

How governance of K-12 education influences policy outputs and student outcomes in the United States

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ABSTRACT: Even though K-12 education policy has become an increasingly salient topic in the United States, few individuals understand the diverse arrangements states have devised to govern America's schools. Describing that variability and then using it to explain student academic success and state policy production is this paper's empirical goal. That focus provides a new test of institutional theories of executive power in policy networks, which predict that more powerful executives in less fragmented networks are likely to produce desirable outputs and outcomes. The results strongly suggest that states perform better when governors are empowered to appoint leaders of state education agencies, but that performance wanes if governors can appoint agency leaders and members of state education boards. The results are more mixed regarding education finances, where fragmentation has inconsistent impacts on student academic success, but does appear to attenuate effective policy production.

Presented at the Annual Meeting of the American Political Science Association, August 31 to September 3, 2006 in Philadelphia, PA. I owe many thanks to Diane O'Hara of the William and Mary Class of 2005, David Kysilko and David Griffith at the National Association of State Boards of Education, David Shreve and Kae Warnock at the National Conference of State Legislatures, and audiences at Brown University and the Government Accountability Office.

Political scientists have spent many hours assessing how government institutions can influence policy outputs and substantive policy outcomes. In studies of American politics, much institutional work has focused on the national government, and especially relationships between presidents, Congress, and administrative agencies.¹ That is true even though scholars note that the American states are diverse and understudied sites for improving understandings of how and under what conditions government institutions are likely to produce desirable results (Erikson, Wright, and McIver 1993; Gray and Jacob 1996; Squire and Hamm 2005). Seizing on that state diversity, this paper examines how variation in state governance of K-12 education can influence student academic outcomes and education policy outputs.

Nearly all states involve four state-level institutional actors in developing and executing education policy: governors, state legislatures, state education agencies (SEAs), and state boards of education.² Further, state education finance systems use revenues from federal, state, and local sources. However, the formal relationships that exist between institutions and the mix of revenue streams vary tremendously across the states. Describing that variability and then using it to explain student academic success and state policy production is the empirical goal of this paper. That focus provides a new test of institutional theories of executive power in policy networks.

Authors often argue that networks involving many institutional locales can more creatively and effectively address pressing public problems (Osborne and Gaebler 1992; Goldsmith and Eggers 2004). Multiple institutions may leverage more expertise, but they also supply interested parties with several potential venues where they can bend policy to suit their particular interests, or derail policy initiatives altogether (Chubb and Peterson 1988; Baumgartner and Jones 1993; O'Toole and Meier 2004). Further, policies whose success depends on networks of loosely connected public agencies can be difficult for chief executives to oversee (Lewis 2003). Public administrators also face implementation challenges when they must coordinate work across agency boundaries (Wilson 1989; Moore 1995) or respond to multiple principals in different institutional locales (Miller 1992; Bendor, Glazer, and Hammond 2001).

If institutional theorists are correct, then one would expect centralized policymaking environments offering chief executives much latitude while limiting the influence of other outside groups to produce better policy outputs and outcomes than more fragmented environments. This paper tests that general proposition by offering a new analysis of the impact that state education governance has on student outcomes and policy quality. Such an analysis is long overdue in light of scholarly advances in institutional and network theory (Moe 1984; Moe 1990; Miller 1992; Shepsle and Weingast 1995; O'Toole 2000; O'Toole and Meier 2000; Howell 2003; Lewis 2003), the rising importance of education on the national agenda (Manna 2006), long-standing debates over appropriate models of education governance (Epstein 2004),

¹ Examples of this tendency are easy to find. As one case, consider the recent, and truly outstanding, collection of works in the three volume set on the "institutions of American democracy" published by the Annenberg Foundation and Oxford University Press. With extremely rare exceptions, the 53 chapters in those works examine executive, legislative, and judicial institutions but focus entirely on the national government (Hall and McGuire 2005; Quirk and Binder 2005; Aberbach and Peterson 2005).

² Readers should not confuse state boards with "school boards." The latter are local institutions that govern individual school districts.

and the urging of political scientists who foresaw the importance of the states' role in education over four decades ago (Masters, Salisbury, and Eliot 1964). In fact, the last in-depth study of state education governance appeared in the 1970s (Campbell and Mazzone 1976).³

My empirical findings strongly suggest that states perform better when governors are empowered to appoint leaders of SEAs, but that performance wanes if governors can appoint agency leaders and board members. The results are more mixed regarding education finances, where fragmentation has inconsistent impacts on student academic success, but does appear to attenuate effective policy production. Theoretically, those results show that less network fragmentation produces benefits up to a point and in certain contexts. The following sections develop those findings. The paper begins with a descriptive overview of state education governance in the United States.

State governance of K-12 education

A common saying holds that education in the United States is a national concern, a state responsibility, and a local function. Even though state constitutions empower all states to establish and maintain free systems of public education, the states vary in how they govern these systems. Generally speaking, governance is a broad concept that can embrace many things including “regimes of laws, administrative rules, judicial rulings, and practices that constrain, prescribe, and enable government activity, where such activity is broadly defined as the production and delivery of publicly supported goods and services” (Heinrich and Lynn 2000, 3). This paper focuses on the links between state-level institutions that run state education systems, and on the sources of revenue that flow into them. Thus, I conceptualize state education governance as possessing an institutional and a financial dimension.

