

The Politics of Public College Tuition and State Financial Aid

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Abstract

What explains the different levels of tuition and financial aid observed in the United States? This study hypothesizes that state level political characteristics account for much of the variation observed. Of particular importance are the ideology of state legislators and the relative influence of public and private institutions. Estimates of a simultaneous equation utilizing panel data for forty eight states over sixteen years supports the hypothesis that state political characteristics are associated with the observed differences in tuition and financial aid across states.

For many prospective college students and their families, the issue of tuition and financial aid is paramount in thinking about attending higher education ([Immerwahr, 2000](#)). The concern among the general public about the price of higher education has not gone unnoticed by elected officials ([Immerwahr, 1999](#)). Nearly 80% of college students in the United States attend a public institution ([U.S. Department of Education, 2001](#), p. 202). How much these students should pay for college has proved to be a perennial issue among state policymakers. Governors and state legislators have spent substantial amounts of political capital to affect the outcomes of this debate ([Carnevale and Fry, 2000](#)).

The question that this study focuses on is not what the effects of changing tuition and financial aid are, but rather, why do levels of tuition financial aid vary so much from state to state? To answer these questions, I begin with public institutions. I posit that decisions about public institution tuition and state financial aid are made at the state level by state policymakers. The question for this study is: to what extent do state policymakers' preferences affect levels of tuition and financial aid in the states?

Despite the consensus among economists regarding the impact of price on attendance, and the amount of time and energy spent in the states to decide how much students and their families ought to pay for college, nothing approaching consensus has emerged from the states. For instance, full-time tuition and required fees at public four-year comprehensive institutions in New Mexico are \$1,762, while charges at the same type of institutions in New Hampshire are \$5,034 ([U.S.](#)

Department of Education, 2001). While federal financial aid programs are administered in a similar fashion across all of the states, state student financial aid programs show as much variation as state tuition policy. For example, Illinois provides \$703 in state grant aid per student, while South Dakota does not provide any state financial aid to its students (National Association of State Student Grant and Aid Programs, 2001). This variation can be explained in part by several factors: a state's economy and the structure of its system of higher education certainly play a role in determining tuition and financial aid policies. But these factors have been shown to have only limited success in explaining the kinds of variation observed across states (Hearn et al., 1996; Lowry, 2001a; Nicholson-Crotty and Meier, 2003; Rusk and Leslie, 1978). The high levels of variation observed among states in the area of college affordability require a different kind of explanation.

If all states shared common goals in this area, then a framework that assumed some kind of common goal, such as maximizing attendance rates or institutional revenues, could be used. The variation in state policy could be attributed to a set of factors that enabled or limited the states' abilities to achieve this common goal. However, this type of analysis has had only limited success in explaining the differences among states (Lowry, 2001a). What remains to be understood about variations in policies on college affordability is not how state policymakers are achieving their goals, but rather, what are the goals of state policymakers?

I argue in this paper that policymakers' preferences are not uniform, and that all policymakers are interested in and have an influence on tuition and state financial aid. The influence of policymakers on state financial aid programs is straightforward—these are programs created via statutory authority and are typically run by a state operated office. The influence of policymakers on institutions as they set tuition levels may be direct, as in Florida where legislators set tuition levels, or indirect, as in California where policymakers seek input into tuition at the University of California through the budget process (Richardson et al., 1999).

However, the literature on higher education politics and policy indicates that institutional interests are also not uniform (Berdahl, 1971; Glenny, 1959; Millett, 1984; Richardson et al., 1999; St. John, 1992). Tuition and financial aid policies, which are created through the joint efforts of institutions and policymakers, are also the target of prolonged and sometimes confrontational negotiations between these two groups. This study suggests that in particular, the interests of public and private institutions differ in specific ways that will affect tuition and financial aid policies.

Neither legislative preferences nor institutional preferences act in isolation. Instead, tuition and financial policy is set as a result of policymakers' actions in the context of the higher education

institutions that are in their state. My hypothesis is that public tuition and state financial aid are determined through the interaction of policymakers' preferences and institutional influence. This is a hypothesis that has not yet been tested.

Literature Review

The policies of states differ in terms of how public and private institutions of higher education are financed (Lenth, 1993). In some states appropriations are provided at a certain level and institutions are allowed to bring in revenues from all other sources as they see fit (St. John, 1992). In other states, policies are in place to fund a certain number of students or a certain percent of overall costs. In still other states, policies limit revenue from other sources, particularly tuition (Richardson et al., 1999). In all cases, state decisions about the level of funding to provide to higher education and their degree of involvement in the process of collecting revenue translate into a direct effect of state policy on tuition and financial aid policy. Directly or indirectly, governors and legislators in all states have an effect on the net price of higher education for students (Lenth, 1993). This model of state policymaking for tuition and financial aid policies will be developed more fully later in this paper.

There is voluminous literature on the process of policy setting within the states, as well as the specifics of policy formation within higher education. This literature review is focused specifically on the handful of studies that have taken up the question of how state policymakers decide on tuition and financial aid levels. In particular, I discuss Rusk and Leslie (1978) foundational study on the process of tuition setting. I next turn to the Hearn et al. (1996) study, which used a more recent dataset to analyze the correlates of tuition levels throughout the U.S. Finally, I review two related studies which use similar datasets and diverging theoretical frameworks to attempt to explain variation in tuition and financial aid policies.

Rusk and Leslie's analysis of tuition prices in the states provides direct empirical support for the hypothesis that state decisions about the financing of higher education, particularly in the appropriations process, have a direct effect on tuitions charged (Rusk and Leslie, 1978; St. John, 1992). Their study is limited in that they assume a standard pricing model for higher education, assuming that higher education is a commodity like other goods. However, tuition levels are implicitly a decision about subsidy levels for higher education, and better models have been developed which take into account the political and economic characteristics of states.

Hearn et al's 1996 study of tuition and aid policies in the 50 states is the most comprehensive study to consider the question of how state contexts relate to policy outcomes in this area. The

authors seeks to show some “causally suggestive” associations, using generalized indicators that may shed light on the context in which student aid and tuition are set. They ask two broad questions: “In what ways are postsecondary financing policies associated with region, social and economic resources, and governance factors,” and “which of these state characteristics are most closely associated with postsecondary financing policy?” (Hearn et al., 1996, p. 252)

The authors findings indicate that “Region seemed to be the critical factor in the formation of state policies relating to tuition and student financial aid” (Hearn et al., 1996, p. 266). The authors acknowledge that region does not seem to be a concept that is a true causal factor, and that other processes may be at work in states with geographical proximity. However, the authors tests for highly influential observations driving the regional effect, and conducted cluster analysis attempting to identify similar groups of states. These tests revealed that regions do seem to work at the level of a statistical property. That is, states are similar in a sufficient number of ways within regions to use region as an identifying concept (Hearn et al., 1996).

