th>
<th>ACT Scores</th>
<th></th>
<th>SAT Scores</th>
<th></th>
<th>Above 1110</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Diversity</td>
<td>Diversity</td>
<td>Diversity</td>
<td>Diversity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Networking</td>
<td>-0.009*</td>
<td>0.121</td>
<td>4.86</td>
<td>1.33*</td>
<td>-0.060*</td>
<td>0.906</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>(0.042)</td>
<td>(1.79)</td>
<td>(2.45)</td>
<td>(0.233)</td>
<td>(0.331)</td>
</tr>
<tr>
<td>Quality</td>
<td>0.094</td>
<td>0.094</td>
<td>2.66*</td>
<td>4.26</td>
<td>1.067</td>
<td>0.495</td>
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<tr>
<td></td>
<td>(0.042)</td>
<td>(0.042)</td>
<td>(2.10)</td>
<td>(2.44)</td>
<td>(0.281)</td>
<td>(0.337)</td>
</tr>
<tr>
<td>Employee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stability</td>
<td>0.000*</td>
<td>-0.009</td>
<td>0.57</td>
<td>1.26</td>
<td>0.038*</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.007)</td>
<td>(0.42)</td>
<td>(0.43)</td>
<td>(0.047)</td>
<td>(0.052)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.29</td>
<td>0.45</td>
<td>0.51</td>
<td>0.50</td>
<td>0.31</td>
<td>0.31</td>
</tr>
<tr>
<td>N</td>
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<td>1046</td>
<td>1005</td>
<td>805</td>
<td>1238</td>
<td>1145</td>
</tr>
</tbody>
</table>

All equations control for teachers’ salaries, instructional funding, percent black students, percent Latino students, percent poor students, class size, teacher experience, noncertified teachers, and individual year dummy variables.

Numbers in parentheses are standard errors.

*Not significant, .10 level one tailed test
Table 8. Management and the State Aid:  
Low End Indicators

<table>
<thead>
<tr>
<th></th>
<th>Attendance</th>
<th></th>
<th>Dropouts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Network</td>
<td>−.026</td>
<td>.037</td>
<td>−.062</td>
<td>−.013*</td>
</tr>
<tr>
<td></td>
<td>(.019)</td>
<td>(.023)</td>
<td>(.029)</td>
<td>(.030)</td>
</tr>
<tr>
<td>Quality</td>
<td>.033</td>
<td>.072</td>
<td>−.100</td>
<td>−.078</td>
</tr>
<tr>
<td></td>
<td>(.023)</td>
<td>(.024)</td>
<td>(.034)</td>
<td>(.031)</td>
</tr>
<tr>
<td>Employee Stability</td>
<td>.011*</td>
<td>.014</td>
<td>.003*</td>
<td>−.004*</td>
</tr>
<tr>
<td></td>
<td>(.004)</td>
<td>(.003)</td>
<td>(.006)</td>
<td>(.005)</td>
</tr>
<tr>
<td>R-squared</td>
<td>.29</td>
<td>.23</td>
<td>.20</td>
<td>.15</td>
</tr>
<tr>
<td>N</td>
<td>1279</td>
<td>1220</td>
<td>1277</td>
<td>1202</td>
</tr>
</tbody>
</table>

All equations control for teachers’ salaries, instructional funding, percent black students, percent Latino students, percent poor students, class size, teacher experience, noncertified teachers, and individual year dummy variables.

Numbers in parentheses are standard errors.

*Not significant, .10 level one tailed test
### Table 9. Summary of Results

**State Aid**

Comparison of slopes for districts with a great deal of state aid with those with less aid. Figures are which slope is larger. Neither is coded if neither coefficient is significant or if they are equal. Median splits on all including federal aid.

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Low</th>
<th>Neither</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networking</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Quality</td>
<td>3</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Teacher S</td>
<td>7</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Management S</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 10. Summary of Results: Funding Diversity

Comparison of Slopes for Districts with a great deal of funding diversity with those with less aid. Figures are which slope is larger. Neither is coded if neither coefficient is significant or if they are equal. Median splits on all including federal aid.

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Low</th>
<th>Neither</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networking</td>
<td>2</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Quality</td>
<td>2</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Teacher S</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Management S</td>
<td>7</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>