In terms of state institutions, governors, legislatures, SEAs, and state boards are key actors that develop and implement K-12 education policy. Increasingly in education, governors have become visible policy leaders. Their influence at the first national education summit in 1989 with President George H. W. Bush, and their alliances with business leaders have frequently made them the face that many citizens and public officials associate with state education reforms (Manna 2006). State legislatures also play crucial roles because they pass education laws, appropriate money for schools, and establish state education finance systems (Evans, Murray, and Schwab 1997; Ladd, Sobol, and Hansen 1999). Some state legislatures' recent and vocal criticism of the controversial No Child Left Behind Act (NCLB) means that they, like governors, can also command the spotlight on crucial education issues (Becker and Helderman 2004; Dillon 2005).

On the administrative side of K-12 governance, the chief state school officer plays an important role (Wirt and Kirst 1997). As head of the SEA, chiefs are responsible for the daily functioning of state policy and, importantly, for developing or interpreting state and federal regulations. State boards appear to possess both significant powers but limited influence. Their responsibilities often include controlling state teacher and administrator licensing standards, which essentially outline who can enter the public education field; defining high school

³ Even though researchers have typically neglected state governance of K-12 education, recent empirical work has examined state governance of higher education (Knott and Payne 2004).

graduation requirements; approving state standards and testing systems; and setting rules for school district accreditation (Cohen 1987). Even with these formal powers, several observers have characterized state boards as relatively weak institutions due to the part-time or even voluntary status of most board members, and minimal staff resources they command (Sergiovanni, Burlingame, and Coombs 1987; Wirt and Kirst 1997; Conley 2003).⁴

Since at least the 1970s, state officials have debated how to select state education chiefs and state board members. Governors, as the most recognized state officials and often the people who field complaints about state education performance, have attempted to seize greater institutional control over SEAs and boards. Former Michigan governor John Engler (2002), for example, argued for giving governors power to appoint board members so that “parents and employers can then hold one person accountable for results—the governor. Not eight citizens who are nominated by political party conventions and elected at the bottom of the ballot.” Similarly, former Reagan Secretary of Education Terrell Bell noted in his memoirs how governors often expressed frustrations to him regarding the institutional independence of state education chiefs. The governors often claimed that chiefs were less than forthcoming about the academic performance of their state’s students. According to the governors, without independent information they were “defenseless when their state superintendents and commissioners of education insisted that students in *their* state were above the national average in academic achievement” (Bell 1988, 136).

Table 1 illustrates the diverse ways that states have selected SEA chiefs and board members during the ten-year period from 1997 to 2006.⁵ The data come from annual coding of each state’s arrangement. The first part of the table shows that during this period governors in most states possessed power to appoint board members, but because these members serve staggered terms, typically governors have not appointed entire boards during their tenure. The governors have had fewer opportunities to appoint SEA chiefs; those officials typically gain their posts through board appointments or in state elections. The second part of Table 1 presents some of the combinations that ensue when one interacts the selection methods for state education chiefs and board members. The four arrangements in the table capture most states, but some employ different arrangements altogether.

Table 1 about here

Concerning education finances, the other dimension of governance I consider, even though education is a state responsibility, state, local, and federal sources finance K-12 education across the United States. In the aggregate, states contribute roughly 49 percent, local governments about 42 percent, and between 7 and 8 percent come from federal sources. Annual data on federal and state finances from the 1986-87 to 2002-03 school years appear in Figure 1.⁶

⁴ One recent study of board activity found that boards spend most of their time on "administrivia" and "ceremonial duties," rather than on the policy strategy activities that are supposed to drive their workloads (NASBE Study Group on Education Governance 1996, 14).

⁵ Many thanks to David Kysilko at the National Association of State Boards of Education for providing the raw data used to compile this table.

⁶ Data on state and federal finances were downloaded from the US Department of Education’s Common Core of Data, and are available at <http://nces.ed.gov/ccd/bat/> (accessed July 7, 2006). For each data point, summing the X- and Y-axis values and subtracting that total from 100 will generate the percent of K-12 revenues from local sources.

In this figure, each data point represents an individual state. The general pattern emerging over this 17 year period reveals much variability in how states finance their K-12 education systems. In general, and not surprisingly, federal contributions are much smaller than state ones. Federal and state revenues vary, though, with some states in some years relying on the federal government for as little as 2.6 percent but others as much as 17.7 percent of their revenues. Even more variability exists across the state revenue measure, with those amounts ranging from 5.9 to 90.3 percent.

Figure 1 about here

How state education systems are financed has important governance implications. Many states have reformed their finance systems and centralized funding to achieve more equitable results across state school districts (Evans, Murray, and Schwab 1997; Ladd, Sobol, and Hansen 1999). That has attenuated local district power and emboldened state policymakers with greater responsibilities and influence. Regarding federal education revenues, state legislators and governors alike have complained about what they perceive as the distorting effects that federal funding can have on state efforts to improve education (Hill 2000; Wirt and Kirst 1997; McDermott and Jensen 2005). Typically, federal dollars come with many strings attached and, which many observers do not recognize, are primarily sent directly to SEAs, thus bypassing the normal state budget process. That can limit gubernatorial and legislative control, creating further potential animosity between these leaders and SEA chiefs.