Hearn et al’s study is a landmark in attempting to understand the context in which states set prices for higher education. Earlier studies suggest mostly economic reasons for the pricing of higher education. Hearn, et al are unique in creating a model that suggests that the values and preferences of those within the states are a key factor in setting tuition and financial aid policies. This aspect of their research, along with the inclusion of the organization of governance of higher education, makes this study and their model of tuition setting important (Hearn et al., 1996).

We would need to add variables concerned with the actual political processes and balances in each state (not simply variables concerned with the size of potentially competing interest groups); the nature of constitutional, bureaucratic and regulatory authority over education in the states; historical patterns in the states; and many more aspects of state contexts (Hearn et al., 1996, p. ?)

However, there may be a few of these variables that are critical in the process of setting tuition and would unmask the regional effect and provide better understanding of state specific processes for setting tuition and financial aid. Understanding what these specific effects are would advance our knowledge in this field.

Lowry (2001b) takes up the question of the processes within each state that may affect tuition charges at colleges and universities. Lowry poses the problem of the setting of tuition at public colleges and universities as a principal- agent problem Moe (1984) . He suggests that state policy-makers, as the principals, wish to hold tuition and fees lower and keep university spending down. Administrators and faculty members, on the other hand, wish to raise tuition and fees and spend

more on all activities. Trustees in Lowry's framework are the implementing agents, responsible for carrying out the wishes of the state policymakers (Lowry, 2001b).

The key influence on the policymaking process, according to Lowry, is the degree to which policymakers have oversight to the decisions of administrators. Policymakers can gain oversight through one of several means—a centralized governing structure means that legislators have fewer contact points for communicating their preferences, indicating that they will have more oversight. Also, having more trustees selected from outside the academy, either through government nomination or direct election, will result in greater implementation of state policymaker's goals (Lowry, 2001b).

Lowry's results indicate support for his hypothesis that state legislators can use multiple means to ensure oversight over the setting of tuition and fees at public institutions. Both the presence of a centralized decision maker for higher education or a high number of externally selected trustees are associated with lower levels of tuition, holding all other variables in the equation constant (Lowry, 2001b).

Lowry's analysis adds several important insights to the analysis of setting of tuition and fees in the states. However, Lowry's model for policymaking is based on a core assumption that does not seem to be supported in the literature. He states that “with respect to preferences, elected state officials should generally prefer lower prices and smaller budgets than do university administrators and faculty” (Lowry, 2001b, p. 846). Lowry's assumption does not accord with the actions of many state legislatures to raise tuition and lower financial aid. There is little evidence that the preferences of state policymakers are uniform in regard to the setting of tuition and fees (Lowry, 2001b).

Lowry mentions this possibility in his study, and includes as a test variable the ideology of state legislators in the equation reported above. The coefficient for this variable was not significant. However, this may be due more to the multicollinearity of this variable with several of the other variables included in the model. From a purely theoretical perspective, it would seem more likely that the preferences of legislators would precede the implementation of a particular governance arrangement. Therefore, the existence of either a more centralized board or more externally selected trustees (with their subsequent effects on tuition and fees) could be traced back to particular preferences of state legislators which would vary from state to state. Anecdotal and systematic evidence of the degree to which legislators differ on the question of raising tuition or decreasing financial aid point to an explanation which would center on the preferences of state legislators as the a priori setting for governance decisions which subsequently affect tuition and financial aid.

Also, Lowry's study does not control for the effect of private institutions in the state, a variable

that was shown to be important even in the setting of public tuition in Hearn et al (1996). It seems possible that very different policy options are available to legislators in states with large private as opposed to large public enrollments.

Nicholson-Crotty and Meier (2003) raise the question of how differing preferences of state legislators may affect tuition levels. They suggest that Lowry's hypothesis can be restated as saying that boards operate either to insulate institutions from state politics or to communicate political preferences to institutions. The authors add data on the ideology of legislators from Berry et al (1999) interacted with the structure of governance in the state to Lowry's above equation. Their results are decidedly mixed: "the widely varying patterns of coefficients as politics interacts with structure suggests that the relationships are highly complex" (Nicholson-Crotty and Meier, 2003, p. 93). Further research may serve to clarify the results obtained by Nicholson-Crotty and Meier. In particular, the degree to which private institutions play a role in the political system in the state has yet to be analyzed.

The above literature points to an important gap in our understanding of how tuition and fees are set at public colleges and universities in the 50 states. It seems clear that for public colleges and universities, a standard economic theory of pricing cannot explain the phenomena at hand with much accuracy. Models that take a more politically oriented approach have a great deal of promise. Hearn et al's analysis indicates that while there is a strong association between region of the country and tuition and financial aid levels, little is known about the state level processes that affect the price of college in different states. Lowry's work shows that what is known about the effect of different forms of governance has yet to be related to the preferences of legislators in the states. Nicholson-Crotty and Meier's work indicates that the interaction between politics and higher education structures is not yet well understood.

Conceptual Framework

This paper argues that the process of setting tuition and financial aid in the 50 states is at its heart a political process. By this, I mean that it is a struggle between different groups to affect the outcomes of government policy. This process may be direct, as in Florida, where the legislature sets tuition at public institutions. Or it may be indirect, as in California, where the legislature does not have authority to set tuition at the University of California, but has input into the process of tuition setting through the appropriations process (Richardson et al., 1999). In every state, legislatures have a "say" in both public tuition levels and financial aid. The question is: to what extent does legislators' ideology affect public college tuition and state financial aid?

To answer this question, I propose a model of state policymaking that hypothesizes that political systems are in the business of converting demands into policies. The extent to which demands from the overall citizenry, interest groups, and individual groups are converted directly into policies affecting those groups is mediated by the nature of the political system and the beliefs of those acting within the system. I differ from [Lowry \(2001b\)](#) by positing that the goals of legislators vary from state to state. I differ from [Nicholson-Crotty and Meier \(2003\)](#) in saying that private institutions in each state are a powerful interest group whose goals must be accounted for, even in studies of public college tuition.

This conceptual framework will lay out the process of demand conversion in the states in three areas. First, a set of constraints on state policymaking will be described. State policymakers are constrained from certain actions by certain factors that are beyond their immediate control. These include factors which come from both the “environmental” and “political” side of the policy studies and higher education governance work summarized previously. What is crucial about these variables is that policymakers in any state in any year are not in a position either to expect changes in them or respond to them in any short-term way.

