Differences Across States
in Higher Education
Finance Policy

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Abstract:

In the United States, public higher education finance policy is primarily decided at the state level, and policies can vary dramatically across state lines. We use data from 1989/90 and 2008/09 to describe these differences and how they have changed over time. We examine numerous aspects of each state's higher education system: average four-year tuition and fees, average two-year tuition and fees, the share of each state's public enrollment that is located at two-year institutions, total state grant aid, total need-based state grant aid, and total non-need-based state grant aid. The findings reveal substantial variation across states, but these differences across states fell over time for most measures. The relationships between variables also changed. For example, the positive relationship between a state's tuition level and its financial aid offerings declined during the period. Our analyses produce insight into national trends in tuition and grant aid by examining the contribution of individual states to these trends. We find that national figures have been heavily influenced by the decisions of a few large states with atypical finance policies and by the shifting of population away from high-tuition northern industrial states and towards low-tuition Sun Belt states.

Introduction

While the federal government has a major impact on public institutions through its provision of student aid and research support, the influence of state government policy is much larger (Hauptman, 2001). States supply direct institutional subsidies through appropriations and funding for capital projects, offer financial aid directly to students, and play a major role in overseeing the institutions and helping shape their listed levels of tuition and fees. In each of these areas, the role of state governments is large and has changed over time.

In recent decades, the appropriations provided by state governments have not kept pace with growing enrollments and rising costs. Adjusting for the rising price of educational inputs through the use of the Higher Education Cost Adjustment (HECA), Cheslock and Gianneschi (2008) find that state appropriations per FTE student fell from around $8,000 to around $7,000 between 1980 and 2004. (Figures are in 2004 dollars.) Appropriation levels have dropped further in recent years due to the economic slowdown. At the same time, higher education costs have risen substantially over time (Archibald and Feldman, 2008). Unsurprisingly, in-state tuition and fees at public institutions have increased. Between 1989/90 and 2009/10, average tuition grew from $2,936 to $7,020 at four-year institutions, an increase of 139% (Baum and Ma, 2009). (Figures in 2009 dollars.) States help defray tuition prices by offering state grant programs, and in 2008/09, the average state grant per FTE undergraduate was $660 (NASSGAP, 2010).

These national figures for tuition levels and state grants are highly misleading in one important sense: they represent the average experience, not the experience of any one state. States can vary dramatically in the prices charged at their public higher education institutions, and consequently, the prices students face will depend highly upon the state in which they reside.

For example, average in-state tuition and fees vary from $3,726 in Wyoming to $14,416 in Pennsylvania for flagship institutions and from $3,588 in New Mexico to $11,133 in New Jersey for comprehensive colleges and universities (Washington Higher Education Coordinating Board, 2010). State grant dollars per FTE student vary from $7 in Wyoming to $1,917 in South Carolina (NASSGAP, 2010).

These differences are important because past research has thoroughly documented how increases in higher education prices lead to substantial declines in a student's propensity to enroll (Heller, 1997; Leslie and Brinkman, 1987). These findings in combination with the large heterogeneity in prices across states mean that a student's state of residence can substantially influence his or her likelihood of college attendance. State lines represent major boundaries that demarcate different levels of college access. Our understanding of these differences in prices across states, however, is limited.

Almost all past research in this area has attempted to explain whether differences across states in governance structures and state political characteristics partially determine differences across states in tuition and state grant aid (Doyle, in press; Hearn et al., 1996; Lowry, 2001; McLendon et al., 2006; Nicholson-Crotty and Meier, 2003). As a result, we have a good understanding of how these factors contribute to the variation in public higher education prices across states. We have not, however, thoroughly described the variation itself. That is, while we now comprehend some of the reasons why states vary in tuition and grant aid, we don't have a good understanding of the size and shape of that variation. This problem is especially acute when it comes to changes over time; we do not know whether states have become more similar or more diverse in their tuition and state grant aid policies. Such information is vital because geographical inequalities in access are a substantial part of the U.S. higher education system.

This paper consequently examines how the structure of between-state inequality in tuition and state grant aid changed over the 1989-2008 period. Our analysis considers a variety of tuition and aid measures as well as the relationships across these measures. For tuition and fees, we examine the average four-year public tuition, the average two-year public tuition, and the share of each state's public enrollment that is located at two-year institutions. For state grant aid, we examine total grant aid, total need-based grant aid, and total non-need-based grant aid. Estimates for these variables are drawn from a variety of sources: the Integrated Postsecondary Education Data System (IPEDS), the annual survey of the National Association of State Student Grant and Aid Programs (NASSGAP), and the Digest of Education Statistics (DES).

As we investigate whether states have become more similar or more diverse in the prices they charge, we reveal insights into the national patterns described earlier. A national trend is simply a weighted combination of 50 individual state trends. States are weighted because enrollment levels vary drastically. California enrolled 2,136,087 students in its public higher education system in 2007/08, while Vermont enrolled only 24,829 (National Center for Educational Statistics, 2009). When tuition and aid figures for California and Vermont are presented alongside each other, these giant differences in size can be obscured, and the reader can implicitly weight states fairly equally. When national figures are computed, however, California is assigned a weight 86 times larger than Vermont's. Throughout our analysis, we will document the major role that large individual states have played in shaping national figures. We will also illuminate another important but hidden determinant of observed trends: the population shifts within the United States from industrial northern states to fast growing Sun Belt states. These population shifts have altered the weights assigned to individual states, and the changes in weights often have a nontrivial effect on national trends.