Factors affecting performance in networks of public institutions

A focus on institutional networks is a useful theoretical angle for studying state education governance. In general, policy networks involve two components: nodes, which represent particular institutional or organizational locales, and links, which symbolize lines of hierarchical authority or mutual communications between nodes. Conceptually, network arrangements are particularly flexible because they incorporate both kinds of relationships. O'Toole (2000, 26) notes this point in explaining "It is not so much that networks have *replaced* hierarchies but more that standard hierarchical arrays, or parts of them, have often been enmeshed in lattices of complex network arrangements." Thus, a governor who appoints a state education chief and another governor who serves alongside an independently-elected chief both participate in networks, even though the relationships between governor and chief in both states are dramatically different.

The research literature often describes policy networks as involving public, private, and non-profit actors (Milward and Provan 2000; Salamon 2000). Many networks contain all those groups, but analytically one can gain useful leverage by considering networks that exist within government itself. Some authors call this arrangement "joined up government," which exists when actors across different governmental institutions work together to address policy challenges (Goldsmith and Eggers, 2004). My empirical analysis follows that approach by focusing on government actors and institutions at the state, federal, and, by implication but not direct measurement, the local level as well.

As I noted in the introduction, institutional theorists would predict that fragmented networks are more likely to undermine policy outputs and outcomes than more centralized ones

that lodge much authority in a chief executive. What theory, research, and intuition support that basic claim? Three issues are especially relevant and include coordination challenges, political accountability, and the potential for network cooptation. The rest of this section considers these topics.

Coordination challenges are the first issue. When clear lines of authority link different network nodes to each other, it is more likely that policy principals will be able to control and transmit clear messages to their agents (Miller 1992; Bendor, Glazer, and Hammond 2001). Conversely, when authority is more dispersed, network actors can have difficulty knowing who can command resources, personnel, and public authority to address social problems. Also, when different institutions contribute budgetary resources to a collective effort, institutional leaders will likely demand a say in how their particular contribution is used. Even when different network actors may agree on fundamental goals, the added transaction costs associated with uncertainties about wielding power can hinder their ability to act effectively (Wilson 1989). Those coordination problems expand when network actors disagree on goals or specific strategies. Where joined up government is needed, disagreement can foster bunkered mentalities that encourage institutional actors to stymie action altogether (Baumgartner and Jones 1993).

Political accountability is a second factor related to institutional performance in joined up government. In principle, a person is held accountable for performance when she properly receives praise for success and reprimands or interventions for failure. Because fragmented networks disperse authority among different institutions, it can be hard for citizens, the media, and people in government to properly hold individuals accountable for performance (Posner 2002; Kettl 1997; Wilson 1989; Goldsmith and Eggers, 2004). In certain relationships, for example, agents who serve multiple principals can strategically play one master off the another, which complicates the accountability challenge even more (Bendor, Glazer, and Hammond 2001). Chief executives, such as presidents, governors, and mayors are particularly attuned to accountability challenges because citizens typically blame them for failures, even when these officials may lack the institutional resources to succeed. That leads chief executives to crave more centralized, insulated control within policy networks. Lewis (2003, 4) describes this dynamic by noting that “Presidents seek control of the bureaucracy not only to influence public policy and meet public expectations but also because presidents are held accountable for their performance as managers. ... Agencies that are insulated from their control, and the increasing bureaucratic fragmentation that results from that insulation, significantly constrain the president’s ability to manage the bureaucracy and satisfy public expectations.”⁷

The potential for cooptation is a final reason to expect that more fragmented networks of institutions will struggle to perform well. Cooptation can occur when policy entrepreneurs or savvy interest groups leverage fragmented networks to promote their own narrow policy interests (O’Toole and Meier 2004). Chubb and Moe (1988; 1990) have argued that education represents an ideal arena for cooptation, given that public schools often become overloaded with demands foisted upon them by policymakers responding to narrow concerns of particular groups. Recognizing this potential, in education and other areas groups often shop across network venues to find avenues for influencing policy development or locking in their successes (Baumgartner

⁷ To emphasize this point, Lewis (2003, 26) notes later that “all modern presidents have attempted to prevent control problems by opposing agency designs that will limit their control or confuse lines of accountability.”

and Jones 1993; Chubb and Peterson 1988). Notably, there is usually nothing sinister or necessarily illegal in this group behavior. It simply represents the predictable efforts of organized interests working to achieve their stated goals (Olson 1965; Baumgartner and Leech 1998).

Hypotheses relating state education governance to performance

The challenges associated with coordination, political accountability, and cooptation in fragmented networks are highly relevant for studying state governance of K-12 education. Coordination can be difficult because many institutions and levels of government claim some authority over American schools (Epstein 2004; Conley 2003). As the earlier quotes from Governor Engler and Secretary Bell illustrate, rightly or wrongly governors have often found themselves held accountable for educational results. As Lewis (2003) has discovered for presidents, that concern has led governors to crave more centralized control over SEAs and state boards (Elmore and Fuhrman 1994). Finally, as far back as the 1960s, political scientists have noted the potential for powerful interests to leverage state institutions to achieve their own goals in education (Masters, Salisbury, and Eliot 1964).