However, policymakers are in a position to respond to a set of demands that are placed on them in the two areas of policy under discussion. The levels of public tuition and state financial aid in each state in each year can be seen as a negotiation of several demands: from citizens in the form of voting patterns, from young people, who may increase demands on legislators to “do something” about college prices, and from institutions both public and private. In responding to all of these, I hypothesize that policymakers in the states operate within a set of restrictions and respond to these demands with reference to their own ideology. The means by which these demands are converted into policy will depend both on their particular nature and the ideology of the policymakers in question.

Dependent Variables

There are three dependent variables included in this study. The first is state tax appropriations for higher education in the state, on a per student basis ([Center for Higher Education and Educational Finance, 2000](#)); the second variable is tuition and required fees at public four-year colleges and universities for all states ([U.S. Department of Education, 2001](#)); and the third is the total amount of state student financial aid on a per- student basis. Decisions regarding each of these variables are theorized to be the result of political process, with legislators operating within restrictions set by the characteristics of their own states.

Restrictions

The restrictions listed in this section are factors in state policymaking that are beyond the immediate control of state policymakers. This is not to say that these are not areas that state policy seeks to change: improving the economic circumstance of the state in any given year is a perennial goal of state policymakers. Instead, these are areas which are best understood as “givens” in the process of setting policies for tuition and financial aid. Three general areas of restrictions will be considered: environmental restrictions, restrictions imposed by the political structure of the state, and restrictions imposed by the structure of the system of higher education in the state.

Environmental Restrictions

In setting policy in any given year in any area of state policy, legislators and the governor face a set of characteristics of the state that are inflexible in the short-term. These are not so much a set of demands on the process of policymaking in the area of tuition and financial aid, as factors which limit the scope of the demand conversion process. Environmental restrictions include the state’s economic situation, demographics, geography, political culture, and nature of public opinion.

Political Institution Restrictions

In the environment-versus-politics debate in the policy studies literature, many political variables were found to be important, but not as important as the environmental context of the state. It is more appropriate to say that these variables are important given the context of the state. Characteristics of the political system that must be accounted for in understanding the process of policymaking include partisan control and legislative professionalism.

Partisan control matters in two ways in the policymaking process. First, the simple matter of which party is in control of the houses of the legislature and the governor’s office will have an impact on state policy outputs. Citizens vote for different parties expecting different results. Second, the extent to which control of the government is united under one party or divided among different areas of government under different parties will also have an effect, most likely on the degree of responsiveness to demands (Francis, 1967).

Legislative professionalism has been found to have an impact on the policy outcomes of states in several areas, including higher education policy (Nicholson-Crotty and Meier, 2003). Legislative professionalism as a concept measures the degree to which legislators behave and are treated more like full-time politicians (professionals) as opposed to persons who volunteer to serve as elected officials (Fiorina, 1994). States with more professional legislatures will be more active, and

according to Francis, more responsive to demands (Francis, 1967).

Higher Education Institutional Restrictions

The large literature on governance in higher education suggests ways in which the design of the system of higher education sets the context for policymaking in the state. Given Richardson's et al hypothesis that states with more decentralized systems will be less responsive to state demands, I suggest that the most important characteristic of higher education governance is the centralization of control of public institutions (Richardson et al., 1999).

States with more centralized authority over higher education will most likely be more responsive to state demands. Evidence from this comes from Lowry (2001b) and Hearn and Griswold (1994). The process at work here would be hypothesized to be that with fewer necessary contact points, a more centralized authority structure for higher education in the state will allow for more direct communication of state goals to higher education leaders (Lowry, 2001b).

Demand Conversion

I hypothesize that tuition prices are set as part of an ongoing negotiation between institutions in the state and state leaders. The two most important interest groups regarding higher education in any state are the public and private institutions themselves, followed by students. Policies in the states are set with reference to the relative strength of these institutions, and the needs of students attending these institutions.

I hypothesize that the end goal for all institutions is to raise as much money as they can and spend all they raise (Bowen, 1980). However, the process for doing so for different institutions will be very different. For public institutions, the public policy that will allow more students to enroll and will allow revenues to be maximized will be lower tuition. This is not to say that public institutions will not raise tuition if other revenues are not forthcoming, only to say that in terms of their demands on state legislators, public institutions will push for lower tuitions. In states with large public enrollments, more students will have their price of attendance lowered by keeping tuitions low than by spending more on state financial aid.

Private institutions, on the other hand, will argue for a tuition equalization or other process that will increase the amount of state money spent on financial aid (Breneman et al., 1978). Private institutions are better served by state policy priorities that favor higher tuition and higher aid. In addition, in states that are dominated by large private enrollments, more students will have their overall price of attendance lowered through state financial aid than through state support for low

tuition at publics (Berdahl, 1978).

The process of setting state policy for tuition and financial aid is hypothesized to be different in states with a large public sector as opposed to states with a large private sector. State legislators will respond to demands from institutions and students by using the most appropriate policy "levers" in each case.

In the cases of states with a large public college system, legislators will be responding both to the demands of the public and to the interests of students by keeping tuition low. However, responsiveness on the part of legislators to this goal will be conditioned by their ideology. Liberal legislators are hypothesized to favor a more redistributive policy, while conservative legislators are hypothesized to favor a more market-based approach (Klingman and Lammers, 1984). In the case of states with a large public sector, low-tuition, low-aid is seen as a redistributive policy, while high-tuition, high-aid is seen as a market-based strategy.

In states with a large private system essentially the opposite process is at work. Liberal legislators, seeking a more redistributive policy, will favor a high-tuition, high-aid approach that lowers prices for students. Conservative legislators will resist more spending on financial aid, and support policies that make public colleges more competitive in the market, including low-tuition.

The general form of the relationships and the specific variables for each can be seen in Figure 1. Figure 1 shows only the important variables and concepts for this study. Any box that is shaded represents a conceptually important area that is not directly measured in this study. The next section lays out a set of hypotheses and the generalized form of each structural equation to be tested.

Appropriations

Appropriations is included in this analysis as a necessary starting point for understanding subsequent variation in tuition and financial aid. Appropriations is hypothesized to be a function primarily of wealth in the state, as well as the degree of liberalism in state government. I hypothesize that appropriations will mostly be driven by these factors.

Hypothesis 1: Holding other variables constant, appropriations in any state will depend on the amount of money available to spend on any state function, and the level of liberalism in state government.