3

Brief History of State Higher Education Pricing Policies

The structure of the U.S. public higher education system started forming in the late 18th century and expanded during the 19th century, especially after the passage of the Morrill Act in 1862 (Heller, 2002). In the early 20th century, enrollments started to increase rapidly at public higher education institutions. Goldin and Katz (1999) note that the fraction of students in public institutions rose from 0.22 to 0.5 between 1897 and 1940, and they provide two explanations for this growth. First, the number of high school students was rapidly increasing, especially in states in the middle part of the country and the west coast that had well functioning public higher education institutions. Second, public institutions were well positioned to take advantage of opportunities created by major changes in the structure of knowledge that occurred from around 1880 to 1910. These changes allowed higher education institutions to connect more directly to the economic needs of the state, and unsurprisingly, states started to increase their funding of public higher education institutions soon after.

In the early 20th century, states varied substantially in the funding they provided to their higher education institutions and in the enrollment per capita of their citizens. Goldin and Katz (1999) find that "newer states with a high share of well-to-do families and scant presence of private universities in 1900 became the leaders in public higher education by 1930" (p. 54). These historical findings are very important for this study because between-state differences have persisted over time. The cross-state correlation between 1929 and 1994 levels of (log) state and local government spending per capita on higher education is 0.44 (Goldin and Katz, 1999). Furthermore, the determinants of state-level differences remain important. For example, the level of in-state tuition and fees at four-year public universities in 1994 has a correlation of -0.59

with year of statehood (Goldin and Katz, 1999). Newer states continue to spend more government funds on public higher education and charge lower tuition and fee levels.

In the early 20th century, however, tuition and fees were quite low – approximately $50 per year in the 1920s and $80 per year at the start of World War II – so any variation across states had limited consequences (Heller, 2002). After the war, tuition levels slowly increased so that "the era of extremely low-tuition and no-tuition policies was over" by the mid-1970s (Hearn et al. 1996, p. 244). Since the 1980s, tuition and fees have increased much more rapidly (Baum and Ma, 2009). Many explanations for rising educational prices have been provided, and they typically focus on rising costs, stagnating or declining government support, and rising student demand (Mumper, 2001; National Commission on the Cost of Higher Education, 1998; Paulsen, 2000).

When tuition rises, we might also expect state grant aid to rise, because the philosophical justification for increasing tuition and fees was the need to replace low-tuition policies – which provided substantial subsidies to upper-income students – with high-tuition/high-aid policies (Hearn & Longanecker, 1985). The high aid was to be targeted at low-income students in the form of need-based aid, so that ability to pay was not a major determinant of college attendance. Historically, most state aid programs were need-based, and the introduction in 1972 of the State Student Incentive Grant (SSIG) program – now known as the Leveraging Educational Assistance Partnership (LEAP) program – provided incentives for states to increase their aid offerings further. Before the authorization of the SSIG program, 24 states had state grant programs. By 1977, all 50 states had developed one (Heller, 2002). These programs then steadily grew from $975 million in 1981/82 to $2.4 billion in 1993/94 (Heller, 2002). The vast majority of these new funds were need-based, but that practice started to change in the mid-1990s. A number of

states used financial windfalls created by tobacco settlements and the introduction of lotteries to create new programs that distributed grants to students based on academic achievement (Heller, 2002; Doyle, 2006). While only a minority of states have large merit-aid programs, these programs are quite large, so the share of aid that is non-need-based has grown considerably.

Related Literature

While no study has sought to describe thoroughly the variation across states in higher education pricing, some have attempted to identify those state characteristics that help explain this variation. Rusk and Leslie (1978), in the first major study in this area, examine the role of historical and economic variables in shaping the variation across states in tuition and fees in the 1970s. Hearn, Griswold, and Marine (1996) studied how region, social and economic variables, and postsecondary governance arrangements influenced state tuition and fees as well as state grant aid in the late 1980s. Their findings are mixed, insofar as region is the only consistently strong predictor of state differences in policy. Hearn, Griswold, and Marine often examine the interrelationship between variables, and for the purposes of this study, their most relevant finding is a moderate positive correlation of 0.41 between tuition levels and state grant aid (1996).

Subsequent studies have focused more specifically on how governance structures and political characteristics explain between-state differences. Lowry (2001) finds evidence that governance structures and trustee selection procedures can substantially alter the prices charged to students. More specifically, he finds that government structures that enhance political control contribute to lower prices while decentralized structures lead to the opposite result. Prices are also lower when trustees are selected by nonacademic stakeholders rather than academic stakeholders.