Thus, one can safely say that governance of public education in the American states is characterized by fragmented networks that involve several institutional actors at the state level and elsewhere (Chubb and Moe 1988; Wirt and Kirst 1997; Conley 2003; Epstein 2004). However, as Table 1 and Figure 1 collectively illustrate, some states possess more fragmented networks than others. That variability and the theoretical expectations described in the previous section suggest the following hypotheses about state education governance and performance.

The first two hypotheses consider the governor's institutional relationship to SEAs and state boards. Hypothesis 1 is that states with greater gubernatorial control over SEAs and state boards will produce more desirable student outcomes than states where governors have less control. Hypothesis 2 is that states with greater gubernatorial control over SEAs and state boards will produce more reformist policy outputs than states where governors have less control. Table 1 suggests several other relationships amenable to testing. In these hypotheses I focus on the governor's role. That enables me to more directly consider both the theoretical literature's claim that strong chief executives should enjoy greater success, and the hitherto untested claims of the governors that echo this prediction.

The next two hypotheses focus on party politics and the institutional relationships between governors and state legislatures. Hypothesis 3 is that states where the governor and legislature share the same party are likely to produce more desirable student outcomes than states where party control is divided. Hypothesis 4 is that states where the governor and legislature share the same party are likely to produce more reformist policy outputs than states where party control is divided. I have not discussed partisanship in previous pages, but, generally speaking the logic of these hypotheses follows my earlier discussion of coordination challenges. The literature on divided government is not entirely consistent, but several scholars agree that substantive policymaking becomes more difficult when divided government exists (Brady 1993; Coleman, 1999; Howell Adler, Cameron, and Riemann 2000; Bowling and Ferguson 2001;

Lewis 2003).⁸ Party division is also another marker of a more fragmented network, which I have argued should hinder the production of desirable policy outputs and outcomes.

The final hypotheses focus on the financial dimensions of governance. Hypothesis 5 is that states with more control over the source K-12 revenues will produce more desirable student outcomes than states that possess less control. Hypothesis 6 is that states with more control over the source of K-12 revenues will produce more reformist policy outputs than states that possess less control. In colloquial terms, these hypotheses examine what some policymakers call the golden rule, which states “he who has the gold makes the rules.” When more actors contribute funds to finance a state’s schools, that expands the network of institutions likely to press for control, further fragmenting the state’s governance system.

Data and methods

I test these hypotheses using dependent variables that capture state-level student outcomes and others that capture state policy outputs. The student outcomes are state performance on the 4th and 8th grade National Assessment of Educational Progress (NAEP) tests in reading and math. Because results on state-developed proficiency tests are not always comparable, NAEP is a superior metric because it is the only common test administered to representative samples of students in each state.⁹ For 4th and 8th grade, I analyze the percent of all students and the percent of students eligible for free or reduced cost lunch (a proxy for poverty status) scoring proficient or advanced on the NAEP reading and math test. The focus on lunch-eligible students is important because of the growing recognition that achievement can vary tremendously among subgroups of students.¹⁰ Finally, the NAEP is not administered every year in every subject, and not all states were required to participate until the 2003 administration of the test. I analyze reading results from 1998, 2002, and 2003 and math results from 2000 and 2003 using least squares regression with robust standard errors clustered by state to account for within-state correlation across observations.

The two policy outputs variables come from annual ratings of state education policy published by *Education Week* in its Quality Counts series.¹¹ One measure assesses the quality of the states' standards and accountability systems, and the other assesses the quality of state policy

⁸ It is worth noting Coleman’s (1999) caution that one should consider more nuanced measures of government division that account for chamber and executive party. Clarner (2003) raises similar points in the state context, specifically. I do not explore those nuances, but one could apply them here as well. Further, recall from Table 1 that some state education chiefs and state board members run in elections, some partisan, and that partisan governors can often appoint these individuals to their posts. I do not examine those issues here, but they suggest an even more complex partisan reality for unified or divided government at the state level, which involves other institutions beyond legislatures and governors’ offices.

⁹ Results from SAT or ACT tests are also a possible cross-state metric. The NAEP is still preferable over these other tests given the unrepresentative sample of test takers in the college entrance exams and the regional preferences that often exist for one of these two tests. Some state colleges do not require both tests for admission, so students often take one but not the other. See Mintrom and Vergari (1998) for an application that addresses these comparability problems with the SAT and ACT.

¹⁰ For example, the No Child Left Behind Act recognizes this by requiring schools, school districts, and states to report student test score data disaggregated by key student characteristics, such as race, ethnicity, poverty status, and whether students are learning English as a second language.

¹¹ *Education Week* is the leading news weekly covering K-12 education policy in the United States. Quality Counts data are available on line at <http://www.edweek.org> (downloaded July 2004).

concerning teachers. Both measures are indices that range from 0 (low quality) to 100 (high quality). The standards and accountability index includes elements such as whether the state has developed standards in core subjects, the nature of state assessment systems, and the methods states use to hold schools and districts accountable for performance. The teacher policy variable measures the rigor of the states' teacher preparation and licensing requirements, the strictness with which states require teachers to work in their fields of study, and opportunities for professional support and training. I analyze each measure from 1997 to 2004 and, as with the NAEP variables, use least squares regression with robust standard errors clustered by state.