Public College Tuition

When setting policy for public college tuition, legislators are acting within the set of environmental, political, and higher education system design restrictions noted above. The degree to which they

can act is limited by each of these areas. However, the direction of their actions are influenced primarily by two factors: the relative strength of public or private institutions in their state, both in terms of enrollments and numbers of institutions, and their own ideology. Liberal legislators will prefer a more redistributive policy. In states where public institutions are dominant, this will lead to policies that favor low tuition. Conservative legislators will prefer a policy that allows market forces to work. In states where private institutions are dominant, this will lead to policies that favor higher tuitions. The opposite effect is hypothesized to be at work in private dominant states.

Hypothesis 2: Holding other variables constant, tuition increases based on the level of liberal ideology of policymakers conditioned by the strength of private institutions in the state.

State Financial Aid

When setting financial aid, state legislators are acting within the restrictions described above. In this case however, the interests of the primary groups, the policy levers, and the effect of ideology are all hypothesized to be very different. Again, liberal legislators will favor a more redistributive policy. However, in states where most students are attending private institutions, the best way to redistribute funds is through a state student financial program (Berdahl, 1978). In states where private institutions are dominant, a more liberal legislator will favor higher financial aid. Conservative legislators are likely to resist this, favoring policies that are less redistributive.

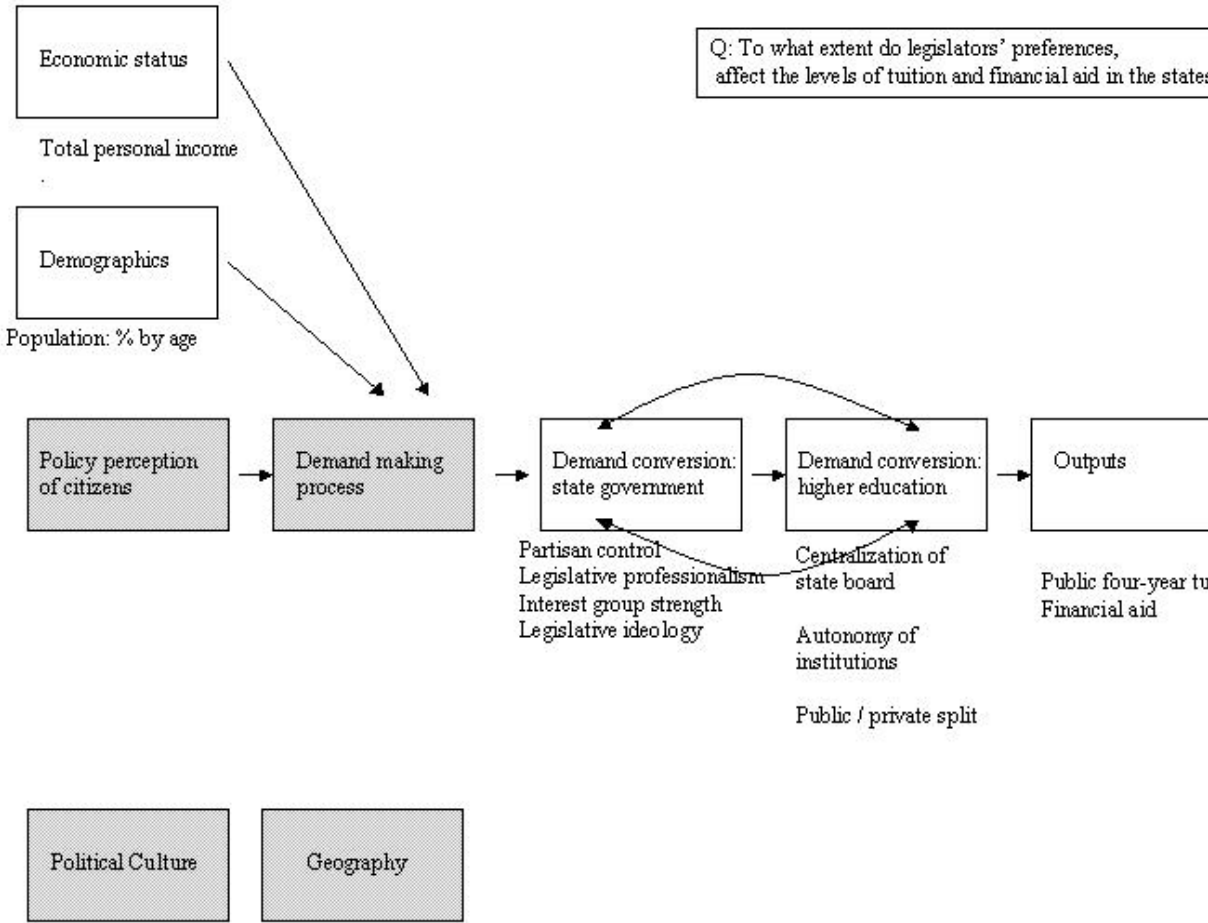
Hypothesis 3: Holding other variables constant, financial aid increases based on the level of liberal ideology of policymakers conditioned by the strength of private institutions in the state.

The following sections describes the specific data and methods used to test these hypotheses.

Data and Methods

This chapter details the data used in the analysis, as well as the particulars of the analytical strategy. The data used in this study come from a database of state-level characteristics that was compiled from multiple sources. While the operationalization of each variable has been discussed earlier, in this section I describe the relevant characteristics of each variable. I next proceed to a discussion of a model of policymaking for tuition and financial aid. Because the relationships laid out in the conceptual framework involve simultaneous causation between the key dependent variables, a simultaneous equations model is employed in this study. The specification and identification of this model are considered. Next, the process for estimation is described. I use two-stage least squares as the estimator for this model. In addition, I make several corrections that are necessary due to the use of panel data. In particular, I describe the appropriate covariance structures for

Figure 1: Theoretical Framework for the Study



autocorrelation and heteroscedasticity. The chapter ends with a description of several specification tests.

Data on all of the variables described in this section were collected for all 50 states for the years 1985-1999 ¹. However, due to some anomalous features, three states (Alaska, Hawaii, and Nebraska) are eliminated from the analysis.

Appropriations: Description

State appropriations to higher education are measured using the total amount of tax dollars appropriated for higher education in a given year divided by the number of full-time students ([Center for Higher Education and Educational Finance, 2000](#); [United States Department of Education, 2001](#))². Table 1 shows the mean level of appropriations per student for both 1985 and 1999.

Tuition: Description

Tuition is measured by looking at the average tuition charged at public four-year non-doctoral degree granting institutions in the states ³. Table 1 contains data for mean tuition at public four-year institutions for the 48 states in 1985 and 1999.