A number of recent papers have focused more on various political characteristics for each state (Doyle, in press; McLendon et al., 2006; Nicholson-Crotty & Meyer, 2003). These papers examine the impact of numerous aspects of state legislatures such as ideology, level of minority representation, and level of professionalization. These papers also differ from earlier work by using panel data sets containing observations from numerous years for each state. Doyle (in press) and McLendon et al. (2006) solely use variation across time for individual states to identify their results.

Two additional studies approach the topic of tuition pricing by states. Lenth (1993) surveys states not only to capture differences in prices but also to reveal variation in the processes by which tuition is determined. St. John (1992) uses a case-study approach to examine how individual states adjusted tuition policies during the 1980s.

Finally, many papers use variation across states in tuition and grant aid to study how tuition and aid levels impact enrollment decisions (Cornwell, Mustard, and Sridhar, 2006; Dynarski, 2000; Heller, 1999; Kane, 1994). These studies have essentially treated the variation across states as experiments that can allow researchers to understand the influence of state policies. The findings from this line of research clearly demonstrate that state tuition levels and financial aid offerings impact students' educational attainment. In other words, price differences across states have real consequences for students. To describe access within the U.S. higher education system, we need to understand how much state residence matters in terms of varying prices, and we need to understand the extent to which the answer to that question has changed over time. This study is partially motivated by a desire to produce that understanding.

Why Might Between-State Differences in Higher Education Prices Change?

Before we examine whether states have become more or less similar in their tuition and fees since 1989, we need to conceptualize how public institutions set prices. A useful place to start is the balanced budget constraint that higher education institutions face: an institution's costs must be offset by the sum of tuition revenue plus non-tuition revenue. From this perspective, tuition must be increased whenever costs rise by a larger amount than non-tuition revenue. While the source of cost increases is in dispute, all agree that costs have grown quickly at almost all higher education institutions (Archibald and Feldman, 2008). Meanwhile, non-tuition revenue sources are not experiencing similar growth. State governments are under pressure to increase spending on other programs such as Medicaid and pensions at the same time that the public is strongly resisting tax increases (Hovey, 1999; Kane et al., 2003). Other sources of revenue, such as private gifts, are growing at faster rates, but these revenue sources are still relatively small (Cheslock and Gianneschi, 2008). Given these trends, we would clearly expect substantial increases in tuition and fees at public institutions, especially in states where these trends are strongest.

While this simple framework correctly recognizes institutional costs and non-student revenues as important considerations, it assumes that students are willing to pay high tuition prices and also assumes that institutions have control over their tuition.[1] The former assumption is likely to be most problematic in states with student populations unwilling to pay higher prices or with existing tuition levels that are already substantial. The latter assumption is wrong in all

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[1] Another major problem is that it does not allow for the possibility that tuition and fees are a primary determinant of institutional costs. Bowen (1980) argues that an institution's desire to do a large number of things at a very high level of quality means that costs will only be restrained by the revenues that are available. Ehrenberg (2000) makes a similar point and uses the compelling metaphor of a "Cookie Monster" that can never have enough cookies. If such descriptions are true, we should expect institutions to push for tuition increases regardless of their current costs. This issue is not especially troubling for this paper, because much of our subsequent discussion will not focus on cost differences across states.

states, because state governments can always moderate tuition increases by threatening to withhold future appropriations. In many states, state governments have even greater power, because they have full or partial control of the process by which tuition and fees are set (Lenth, 1993).

With these basic points in mind, let us now consider whether states have become more similar or more diverse in their pricing of public higher education since 1989. A number of considerations suggest greater similarity. If each state had cut higher education appropriations by equal dollar amounts and allowed institutions to increase tuition dollars to offset these cuts, tuition would have increased by similar dollar amounts in all states. In percentage terms, however, states that initially have low tuition would have experienced much larger tuition increases, and the proportional difference in tuition across states would have fallen.

Alternatively, low-tuition states could have increased tuition by greater dollar amounts than other states. Low-tuition states may still have been pricing education well below the levels that their citizens were willing to pay, so proposed increases would have generated less resistance. Institutions in low-tuition states may also have pushed harder for tuition increases. As the basic foundations supporting low-tuition policies continue to erode, low-tuition institutions will likely feel the greatest financial stress. When negotiating with state leaders, these schools could have effectively argued for tuition increases by noting their financial stress and by presenting cross-state comparisons that demonstrate their need to raise prices.

These states, however, may have low tuition for a reason. In some states, state legislatures can have substantial authority over the setting of tuition (Lenth, 1993). As prior research has demonstrated, the method by which trustees are selected and the level of centralization in governance structures can also influence tuition setting (Lowry, 2001). Other

9

formal constraints on tuition growth can exist, such as constitutional provisions calling for low tuition. Informal constraints, such as an ideological commitment to low tuition within a state, can also restrain tuition increases. If a state with initially low tuition faced these constraints, it may have experienced low levels of tuition growth even if the institutions in that state possessed sound arguments for raising prices.