The independent variables fall into three categories. The first, which contains four dummy variables, captures the institutional dimension of governance. These measures indicate whether the governor appoints members of the state board, whether the governor appoints the chief state school officer, whether the governor appoints both board members and chiefs, and whether the state's governor and legislature share the same party. All measures are coded 1 if yes and 0 otherwise. If strong executives are associated with superior student outcomes and high-quality policy outputs, then the regression coefficients on the first three variables should be positive. Similarly, if unified governments tend to minimize transaction costs and coordination problems, they should also produce better outcomes and outputs.

The second category includes two variables examining the financial dimension of governance. One is the percent of education revenues in the state coming from state sources and the other is the percent of education revenues in the state coming from federal sources.¹² If less fragmented networks are associated with higher student performance and higher quality policy, the regression coefficients should be positive for the state measure and negative for the federal one. One substantive result of greater state control of K-12 revenues is that it reduces the potential impact of local districts and the federal government in the state education system. That state control creates a less fragmented network. Conversely, greater reliance on federal revenues expands the network by providing leverage for national elected officials and the interest groups that lobby them to influence how states govern their education systems.

The final category are two control measures that address the racial and economic conditions of each state's population. One is the percent of white state residents and the other is the percent of state residents in poverty.¹³ Much research has found that white students and more affluent students tend to outperform racial minorities and economically disadvantaged students on standardized tests (Coleman 1966; Jencks and Phillips 1998). In the NAEP models, then, the race measure should be positively signed and the poverty measure negatively signed. The potential effects of race and poverty on the policy quality variables seem less clear. It may be that states with greater racial diversity and greater poverty prompt additional groups to advocate for minority and poor students' interests. That would suggest a more challenging environment for policymakers to coordinate and manage.

¹² These data come from US Department of Education's Common Core of Data, and are available at <http://nces.ed.gov/ccd/bat/> (downloaded July 2006).

¹³ Initially, I considered including student measures of race and poverty status, for the latter, in particular, the percent of students qualifying for free or reduced price lunch. However, not all states reported data on lunch eligibility to the US Department of Education to include in the Common Core of Data. The Common Core does include student racial characteristics, but to maintain consistency in measuring these population figures, I decided to use both measures of overall state population from the US Census Bureau.

Impacts of state governance on student outcomes and policy outputs

Turning first to the student outcomes measures, Tables 2 and 3 present models predicting 4th and 8th grade achievement, respectively. The institutional variables lend qualified support to the theoretical expectation that states with strong chief executives in less fragmented networks are likely to produce more desirable outcomes. Across all eight models in Tables 2 and 3, states with governors possessing power to appoint board members do not perform any better or worse than states that do not grant governors that power. The signs and magnitudes of the coefficients are inconsistent, and none achieve statistical significance at standard levels.

The results show that governors who can appoint state education chiefs perform better—generally much better—than states where chiefs gain their posts by other means. In six of the eight models the results on this variable are statistically significant at standard levels, and the substantive impact is large. For example, regarding 4th grade reading for all students, the regression model predicts a 4.48 ($p < .05$) percentage point advantage for states where governors appoint SEA chiefs but not board members. That result also holds for lunch-eligible students; here the model predicts a 5.53 ($p < .01$) percentage point advantage in reading where governors appoint SEA chiefs but not board members. Those results strongly support the expectation that executives who possess more direct authority over administrative agencies are likely to produce more desirable results.

The advantages of executive power are not absolute, however. The models also consistently show that concentrating additional institutional authority in the governor's hands is associated with lower student performance. The variable indicating whether governors can appoint both chiefs and boards is negatively signed in all models and statistically significant (at $p < .10$ or better) in six of eight instances. Assessing the substantive impact requires one to consider the collective results on all three variables involving gubernatorial appointment power over boards or chiefs. Using the 8th grade math results for all students to illustrate the effect, in states where governors can appoint boards and chiefs, the model predicts approximately a 1 percentage point decline in students achieving at proficient or advanced levels ($-0.67 + 7.76 + -8.05 = -0.96$). Compare that to states where governors appoint chiefs only, but not boards, where the model predicts a 7.76 ($p < .01$) percentage point advantage.

The other substantive variables of interest have relatively limited impact on 4th and 8th grade achievement. The unified government measure is positive and statistically significant in the 8th grade reading model for lunch-eligible students, as predicted. However, that variable fails to achieve statistical significance in the other seven models. The state revenues variable behaves similarly; it is statistically insignificant in seven models. The one exception is the 4th grade reading model for lunch-eligible students. The impact is positive, as predicted, but substantively small; a 1 percentage point increase in state revenues is associated with only a 0.04 ($p < .10$) percentage point increase in student performance.