Financial Aid: Description

Financial aid is measured by looking at the total amount of direct aid awarded to students from the state government. This includes both need-based and non-need-based aid. This measure excludes aid given by the federal government, or by institutions to students. For descriptive statistics on financial aid, see table 1.

Independent Variables

There are two independent variables that are central to the theoretical argument laid out in the preceding chapter. The first key variable is the level of government liberalism in the state. The second key variable is the size of private enrollment in the state. As discussed earlier, the interaction between these two is theorized to have an effect on observed tuition and financial aid levels.

Along with these two variables, several additional independent variables are included in the structural equations. These are conceptualized as limits on the actions of policymakers in the state.

¹The period 1985-1999 is used due to consistent quality of data for all indicators reported for this period.

²As with all variables measured in dollars, this measure is adjusted for inflation using the CPI-U.

³In Delaware, Hawaii, and Wyoming, the only public four-year institutions in the state are flagship research institutions. Since these are also the open access four-year institutions in these states, they are included in the analysis.

The broad categories for these variables are state economic conditions, demographic characteristics of states, and partisan control of government.

In addition to these variables, several variables are included which are only correlated to each of the dependent variables. As is explained later in the chapter, for the structural equations in the simultaneous equations model to be identified, a set of restrictions must be placed on each equation.

Level of Government Liberalism: Description

The level of government liberalism utilizes both an ideology score developed by examining the voting record of the congressional delegation and the representation of each party in the state government. This measure is based on a range of 0-100, with 0 being the most conservative and 100 being the most liberal.

Enrollment in Private Institutions: Description

The level of enrollment in private institutions is the most stable characteristic of states that is included in this study. Most states had their system of higher education in place by the early 1980s, so wide swings in the percent of students enrolling in public or private institutions should not be expected ([Breneman et al., 1978](#)). This figure is lagged by one year to avoid possible endogeneity between it and financial aid measures⁴. [Table 1](#) shows the nationwide average for this measure in 1985 and 1999.

Other Variables

The first set of control variables to be included relate to state economic conditions. The two variables in this category are gross state product per capita and median family income in the state. The conceptual framework describes the rationale for including these variables. [United States Department of Commerce, Bureau of the Census \(2003\)](#).

The second set of control variables has to do with state demographics. As mentioned in the chapter on theory, the variable that has the most theoretical interest and empirical support is the percent of the state population aged 18-24. This variable is an indicator of the level of demand for higher education, since most people have their highest intensity of enrollment in higher education during this period ([Adelman, 1999](#)).

⁴Without this time lag, it may be the case that higher levels of financial aid lead to higher levels of private enrollment, rather than vice-versa. I am grateful to Dale Ballou for this insight.

Last, a measures of partisan control of government are included. This is defined as the percent of the upper house of the legislature that is Republican. This control is in place in order to control for the role of political strategy, as opposed to ideological convictions.

In the structural equation for appropriations, an additional variable is included to help identify the overall model. Tax collections per capita measures all forms of tax revenues per person in the state. This variable is related to appropriations, but not to tuition or financial aid.

The structural equation for tuition includes a variable describing the structure of the coordinating board in the state. As described in the conceptual framework, states have many different ways of organizing the interface between state government and higher education. This measure is a four-part polytomous variable. The variables as included in the model use the centralized board as the reference variable.

The structural equation for financial aid includes a variable for legislative professionalism. Legislative professionalism as a concept indicates a legislature that is more likely to be composed of individuals who act like full-time policymakers (Fiorina, 1994). I theorize that a professional legislature is more likely to enact financial aid programs, since these are a more complex mode of changing the net price of higher education than simply changing tuition rates. Legislative professionalism is defined by a single variable, legislative pay. This includes per diem and travel expenses, since in some states legislators are compensated only through these means (Council of State Governments, 2000).

Specification of the Model

The variables above are used in a model to estimate the relationships between them. This section will detail the specification of the model. It describes all of the variables to be included, as well as the restrictions placed on each structural equation in order to allow identification.

The issue of endogeneity must be considered when estimating equations for tuition and financial aid. In particular, the level of appropriations available for either of these functions must be considered as both a cause and an effect of tuition and financial aid. A simple linear budgeting model would suggest that appropriations should be thought of as a causal variable for tuition and financial aid. A legislature decides on a level of appropriations, then later decides on the amount of that appropriation that should go toward directly subsidizing public institutions or directly subsidizing students through financial aid.

However, in the type of yearly decisions under consideration in this paper, this type of thinking would be inappropriate. It would be incorrect to suggest that a legislator decides on the level of

appropriations without considering the impact of her decision on tuition or financial aid. Similarly, levels of tuition and financial aid must be set with reference to the available appropriations for that year. For this reason, the methods detailed here are concerned with the issue of endogeneity.

The three endogenous variables are:

y_1 = Natural log of appropriations per FTE, adjusted for inflation

y_2 = Natural log of tuition at public four-year institutions, adjusted for inflation

y_3 = Natural log of total financial aid per FTE, adjusted for inflation

The independent variables are:

x_1 = Fixed effects for states. While this is in fact a 1x47 vector of indicator variables, for notational and conceptual simplicity I will treat it as a single variable.

x_2 = Level of government liberalism in the state, as described above

x_3 = Percent of FTE enrolled in private institutions

x_4 = Level of government liberalism times percent in privates—the key interaction effect

x_5 = Natural log of median family income for a family of four, adjusted for inflation

x_6 = Natural log of gross state product per capita, adjusted for inflation

x_7 = Percent of the population 18-24

x_8 = Proportion of the electorate voting Republican in the last gubernatorial election

The variables that are restricted from various equations to satisfy the rank and order conditions are:

z_1 = Tax Collections per Capita

z_2 = Type of governing board: segmented

z_3 = Type of governing board: strong coordinating board

z_4 = Type of governing board: weak coordinating board

z_5 = Legislative compensation

Identification of the Model

Using the variables described above, the structural equations for each endogenous variable are listed below:

Appropriations:

$$\begin{aligned} y_{1it} = & \beta_{10} + \beta_{12}y_{2it} \\ & + \gamma_{11}x_{1it} + \gamma_{12}x_{2it} + \gamma_{13}x_{3it} + \gamma_{14}x_{4it} + \gamma_{15}x_{5it} \\ & + \gamma_{16}x_{61it} + \gamma_{17}x_{71it} + \gamma_{18}x_{81it} + \\ & + \lambda_{11}z_1 + u_{1it} \end{aligned} \tag{1}$$