Institutions in low-tuition states are also hampered by the manner in which tuition increases are often measured. The press typically reports percentage increases rather than growth in dollars, which makes an increase of $1,000 look much more severe in a low-tuition state than in a high-tuition state. This tendency also occurs within governmental public policy discussions. Recent federal reform efforts sought to moderate tuition growth by punishing institutions with the highest percentage increases in tuition rather than the highest dollar increases (Burd, 2003; Burd, 2004). As a result, low-tuition states may only have experienced slightly higher percentage growth in recent years, which would have caused the dollar gap between states to grow.

To this point, we have solely discussed tuition and fees. Analysis of state grant aid is simpler because state governments have clear control over this process. Higher education institutions are less focused on this revenue source, because it comprises a much smaller share of their budget than do tuition and state appropriations. State policy, however, is moving towards subsidizing consumers rather than producers (Hovey, 1999). This trend may have led states without substantial grant programs to add them over time, which could have decreased inequality across states. A key question is whether this trend also would have caused states with large existing state grant aid programs to increase funding even further. Efforts to increase funding for

10

state grant aid may be more difficult for states with programs that are already large relative to those in other states.

Any discussion of state grant aid must consider the explosion of merit-based aid programs in the 1990s and early 2000s (Heller, 2002). These programs were started using new state revenue sources, such as lottery revenues and tobacco settlements, so they did not face typical state budgetary constraints. Their effects on between-state inequality in total grant aid will be striking, because they led to very large increases for a minority of states.

This section has presented a number of factors that may have contributed to changes in between-state inequality in tuition and state grant aid. This paper, however, does not seek to identify the effect of each of these factors. Previous research has already sought to explain much of the variation across states in their higher education prices, but these studies have not established basic findings that describe changes in between-state inequality in tuition and state grant aid in recent decades (Doyle, in press; Hearn et al., 1996; Lowry, 2001; McLendon et al., 2006; Nicholson-Crotty and Meier, 2003). We wish to provide a thorough description of these changes, and the analysis in this section will help us interpret our results and identify the questions for future research that emerge from our findings.

Data

In this paper, we separately analyze two different data sets, which we will refer to as the IPEDS and NASSGAP/DES data sets. Both data sets start in the 1989/90 academic year, because analysis of earlier years in the IPEDS data sets revealed flaws that would limit the validity of our findings. The ending year in each data set was the most recent year available:

11

2008/09 for IPEDS and 2007/08 for NASSGAP/DES. Figures were transformed into 2008/09

dollars using the Consumer Price Index (Commonfund, 2009).

We used data from the IPEDS survey because it contains each of the variables we need

for our analysis of tuition and fees: average four-year tuition and fees, average two-year tuition

and fees, four-year full-time equivalent (FTE) enrollment, and two-year FTE enrollment. IPEDS

data are at the institution level, so we had to select schools and then compute state-level totals.

For four-year institutions, we only chose public institutions in the 50 U.S. states that were listed

as Research, Doctoral, Master's, or Baccalaureate institutions in the 2005 basic Carnegie

Classification.[2] The resulting sample contained 525 institutions, and of these 525, only six

schools were missing enrollment or tuition data in 1989.[3] These six institutions only enrolled

12,378 students in 2008, which was just 0.25% of students for our targeted population.[4] When

computing state-level figures using these 519 institutions, we weighted by the FTE enrollment of

each institution.[5]

We used a similar procedure for calculating figures for institutions listed as public

Associate's colleges in the 2005 Carnegie Classification. We were able to obtain valid data for

999 of the 1,019 institutions in our targeted population.[6] The 20 schools missing enrollment or

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[2] From that set of institutions, we then dropped six military academies with zero tuition, two small branch campuses that did not offer a bachelor's degree, and one university that only educated graduate students.

[3] Fourteen other institutions did not report enrollment or tuition data in 1989, but we were able to replace missing data for these institutions by using data from 1988 or 1990 that were adjusted using the median 1988/89 or 1989/90 change.

[4] We are assuming that we were able to obtain the full population, because institutions almost always report basic data to the IPEDS Institutional Characteristics survey. Our data processing was complicated by institutions that began operations after 1989. We were able to identify those seven institutions by reviewing the websites of all schools who reported data in 2008 but not in 1989. These institutions were assigned an enrollment of zero for 1989, and because all of our analysis of tuition and fees will weight by enrollment, they will not be influence the results for that year.

[5] We compute FTE enrollment by adding full-time students to one-third of the total of part-time students.

[6] As expected, the preparation of two-year data was messier. We needed to replace missing data with adjusted information from adjoining years for 49 institutions, and we had to identify 21 colleges that were established after 1989.

tuition data only enrolled 18,536 students in 2008, which was just 0.46% of students for our targeted population.

Our selected set of institutions does not contain schools that possess a "Special Focus" Carnegie Classification, because the dynamics underlying tuition and fee setting may differ for schools of health professions, art, and other specialized areas. We also omitted institutions listed as "Associate's: Public Four-Year Primarily Associate's" and "Baccalaureate/Associate's Colleges", but this decision was more difficult. The 50 institutions in these two categories likely set tuition and fees in a similar manner as the two-year and four-year institutions in our sample. Our review of selected websites, however, convinced us that no easy mechanism could be used to assign these institutions to the two-year or four-year categories. Even more troubling was evidence that many of these institutions were primarily two-year institutions in 1989 and had moved much closer to the four-year model by 2008.