The results on the federal revenues variable at least partially challenge critics' claims that federal intervention necessarily distorts state conditions and undermines student performance. When considering results for all 4th and 8th graders, increased reliance on federal funding is associated with lower 4th grade reading performance, which the critics and my predictions suggest. The model predicts that a 1 percentage point increase in reliance on federal funding will

produce a 0.39 ($p < .10$) percentage point decline in achievement. The variable is statistically insignificant in the other three models involving all students. Conversely, federal funding is associated with improved performance for lunch-eligible students. The regression coefficients are positively signed in all four models, and statistically significant in three. The largest effect is for 8th grade math, where a 1 percentage point increase in reliance on federal funding predicts a 0.78 ($p < .01$) percentage point increase for lunch-eligible students achieving at proficient or advanced levels. Substantively, these results suggest that federal funding has marginally negative impacts on students overall, which institutional theories of governance would predict, but it is associated with positive results for disadvantaged students, the primary populations that federal policy is designed to address.

Table 4 reports models predicting the quality of state standards and accountability policy, and the quality of state teacher policy. Here there is lukewarm support for the expectation that more fragmented systems of governance perform worse than more centralized ones. Most of the institutional variables fail to achieve statistical significance. But as predicted, providing the governor with power to appoint state board members does have a statistically significant and positive effect on the quality of state teacher policy. The model predicts states where governors possess that power to score 3.33 ($p < .05$) points higher on the teacher quality index. In a puzzling result, the unified government measure is negatively signed in both models, and is statistically significant in the teacher quality model (-2.05 , $p < .05$).

More consistent support for the hypotheses emerge with the revenues measures. While the percent of state revenues does not have a discernible effect statistically (nor substantively given the small model coefficients), the federal revenues measure is associated with lower quality policy on standards and accountability and teachers. For every one percentage point increase in state reliance on federal revenues, the models predict declines of the index score by 1.76 for the quality of standards and accountability policy and a by 1.35 for teacher policy (both $p < .01$). That bolsters critics claims that it may be more difficult for states to govern their education systems and enact high-quality policy when federal intervention becomes more pervasive.

Finally, and interestingly, the controls for race and poverty also help to predict policy quality. As the percent of white residents increases, the model predicts a statistically significant decline in the quality of standards and accountability quality (-0.26 , $p < .05$). Conversely, policy quality for standards and accountability and teachers improves as the percent of state residents in poverty increases. A one percentage point increase of each corresponds to a 0.99 and 0.76 increase in the respective indices (both $p < .01$). This may suggest that states with populations more likely to fall behind in reading and math achievement have made the greatest efforts to improve the quality of their policy in these areas.

Implications and discussion

The overall results offer nuanced support for theories that argue strong chief executives and less fragmented policy networks are likely to produce the most desirable results. Certainly, there are several ways to improve the analyses in this paper. The most obvious would be to analyze NAEP data for the full range of years available from 1990 to 2005. Data availability issues on some independent variables have currently prevented me from incorporating all

possible years, but I plan to include them in future work. Another improvement would be to consider more student outcomes measures, beyond NAEP scores, such as graduation rates and participation in college entry exams. A final improvement would be to consider several subcomponents of the Quality Counts indices of state policy quality. It may be that the impact of state institutions and education finances may vary by some of the subcomponents of each index, which the present analysis cannot detect.

Even with those limitations, the paper does provide new contributions to the literature on institutions and policy networks. Most important, perhaps, is the finding from the student outcomes measures that gubernatorial power appears most likely to produce desirable results in institutional arrangements that give governors control over SEA chiefs but not boards. States appear to pay a price in achievement when they centralize too much. That finding suggests that there are some benefits to limiting the governor's reach, but giving a governor a strong hand in appointing the leader of the state education bureaucracy appears to pay dividends. It may be that more independence from governors helps state board members, who are less engaged in day-to-day policy management, to provide more detached, critical, and useful oversight of state education systems.

Results on the financial dimension of governance also suggest some benefits and some costs associated with more fragmented policy networks, especially those involving federal influence. On the student achievement models in Tables 2 and 3, federal funding is generally associated with stronger performance by students in poverty who are eligible for free and reduced cost lunches. Some state critics have argued that federal goading has been necessary to improve state attention to the most needy students. Those benefits of greater federal intervention, though grant money from Washington that the states generally receive based on economic need, appear to outweigh the potential costs of coordination, accountability, and cooptation challenges, at least for economically disadvantaged students.

But increased reliance on federal funds comes at a cost when one considers its relationship to the development of policies affecting all students. Table 4 shows how increased reliance on federal funds tends to be associated with lower quality policies concerning standards and accountability, and teachers. Critics of federal involvement may suggest that those results illustrate the difficulty states face in designing overall systems (not just efforts targeted at certain groups of students) when federal dollars and their accompanying requirements play a larger role in the states. Federal dollars may benefit the disadvantaged, as Tables 3 and 4 tend to show, but when seen alongside the Table 4 results, those funds may complicate the overall policymaking environment, and make it difficult for states to enact more general high-quality policies as they govern their education systems.

Studying the overall impact of state institutions governing education is important for both theoretical and empirical reasons. Theoretically, it reveals new insights about the conditions under which strong chief executives possessing power over other state institutions are likely to produce effective results. Greater control over the bureaucracy, which carries the greatest day-to-day responsibilities for schools, but less over boards seems to be the most desirable arrangement in education policy. It would be interesting to see if that result generalizes to other policy areas.