Tuition:

$$\begin{aligned} y_{2it} = & \beta_{20} + \beta_{21}y_{1it} + \beta_{23}y_{3it} \\ & + \gamma_{21}x_{1it} + \gamma_{22}x_{2it} + \gamma_{23}x_{3it} + \gamma_{24}x_{4it} + \gamma_{25}x_{5it} \\ & + \gamma_{26}x_{61it} + \gamma_{27}x_{71it} + \gamma_{28}x_{81it} + \\ & + \lambda_{21}z_2 + \lambda_{22}z_3 + \lambda_{23}z_3 + u_{2it} \end{aligned} \tag{2}$$

Financial Aid:

$$\begin{aligned} y_{3it} = & \beta_{30} + \beta_{32}y_{2it} + \\ & + \gamma_{31}x_{1it} + \gamma_{32}x_{2it} + \gamma_{33}x_{3it} + \gamma_{34}x_{4it} + \gamma_{35}x_{5it} \\ & + \gamma_{36}x_{61it} + \gamma_{37}x_{71it} + \gamma_{38}x_{81it} + \\ & + \lambda_{31}z_5 + u_{3it} \end{aligned} \tag{3}$$

Rank and order conditions for this system of equations are met via exclusion of specified variables from each of the structural equations.

Estimation of the Model

The process of estimation of this model has two parts. The first part is the selection of a consistent estimator for the simultaneous equations in the model. I make use of two-stage least squares as the estimator for the structural equations in the model. Second, the appropriate covariance structure for the model must be used. I use a fixed effects model along with panel corrected standard errors to control for unit specific heteroscedasticity. Then, given the time-series nature of panel data, a correction for temporal autocorrelation among the residuals must be put in place. I assume an AR(1) pattern in the residuals and make the appropriate correction via the Prais-Winsten transformation of the data (Greene, 2003).

Results

The results indicate substantial support for the idea that tuition and financial aid levels are related both the levels of government liberalism and to the role of private institutions within the state. Results for each dependent variable are described below.

Appropriations

Results of the estimation of the two stage least squares model for appropriations are displayed in table . Four specifications of the model are provided. Model 1 shows just the results for the key independent variables of interest. Model 2 includes the key independent variables of interest: government liberalism and the percent of FTE in privates. Model 3 includes variables for the economic characteristics of the states, and model 4 includes all variables in the model. The Akaike Information Criterion (AIC) is used to measure model fit. As table shows, Model 4 has the lowest AIC and therefore the best fit to the data.

To test the over-identifying restrictions in this model, I make use of the test suggested by Hausman (1983). This statistic, based on regressing the residuals from the second stage regression on all of the instruments, is distributed chi-square with degrees of freedom equal to the number of instruments less the number of variables in the equation. In the case of appropriations, the test statistic is $\chi^2(6.11, 3)$, which translates to a p value of .11. This is not statistically significant, but only by a slim margin, indicating that these results reflect a system that is barely overidentified.

In addition, following (Bound et al., 1995) I report the F-statistic and first stage estimates predicting each endogenous variable when the instruments are excluded. This test indicates whether the instruments significantly increase model fit when predicting the endogenous variables. In the

case of tuition (the endogenous variable in the equation for appropriations), the F statistic is .65 with 5 degrees of freedom. The instruments in this case are weak, indicating possible bias in the second-stage estimates.

The results provide no evidence that political characteristics of the states play a large role in changing tuition. As table shows, none of the political context variables are significant at any level.

Economic characteristics appear to play the largest role in within-state changes in tuition. Both gross state product and median income in the state are positively associated with increases in appropriations. However, these are the only variables that have a statistically significant relationship with this dependent variable.

Changes in appropriations within states are driven by changes in the economic environment in the state more than changes in the political environment. However, the same can not be said of tuition rates.

Tuition

The results for tuition provide strong evidence that tuition is related both the levels of government liberalism and the prevalence of private institutions within the states.

As with appropriations four specifications of the model for tuition are presented. Model 4 has the lowest AIC and therefore the best fit to the data. Results from this model form the basis for the discussion below.

The test for overidentification for tuition, model 4 results in a test statistic of 5.64, with 4 degrees of freedom. This translates to a p value of .23, indicating that the system is overidentified. In addition the F statistic for the first stage equation testing whether the instruments significantly increase model fit for appropriations is 7.4, with 5 degrees of freedom ($p < .01$). This indicates that the instruments do predict variation in the endogenous variable, and most likely will not result in biased estimates in the second stage equation. The F statistic for the first stage estimate for financial aid is 1.75 on 5 degrees of freedom ($p = .12$). The instruments in this case weakly predict appropriations, but are good predictors of appropriations levels.

The primary finding from model 4 is that there is substantial support in the data for the idea that legislative liberalism is related to tuition levels, conditional on the influence of private institutions in the state. The coefficient for liberal ideology is -.1, with a 95% confidence interval bounded by [-1.96,-.04]. This result suggests that within any state, as a state government becomes more liberal, it is more likely that tuition will rise.

The interaction term between government liberalism and private enrollment is also significant, with an estimate for the coefficient of .48 and a 95% confidence interval bounded by [.1,.86]. This result suggests that the relationship between government liberalism and tuition levels is conditioned on the level of private enrollment within the state.

Figure 3 graphically displays this relationship. As the figure shows, at low levels of private enrollment, tuition is predicted to decline sharply as a government become more liberal. This conforms with the predictions made in the theoretical framework, where I suggested that the most redistributive option for a liberal legislature in a state with high levels of public enrollment would be to lower tuition.

In contrast, figure 3 also shows that tuition is predicted to increase with higher levels of government liberalism in a state with high levels of private enrollment. Again, this also conforms with the theoretical framework, in that the most redistributive way to spend higher education funding in this case would be through state financial aid programs.

Other results from model 4 in table are also worth briefly mentioning. First, there is a statistically significant negative relationship between the proportion of the population aged 18-24 and observed levels of tuition within states. This result is worth further exploration in that it runs counter to what would normally be predicted by standard economic models. In this case, as demand for higher education increases, the price is predicted to decrease. This is further support for the concepts first discussed by Rusk and Leslie (1978), where they found anomalies in the pricing of higher education.

In addition, higher levels of gross state product per capita are also positively associated with higher levels of tuition, controlling for all other variables in the model. This result could indicate some sensitivity to economic conditions in the state when setting tuition.

Financial Aid

Results for financial aid are summarized in table . As with the other models, the full specification (model 4) provides the best fit to the data and is used for the discussion of the results. The overidentification test for model 4 results in a test statistic of 19.27 with 3 d.f. This is highly statistically significant, meaning that the system fails to meet the standard for identification. All of the results for financial must be considered to be provisional, given the lack of identification for this equation. In addition, the F statistic for the first stage estimates for tuition as an endogenous variable are not statistically significant, again indicating that there may be possible bias in these estimates.