Our second data set uses data from the NASSGAP annual survey report. These data contain measures of total grant aid, total need-based grant aid, and total non-need-based grant aid for undergraduates in each state. We combine the NASSGAP data with enrollment information drawn from the 2009 and 1992 DES, so that we can examine grant aid per FTE student.[7] The DES enrollment figures include students at all higher education institutions in each state, because a substantial share of grant aid flows to private institutions.[8]

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[7] The DES does not directly report FTE undergraduate enrollment, but we can roughly estimate this measure in several steps from the data that DES does report. First, we separately compute the undergraduate share of total headcount enrollment for public and private institutions. We then estimate undergraduate public FTE enrollment by multiplying the computed public undergraduate share by total public FTE enrollment. We do the same thing for private institutions, and then calculate total FTE undergraduate enrollment by adding our public and private estimates together. To check for robustness, we also estimate all results using total headcount undergraduate enrollment for each state. The findings reported in this paper do not vary by enrollment measure.

[8] The NASSGAP survey does not allow one to examine grant aid only for in-state students attending public institutions. The available information is limited for this population and not consistently reported over time.

Results

Tuition & Fees

Tuition and fees grew substantially over this period. Four-year listed prices at public

institutions increased by 119% from $2,981 to $6,539 while public two-year prices increased by

54% from $1,744 to $2,690. Figures 1a and 1b, which compare the percentage change in listed

tuition and fees with the initial level, demonstrate that prices increased in both sectors for almost

every state.[9] These figures also show that the largest percentage increases occurred for those

institutions with the lowest tuition in 1989. The negative relationship between initial tuition and

percentage change in tuition is much stronger for two-year institutions.[10] In terms of fit, the

correlation coefficient is -0.38 for four-year institutions and -0.65 for two-year institutions. In

terms of relationship size, a bivariate regression indicates that a $1,000 increase in initial tuition

and fees is associated with a 15 percentage point decline in tuition growth for four-year

institutions. The corresponding figure for two-year institutions is a 34 percentage point decline.

The more moderate relationship for four-year institutions is clearly observable in Figure 1a.

New Jersey, Illinois, Maine, Minnesota, South Carolina, and Connecticut, which already had

high tuition in 1989, had some of the highest rates of tuition growth. For two-year institutions,

the largest gains were concentrated among those states with the lowest initial tuition.

Thus, the proportional differences across states in listed tuition and fees are declining

over time. The dollar gap between states, however, is rising in both the two-year and four-year

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[9] For all figures in this paper, we only label observations for states that are outliers or states of special interest. Attempts to label all 50 observations produced figures that were illegible and unattractive. Information for all fifty states is available from the authors upon request.

[10] At least some of the estimates for individual states for two-year institutions suffer from major measurement error. Arizona, which shows a decline of almost 50% in two-year tuition and fees, is the primary example. In 1989, eight of 19 two-year institutions report tuition and fees in IPEDS above $2,500 (in 1989 dollars). The 1991 Digest of Education Statistics, however, reports average tuition in Arizona of $519 for 1989, and each of these eight institutions have 2008 tuition below $2,000 (in 2008 dollars). We experimented with analysis that corrected or omitted data from states that appear problematic, and the primary findings were not fundamentally altered. Because corrections or omissions to the existing data felt arbitrary, we simply report the data as it exists within IPEDS.

sectors. Again, the results are more positive in magnitude for four-year institutions. The correlation coefficient is 0.59 for four-year tuition and fees and 0.10 for two-year figures; the bivariate regression coefficients are 0.70 and 0.08. In the short run, the dollar gains are likely more important than the percentage increases, because this figure reflects the amount of new tuition revenue available to institutions. For example, the percentage increase in four-year tuition and fees in Texas was twice as large as the increase in Illinois. But in dollar terms, Texas increased by $4,631, which was smaller than the $5,880 increase in Illinois.

The visual presentation of Figures 1a and 1b suggests that each state is of equal importance, which is fine for comparisons across states. When one wants to understand how individual states contributed to the national increase in tuition and fees, however, one needs to remember the vast differences across states in their enrollments. For example, Vermont may have higher four-year tuition than Pennsylvania, but Pennsylvania had 14 times as many students enrolled at its four-year public institutions in 2008. Consequently, Pennsylvania increased national estimates of tuition and fees much more than Vermont did.

These considerations become much more complex upon considering that enrollment shares for individual states changed over the 1989 and 2008 period. Enrollments grew in Sun Belt states, which traditionally have low tuition and fees, and fell in industrial northern states, which traditionally have high tuition and fees. Furthermore, enrollments might have varied across institutions within states. For example, the enrollment at regional and local institutions could have grown faster than enrollment grew at flagship institutions.