Empirically, the results also can inform state-level debates over education governance and policy. Governors have craved greater power over SEAs and state boards for at least thirty years now, but published work to date has not tested those claims with quantitative evidence. Further, a focus on institutions takes a step back from other analyses that examine education policy more directly. Put another way, much work has considered the impact of specific state education policies on student results. Do students in states with smaller classes, better qualified teachers, or more rigorous standards do better than students in other situations? Scholars and policy analysts have addressed those questions and others. Leaving specific policies aside, it is still useful to know if broader institutional arrangements also correlate with positive results. With so many policy interventions in education attempting to improve student academic success, it can sometimes be hard to clearly isolate the effects of one or the interaction of several, that are driving observable outcomes.

It would be terrific to know which policy levers contribute to which outcomes, but sometimes that is all but impossible to determine. An alternative perspective, as I have offered here, focuses on the performance of more general institutional environments. That approach parallels Chubb and Moe's (1988; 1990) well-known work on public and private schools. They suggest that policy content is essentially endogenous to the institutional environments that produce them, and therefore a focus on institutions can help reveal which arrangements are likely to produce the most successful students. The unstated assumption is that the best arrangements are likely to produce the most effective policies and, in the end, the most academic success. In extending that logic to the state level, I have shown how substantive student outcomes and policy quality do indeed correlate with particular institutional environments in the states. Those results help to test existing theories of institutions and networks, provide insights for policymakers debating these issues, and leave much room for future substantive work.

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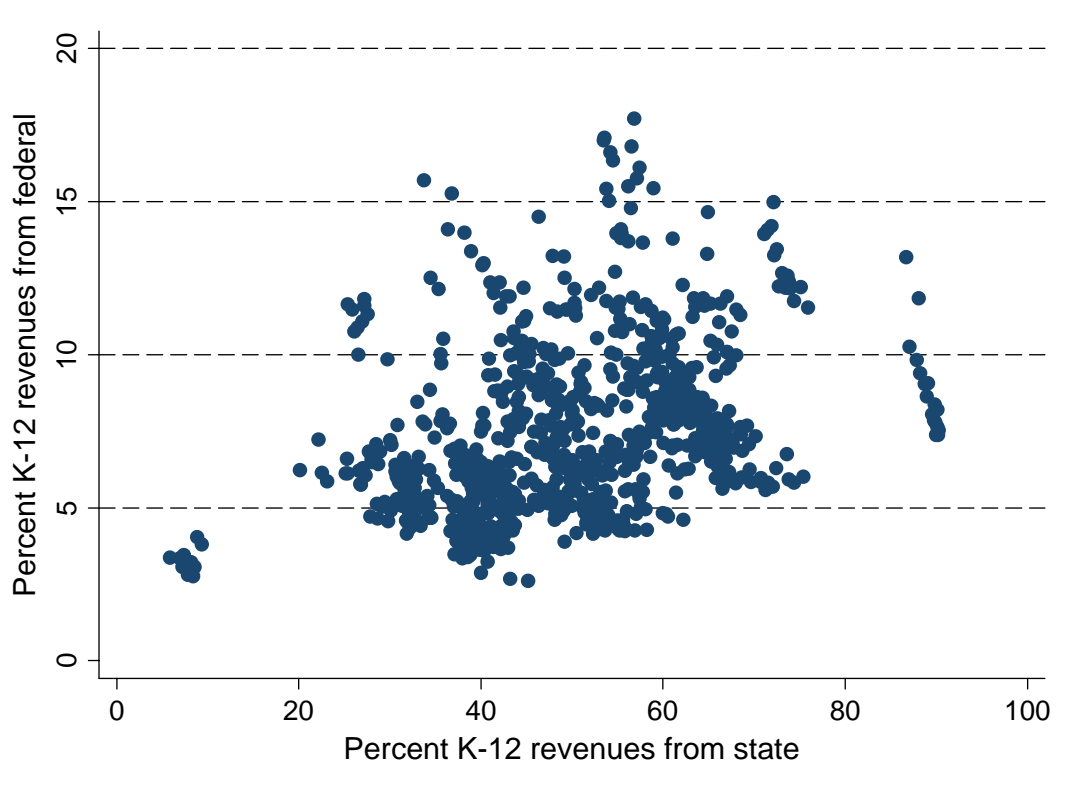
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Table 1. Methods for selecting chief state school officers and state education board members

Variable	Mean	Std. Dev.
Governor appoints board	.71	.46
Board is elected	.20	.40
Governor appoints SEA chief	.21	.41
Board appoints SEA chief	.46	.50
SEA chief is elected	.29	.46
Governor appoints board and SEA chief	.16	.37
Governor appoints board, board appoints SEA chief	.32	.47
Governor appoints board, chief is elected	.23	.42
Board elected, board appoints SEA chief	.16	.37

N=500 for all rows. Measured by state and year from 1997 to 2006. "SEA" stands for state education agency.

Figure 1. State reliance on state and federal revenues for K-12 education



N=848. Each point plots an individual state for a particular year for each school year from 1986-87 to 2002-03.