Unlike tuition, I find no relationship between liberal ideology and levels of financial aid. In addition the interaction between liberal ideology and enrollment in private institutions is not significant at any level. This does not support the hypothesis that financial aid levels are set in much the same way as tuition levels.

I do find a positive and statistically significant relationship between lagged values of private enrollment and financial aid per FTE. As table , model 4 shows, the coefficient for lagged private enrollment is .98, with a 90% confidence interval that runs from .06 to 1.9. This provides support for the idea that private institutions do in fact act as effective lobbyists for higher levels of financial aid, since in any state, an increase in last year's enrollment in private institutions is associated with an increase in state financial aid per student. Figure ?? shows the predicted increase in financial aid for a given increase in the percent of students enrolled in private institutions.

One additional finding regarding antecedents of state financial aid is worth mentioning. Table shows a positive and statistically significant relationship between the variable for legislative professionalism and financial aid levels. In any state, increasing legislative professionalism is associated with higher levels of financial aid. The theory behind the inclusion of this variable is that a more professionalized legislature will be more likely to utilize the more-complex option of state student financial aid when seeking to make higher education more affordable.

The results described above suggest that there is strong support for the idea that tuition levels are set by a process that includes both the interests of state legislators and the institutions of higher education within a state. More liberal legislators are predicted to favor lowering tuition in states with high levels of public enrollment and increasing tuition in states with low levels of public enrollment.

In the areas of financial aid and appropriations, I find less support for the theories laid out earlier in the paper. Appropriations appear to be driven most by the state's economic conditions, while financial aid appears to be driven primarily by the relative strength of private institutions within the state.

Conclusion

Two of the findings from the results present intriguing questions for future work. First, the results from the models for tuition suggest that tuition is negatively related to the proportion of 18-24 year olds in the state. As mentioned, this would run counter to any traditional market models of supply and demand.

Voting models may be able to account for such a relationship, however. The salience of tuition

may increase when a greater proportion of the population is of college age, leading legislators from either party to favor lower tuition, *ceteris paribus*.

Second, the results for financial aid suggest that a more professionalized legislature are related to higher levels of financial aid. The literature on higher education policy has not systematically investigated the relationship of governmental institutions and legislative outcomes. This initial finding however, does suggest that the structures of governmental decision-making may affect the kinds of policy outputs produced within the states. This subject seems promising for further development and elaboration.

The findings presented in this paper provide further evidence that higher education policy is the result of a political process. Previous work has suggested that the price of higher education comes about as the result of market forces. The empirical evidence to support this, however, is weak. The model presented in this paper, which is supported by the evidence, suggests that the price of higher education at public institutions has little to do with market forces and everything to do with political ones.

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Table 1: Summary of Variables in Analysis (Standard Deviations in Parentheses)

	Mean, 1985	Mean, 1990	Mean, 1999
Appropriations per FTE*	5382.96 (1376.36)	5142.24 (1155.61)	5122.49 (1259.42)
Tuition*	1951.42 (681.94)	2483.74 (828.71)	3387.36 (1118)
Financial Aid*	168.54 (163.34)	177.16 (159.58)	290.54 (227.71)
Liberal Ideology	0.52 (0.19)	0.54 (0.21)	0.44 (0.26)
Percent of FTE in Privates	0.23 (0.14)	0.22 (0.13)	0.24 (0.13)
Percent of Population 18-24	12.1 (0.69)	10.59 (0.75)	9.47 (1.07)
Gross State Product per Capita*	26304.1 (7851.79)	28118.96 (8557.89)	32013.58 (7596.76)
Median Income*	49086.22 (5900.95)	51789.04 (7425.91)	58141.13 (7647.32)
Proportion Voting Republican	0.45 (0.1)	0.44 (0.1)	0.52 (0.13)
Tax Collections per Capita*	1375.59 (324.45)	1478.85 (302.23)	1770.55 (376.79)
Legislative Compensation*	1.9 (1.47)	2.16 (1.77)	2.08 (1.71)
Board Structure: Centralized	0.19	0.17	0.17
Board Structure: Governing board for Four Years	0.21	0.21	0.21
Board Structure: Strong Coord. Board	0.34	0.38	0.38
Board Structure: Weak Coord. Board	0.26	0.23	0.23

*Inflation Adjusted

Table 2: Results from Two Stage Least Squares Estimation, Dependent Variable= Log of Appropriations per FTE

	Model 1	Model 2	Model 3	Model 4
(Intercept)	8.54 (0.21)	8.56 (38.23)	1.95 (1.23)	2.12 (0.81)
Tuition	-0.07 (0.19)	-0.05 (-0.28)	-0.01 (0.41)	-0.08 (0.1)
Liberal Ideology		-0.03 (-0.65)	-0.04 (0.2)	-0.07 (0.06)
Percent of FTE in Privates**		0.48 (1.61)	0.28 (0.37)	0.25 (0.22)
Percent of Population 18-24			0.04 (0.05)	0.03 (0.01)
ln Gross State Product Per Capita***			0.35 (0.2)	0.36 (0.08)
ln Median Income***			0.27 (0.11)	0.3 (0.07)
Proportion Voting Republican (Gubernatorial)				-0.01 (0.03)
Tax Collections Per Capita***	0.1 (0.22)	0.07 (0.39)	0 (0.03)	0 (0.03)
Liberal Ideology \times Percent in Privates		0.07 (0.43)	0.07 (0.48)	0.14 (0.16)
Fixed Effects	Yes	Yes	Yes	Yes
AIC	-1495.02	-1484.15	-1484.15	-1484.15
R ²	0.82	0.82	0.82	0.82
N	705	705	705	705

*Instrumented

**Lagged one year

***Adjusted for inflation using the cpi-u

Table 3: Results from Two Stage Least Squares Estimation, Dependent Variable= Log of Tuition