One can examine the impact of these enrollment shifts on national estimates of tuition and fee growth by varying the weights used to calculate 2008 tuition and fees. Our first simulation will use 2008 enrollment shares within states but 1989 enrollment shares across

15

states. For this computation, we will not allow the state of Florida to grow its enrollment share relative to the state of Michigan over time, but we will allow the University of Central Florida to grow its share relative to the University of Florida. Our simulated estimates of 2008 tuition and fees are substantially higher, because greater weights are assigned to high-tuition industrial northern states and lower weights are assigned to low-tuition Sun Belt states. Four-year tuition and fees now reach $6,671, which is 2% higher than the actual figure of $6,539 for 2008. Two-year tuition and fees reach $2,784, which is 3.5% higher than the actual figure of $2,690. The basic point underlying these figures – that enrollment shifts across states have helped restrain national growth in tuition and fees – is rarely recognized. If enrollment shares across states had remained constant between 1989 and 2008, the percentage increase in four-year tuition and fees would have been 124% rather than 119%. The two-year growth rate would have been 60% rather than 54%.

Enrollment shifts within states also moderated national estimates of tuition growth, but the size of the effect was fairly trivial. If each institution retained its 1989 enrollment share for its state, tuition and fees would only have been $29 higher for four-year institutions in 2008 and $15 higher for two-year institutions. So, the disproportionate growth of enrollment at lower-tuition institutions within each state only had a small moderating effect on national estimates of tuition growth. The primary hidden constraint on tuition growth was the large enrollment increases in low-tuition states.

If figures 1a and 1b included indicators of state size, one would observe that many of the outliers are states with very high enrollments. One implication of this point is that the atypical experience of a few large states had a major impact on national estimates of tuition and fees. The two-year sector provides the clearest example. California had the lowest two-year tuition

and fees in 1989 ($186) and 2008 ($585) and had the highest state share of national two-year enrollments in 1989 (20.2%) and 2008 (20.8%). If we recalculated national two-year tuition and fees by dropping California, the national average would be 23% higher in 1989 and 21% higher in 2008. Illinois provides pressure in the opposite direction. Illinois had among the highest two-year tuition and fee averages in 1989 ($4,356) and 2008 ($6,935) and among the highest share of national two-year enrollments in 1989 (6.9%) and 2008 (5.2%). If we remove Illinois from national two-year tuition and fees calculations, figures would be 11% lower in 1989 and 9% lower in 2008.

Large states with atypical tuition and fee levels became less atypical in proportional terms over the period. For example, Texas had the lowest four-year tuition and fees in 1989 at $1,616 and California had the fifth lowest at $1,895. Between 1989 and 2008, Texas had the fastest four-year tuition and fee growth at 287%, and California was third at 178%. If these two states had fully maintained their atypically low tuition in 2008 by simply increasing tuition and fees by 119%, the 2008 national average would have been 5% lower at $6,224 and the national growth rate in tuition would have fallen from 119% to 109%. These states enrolled 18% of four-year students in 2008, so their influence is dramatic.

Additional simulations can demonstrate the influence of several other large states, although none would be as dramatic as the few cases we presented here. Our primary point is to note a particular feature of the U.S. state higher education finance system: the most atypical states are often the largest states. As a result, our national estimates of public tuition and fees have been dramatically influenced by policy decisions in a few states.

Two-Year Enrollment Shares

An important feature of any state's higher education system is the share of its students that attend two-year institutions. Because states have invested in two-year campuses at very different rates, much of the variation across states in two-year enrollment shares reflects supply differences. In general, this variation across states is quite large. Some states, such as Alaska (1%), West Virginia (9%), and Vermont (10%), had very low enrollment shares in 1989. In contrast, California (61%), Washington (61%), and Illinois (57%) enrolled a majority of their students in two-year institutions. Meanwhile, a number of states, such as South Carolina (33%) and Rhode Island (33%), fall well between these two extremes.

Nationally, the share of students at two-year institutions grew from 41% to 46%. This increase was fairly universal as only five states saw their two-year enrollment shares fall. Twenty-five states had an increase of at least five percentage points, and among these 25, 12 of them had increases of at least 10 percentage points. The national gains were not heavily influenced by enrollment shifts across states. If we use 1989 state enrollment shares when calculating 2008 national figures, the national two-year enrollment share only falls from 45.8% to 45.3%. States with smaller initial two-year enrollment shares had the highest growth; the correlation between 1989 enrollment share and the percentage point change over the period is -0.31. This result is expected, because there is a ceiling effect for states with large two-year sectors.

Low-priced entry points may be especially important in states with high levels of four-year tuition and fees. By charging low tuition at two-year institutions, such states still would allow students the opportunity to attain a bachelor's degree at moderate cost through the transfer route. The evidence, however, reveals a strong positive relationship in prices across sectors.

18

Four-year and two-year tuition and fees have a correlation coefficient of 0.58 in 1989 and 0.75 in 2008.[11] Changes in four-year and two-year tuition and fees are also positively correlated. The correlation coefficient is 0.50 for changes in dollars and 0.40 for percentage changes. Clearly, transfer students are not realizing lower-than-average costs at their initial two-year institutions as compensation for higher costs at their four-year institutions. The forces pushing prices higher at four-year institutions within a state are likely also driving two-year prices, and these forces dominate any potential strategic efforts by states to offer lower-cost transfer routes. Although bivariate analysis does not allow for definitive statements, the magnitude of the results certainly suggests that no major strategic efforts of this type are present.