Table 2. Predicting 4th grade reading and math achievement

	4th math all students	4th reading all students	4th math lunch-elig.	4th reading lunch-elig.
Governor appoints board	-0.41 (1.95)	1.96 (1.48)	-1.26 (1.22)	-0.03 (0.89)
Governor appoints SEA chief	7.08* (2.97)	4.48* (2.00)	4.24 (2.90)	5.53** (1.01)
Governor appoints board and SEA chief	-6.14+ (3.46)	-4.85* (2.30)	-3.00 (3.24)	-5.49** (1.30)
Government is unified	-1.94 (1.55)	-0.34 (0.79)	-0.59 (1.07)	0.59 (0.49)
Percent education revenues from state	-0.05 (0.06)	-0.02 (0.05)	0.02 (0.03)	0.04+ (0.03)
Percent education revenues from federal	0.16 (0.25)	-0.39+ (0.20)	0.55** (0.17)	0.24 (0.15)
Percent white state residents	0.15** (0.04)	0.18** (0.03)	0.15** (0.02)	0.18** (0.02)
Percent state residents in poverty	-1.03** (0.28)	-0.68** (0.17)	-0.35 (0.21)	-0.33* (0.13)
Model constant	29.27** (6.83)	27.42** (5.99)	0.32 (3.26)	1.84 (2.70)
R-square	0.32	0.59	0.28	0.53
Adjusted R-square	0.25	0.56	0.21	0.50
F (all p<.01)	7.87	17.76	9.45	12.80
N	90	132	90	132

Note: +p<.10, *p<.05, **p<.01. The dependent variable for each model is the percent of state students scoring proficient or advanced on the NAEP. Math results are from 2000 and 2003 reading results are from 1998, 2002, and 2003. “Lunch-elig.” refers to students eligible for free or reduced cost lunch, a proxy for students in poverty. “SEA” stands for state education agency. Table reports least squares regression coefficients with robust standard errors, clustered by state, in parenthesis. Models run in Stata SE version 9.

Table 3. Predicting 8th grade reading and math achievement

	8th math all students	8th reading all students	8th math lunch-elig.	8th reading lunch-elig.
Governor appoints board	-0.67 (1.75)	1.46 (1.49)	-1.80 (1.21)	0.01 (1.01)
Governor appoints SEA chief	7.76** (1.61)	5.08* (2.06)	6.77** (1.36)	1.43 (1.95)
Governor appoints board and SEA chief	-8.05** (2.31)	-4.61+ (2.45)	-7.05** (1.89)	-1.27 (2.60)
Government is unified	-0.38 (1.00)	0.22 (0.81)	-0.35 (0.67)	1.30+ (0.66)
Percent education revenues from state	-0.06 (0.05)	-0.02 (0.05)	0.00 (0.03)	0.02 (0.04)
Percent education revenues from federal	0.17 (0.27)	-0.25 (0.20)	0.78** (0.23)	0.38+ (0.22)
Percent white state residents	0.20** (0.04)	0.22** (0.03)	0.19** (0.03)	0.22** (0.03)
Percent state residents in poverty	-1.21** (0.26)	-0.61** (0.21)	-0.67** (0.21)	-0.26 (0.19)
Model constant	27.01** (6.43)	22.98** (5.99)	-0.10 (3.83)	-1.77 (3.20)
R-square	0.55	0.62	0.56	0.52
Adjusted R-square	0.51	0.59	0.51	0.49
F (all p<.01)	25.74	18.17	18.04	11.95
N	89	127	89	127

Note: +p<.10, *p<.05, **p<.01. The dependent variable for each model is the percent of state students scoring proficient or advanced on the NAEP. Math results are from 2000 and 2003 reading results are from 1998, 2002, and 2003. “Lunch-elig.” refers to students eligible for free or reduced cost lunch, a proxy for students in poverty. “SEA” stands for state education agency. Table reports least squares regression coefficients with robust standard errors, clustered by state, in parenthesis. Models run in Stata SE version 9.

Table 4. Predicting the quality of state standards and accountability policy and teacher policy

	Standards and accountability	Teacher
Governor appoints board	2.01 (2.75)	3.33* (1.64)
Governor appoints SEA chief	-3.12 (4.61)	-1.14 (2.33)
Governor appoints board and SEA chief	-1.87 (6.38)	-0.47 (2.77)
Government is unified	-1.94 (2.07)	-2.05* (1.00)
Percent education revenues from state	-0.09 (0.12)	0.03 (0.05)
Percent education revenues from federal	-1.76** (0.38)	-1.35** (0.18)
Percent white state residents	-0.26* (0.12)	-0.04 (0.04)
Percent state residents in poverty	0.99** (0.36)	0.76** (0.17)
Model constant	106.57** (12.52)	75.61** (5.88)
R-square	0.21	0.22
Adjusted R-square	0.19	0.20
F (all p<.01)	5.17	13.68
N	346	350

Note: +p<.10, *p<.05, **p<.01. The dependent variable for each model is the Quality Counts index rating state standards and accountability policy and state teacher policy from high (100) to low (0) quality from 1997 to 2004. "SEA" stands for state education agency. Table reports least squares regression coefficients with robust standard errors, clustered by state, in parenthesis. Models run in Stata SE version 9.