	Model 1	Model 2	Model 3	Model 4
(Intercept)	30.01 (211.03)	32.3 (0.59)	3.46 (8.29)	4.56 (20.58)
ln Appropriations*	-2.69 (1.28)	-2.96 (-1.62)	0.32 (0.36)	0.06 (0.08)
ln Financial Aid*	0.29 (0.11)	0.43 (2.1)	-0.17 (0.19)	-0.05 (0.04)
Liberal Ideology		-0.25 (-2.02)	-0.14 (0.12)	-0.1 (0.05)
Percent of FTE in Privates**		-4.2 (-2.37)	0.11 (1.18)	-0.47 (0.35)
Percent of Population 18-24			-0.14 (0.04)	-0.12 (0.01)
ln Gross State Product Per Capita***			0.46 (0.28)	0.37 (0.1)
ln Median Income***			-0.07 (0.23)	0.05 (0.07)
Proportion Voting Republican (Gubernatorial)				0.03 (0.04)
Board Structure (reference=centralized board)				
Structure: Governing Board: Four Years	-0.09 (0.1)	-0.06 (-0.57)	0.02 (0.13)	0.03 (0.05)
Structure: Strong Coord. Board	0 (0.09)	-0.04 (-0.33)	-0.06 (0.15)	-0.02 (0.06)
Structure: Weak Coord Board	0.13 (0.12)	0.11 (0.8)	-0.02 (0.15)	0.01 (0.06)
Liberal Ideology × Percent in Privates		2.09 (1.9)	0.63 (0.49)	0.48 (0.19)
Fixed Effects	Yes	Yes	Yes	Yes
AIC	-1350.24	-1343.23	-1343.23	-1343.23
R ²	0.53	0.46	0.46	0.46
N	705	705	705	705

*Instrumented
**Lagged one year
***Adjusted for inflation using the cpi-u

Table 4: Results from Two Stage Least Squares Estimation, Dependent Variable= Log of Financial Aid per FTE

	Model 1	Model 2	Model 3	Model 4
(Intercept)	3.05 (52.57)	2.85 (0.09)	-3.32 (35.97)	-3.22 (23.04)
Tuition*	0.12 (0.05)			-0.03 (0.2)
Liberal Ideology		0.08 (0.93)	0.05 (0.12)	0.03 (0.12)
Percent of FTE in Privates**		1.27 (2.2)	0.94 (0.56)	0.98 (0.56)
Percent of Population 18-24			-0.01 (0.03)	-0.01 (0.03)
ln Gross State Product Per Capita***			0.73 (0.17)	0.74 (0.17)
ln Median Income***			0 (0.14)	0 (0.15)
Proportion Voting Republican (Gubernatorial)				-0.04 (0.06)
Legislative Compensation (1000s) ***	11.51 (5.01)	11.14 (2.26)	10.57 (4.98)	10.62 (4.99)
Liberal Ideology × Percent in Privates		-0.24 (-0.94)	-0.3 (0.32)	-0.27 (0.33)
Fixed Effects	Yes	Yes	Yes	Yes
AIC	-343.01	-339.48	-346.42	-341.01
R ²	0.78	0.79	0.79	0.79
N	705	705	705	705

*Instrumented
**Lagged one year
***Adjusted for inflation using the cpi-u

Figure 2: Tuition by Legislative Ideology and Percent of Students in Private Institutions

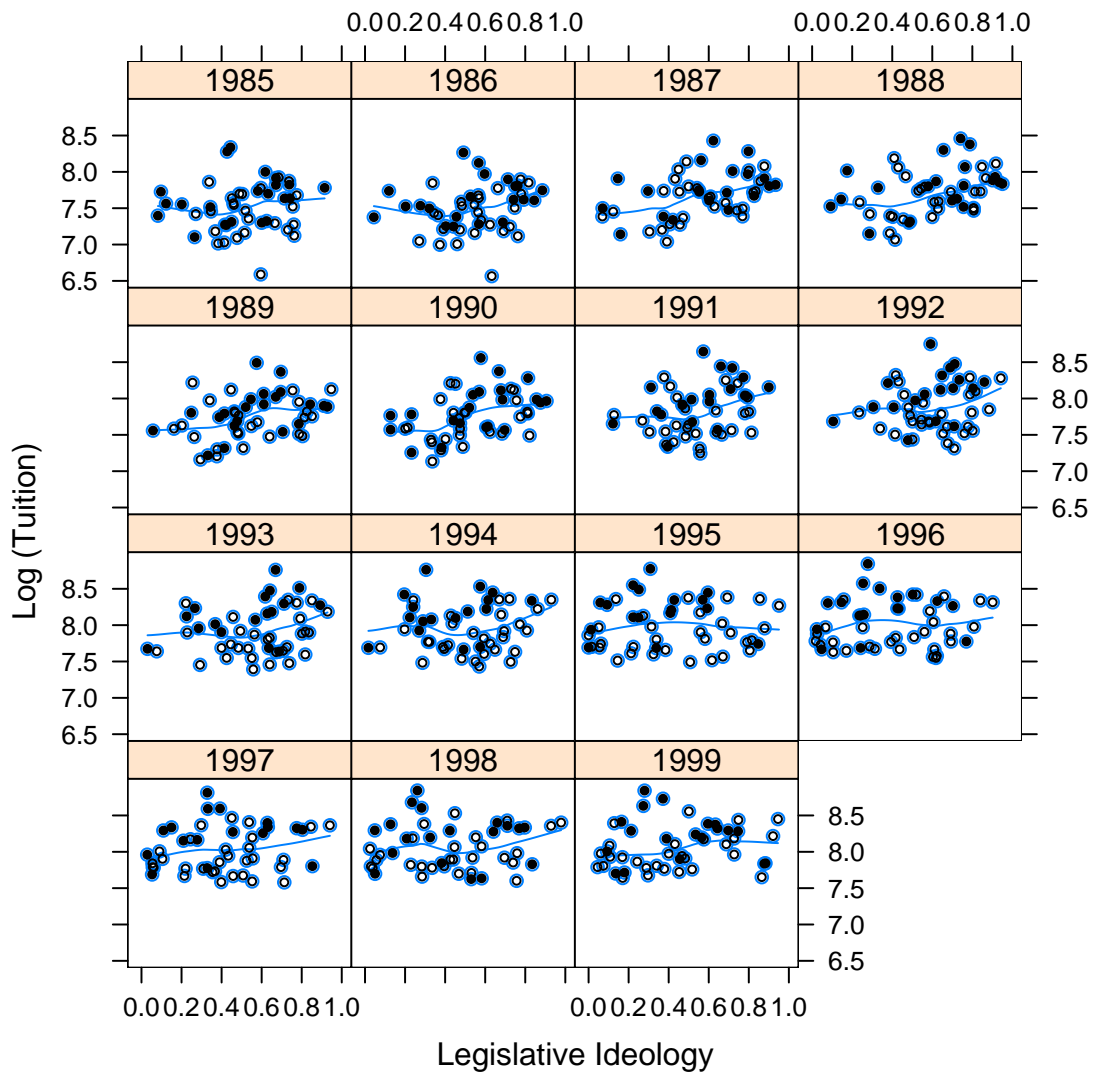


Figure 3: Predicted Change in Tuition, by Legislative Ideology and Percent of FTE in Privates