Another potential strategy would be for states to provide a larger number of lower-priced entry points when charging higher tuition at four-year institutions. In this case, we would expect a positive relationship between four-year tuition and two-year enrollment shares, because two-year enrollment shares are substantially, although not wholly, driven by differences in supply across states. Instead, we find a weak negative relationship.[12]

When we examined differences across states in their two-year enrollment shares, some interesting relationships quickly became apparent. The two-year enrollment share of a state in a particular year is highly correlated with population size. Figure 2a demonstrates this point by comparing the log of a state's population with its two-year enrollment shares. This figure only contains results for 1989, but similar findings occur for 2008. The correlation coefficient is 0.54 in 1989 and 0.53 in 2008, and a bivariate regression produces coefficients of 0.077 and 0.071 for

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[11] Contemplation and further examination did not produce insight into how or why this correlation grew stronger over time. Part of the explanation could simply be measurement error as IPEDS reporting has grown more accurate over time.

[12] From the perspective of institutional finances, a negative relationship would be expected. Higher tuition and fees allow a state to subsidize an institution less per student, and because costs per student are higher at four-year institutions, high tuition allows a state to offer a larger number of four-year slots for the same level of subsidy.

the two years. The opposite relationship occurs, however, when we examine changes over time. As Figure 2b demonstrates, two-year enrollment shares increased less in states with the highest population growth. The correlation coefficient is -0.33 and the bivariate regression result is -0.11.

What accounts for the differences in the cross-section and time-series relationships? In other words, why do large states – such as California and Illinois – have high two-year enrollment shares but growing states – such as Arizona and Nevada – do not increase their two-year enrollment shares as they become larger? Regional differences are one potential explanation, because states with large initial populations are mostly in different regions from states with fast-growing populations. An alternative and more interesting explanation lies in potential variation over time in states' reactions to population growth. States may no longer disproportionately increase the capacity of their two-year sector in response to growing demand. A full exploration of this issue requires a separate study, and we hope this paper will stimulate further inquiry in this area.

State Grant Aid

State grant aid grew over this period. State grants per FTE student increased from $362 to $682 between 1989/90 and 2007/08, an increase of 88%. 55% of that increase was due to growth in need-based aid, which increased from $321 to $496 over the period. The remaining 45% came from non-need-based aid, which grew from $41 to $186. The growth rate for non-need-based aid was much higher than the rate for need-based aid (355% vs. 54%), because non-need-based aid was extremely small at the beginning of the period. The share of aid that was non-need-based consequently grew from 11% to 27%.

20

Figure 3a, which compares the dollar change in need-based state grant aid per capita with the initial value, shows that inequality across states in need-based aid fell substantially in recent years. States with very small state grant aid programs in 1989 realized most of the growth over the period. If we used percentage changes rather than dollar changes, the downward trend in the figure would be extremely large. If we use the Gini coefficient, inequality fell by 20% from 0.55 to 0.44. Clearly, states have become more equal in their offering of need-based grants.

A very different story emerges from non-need-based aid. Almost all of the growth came from a small set of states that added large merit-aid programs during the period. The top 12 states had their average non-need-based grant aid per capita increase from $59 to $714 over the period. State grant awards in the remaining 38 states did not increase at all, as they averaged $36 in 1989 and 2008. None of these 38 states increased non-need-based grant aid per capita more than $95. Among the 12 fast growing states, nine had increases above $370. South Carolina ($1,583), Georgia ($1,459), and Tennesssee ($983) had exceptional growth. Thus, the surge in merit-based aid was strongly concentrated in a few states.

Despite the unequal distribution of non-need-based aid, total state grant aid per capita became more equally distributed over the period. The Gini coefficient for total grants fell from from 0.50 to 0.42. The reduction in inequality in need-based grant aid surely contributed to this trend. Another contributing factor was the original aid totals for the 12 states that added merit-aid programs during the period. These states all had relatively small grant totals in 1989, so their gains led to mobility within the distribution of states rather than further gains by those already at the top. Figure 3b, which compares the dollar change in total state grant aid per capita with the initial value, highlights the major role played by states that added merit-aid programs.

The enrollment shifts across states also helped fuel the growth in non-need-based aid. States with high levels of need-based aid disproportionately experienced slow enrollment growth. Assuming 2008 need-based grant aid per capita remained the same for individual states, need-based grants would have grown nationally by 60% rather than by 54% if state enrollment shares hadn't changed over the period. The opposite story occurred for non-need-based grant aid. States with large merit-aid programs were disproportionately located in the southeast, where population growth was larger. If state enrollment shares had remained constant, non-need-based grant aid would have grown by 310% rather than by 355%. The opposing trends for need-based and non-need-based grant aid perfectly offset each other so that total grant aid was not affected by changes in state enrollment shares over time.

State grant aid is used to offset tuition increases, so we would expect a positive relationship between state grant aid and four-year tuition and fees. States with the highest college prices should feel the greatest pressure to offset tuition with grant aid. Figure 4a reveals that a strong positive tuition-aid relationship existed in 1989.[13] With one exception, all of the states with grant aid per capita above $400 had average listed tuition and fees above $3,000. That one exception was New York, which provides another example of the outlier being a state with large enrollment levels.

Figure 4b shows that this relationship grew much weaker over the period.[14] The correlation coefficient fell from 0.46 to 0.18 and for a bivariate regression of grant aid on tuition and fees, the coefficient fell from 0.11 to 0.04. The relationship between four-year tuition and fees and need-based aid contributed to the decline in the size of the relationship but not to the

[13] For this figure and all subsequent analysis, similar results occur when the relationship between state grant aid and two-year tuition and fees is examined.
[14] Our practice of using the most recent year possible led to a slight mismatch in years for tuition and fees (2008/09) and state grant aid (2007/08) in Figure 4b. Because we are examining change over such a wide period (19 years) and because year-to-year changes are relatively mild, this mismatch does not create substantial problems.

decline in fit. When just need-based aid is used, the correlation coefficient is 0.48 for both years but the regression coefficient falls from 0.12 to 0.07. Changes associated with non-need-based aid were more consistent. The relationship between this form of aid and four-year tuition was slightly negative at the beginning of the period and grew even more negative over time. When just non-need-based aid is used, the correlation coefficient fell from -0.03 to -0.16 and the regression coefficient fell from -0.00 to -0.03. Even more importantly, non-need-based aid became more influential over the period as its share of total aid increased from 11% to 27%. Georgia, Florida, Tennessee, Louisiana, West Virginia, and New Mexico became important outliers that greatly moderated the tuition-aid relationship.

Data Limitations

Optimally, our analysis would have included in-state students in our enrollment totals for each state and would have contained some examinations of tuition and fees net of institutional aid. These imperfections were driven by limitations in the available data.[15] In this section, we discuss each of these limitations and their likely influence on our results.

Out-of-state students comprise a small share of students at public higher education institutions, so their inclusion would only introduce small levels of bias. We examined all students at public institutions in the 2007 National Postsecondary Student Aid Study (NPSAS) survey and found that out-of-state students comprised less than 10% of the sample at public four-year institutions and less than 5% of the sample at public two-year institutions. Furthermore, the direction of the bias created by the inclusion of out-of-state students is fairly easy to predict. For

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[15] IPEDS data only separates students by residence for incoming freshmen who start in the fall. IPEDS also does not report institutional aid dollars separately for in-state students. Further complicating attempts to estimate institutional aid are accounting changes at public institutions in the early 2000s. These changes would make any attempts to accurately compare 1989 and 2008 extremely difficult, if not impossible.

example, the two-year enrollment share would have been slightly higher in each year if out-of-state students were excluded, because four-year enrollment would fall more than two-year enrollment. The exclusion of out-of-state students would also systematically alter our analysis of changing enrollment shares across states. Higher education systems in fast-growing states often have difficulty meeting in-state demand while systems in states with stagnating populations have trouble filling existing capacity. Clearly, the latter group will have a greater incentive to increase out-of-state enrollment, so their state enrollment shares would have fallen even further if only in-state students were counted. As a result, enrollment shifts across states would have been found to have restrained tuition and fee growth even more if only in-state students were examined.

Our lack of institutional aid data is of concern because institutions in high-tuition states could theoretically offset their higher tuition by offering greater levels of institutional aid. In this scenario, listed tuition and fees would differ across states, but net tuition and fees would not. Likewise, institutions in states with small state grant programs could offer more institutional aid to offset the lower state grants their students receive.

Institutional aid could only have offset a small portion of between-state differences in listed in-state tuition and fees, because institutions typically provide fairly little aid to in-state students. Using NPSAS data from 1989, we estimated the average institutional grant awarded to full-time full-year in-state students to be $301 for four-year public institutions and $88 for two-year public institutions. At these magnitudes, the inclusion of institutional aid would likely not alter our results for 1989 in a meaningful way. When we use data from the 2007 NPSAS survey, the average institutional grant increases to $1,091 in the four-year sector and to $221 in the two-year sector. At these magnitudes, grant aid could not fully offset between-state differences but it could compensate for a meaningful portion of these differences.

Past research, however, provides some evidence that suggests this might not be the case. Doyle et al. (2009) and Curs and Dar (2010) investigate whether institutions compensate for lower state grant aid by offering more institutional aid, and they do not find evidence that compensation occurs. Further, policy analysts analyzing the growth of tuition and fees claim that institutional aid has not substantially offset tuition increases (Johnstone, 1993; Johnstone, 2004). Our understanding of the role that institutional aid dollars play in offsetting or amplifying between-state differences in listed in-state tuition and state grant aid is rather limited, however. More research is needed and requires a strategy to address the major data limitations that currently exist.

Conclusion

We have presented a wide variety of findings in this paper, and we conclude by summarizing our results. Our summary will be intertwined with discussion of the future. In several places, we have identified promising areas for future research into changes in state higher education finance policy during the 1990s and 2000s. In all areas, we believe that analysis of future time periods will produce extremely interesting results. Policy analysts have been expecting states to cut higher education funding substantially in the future as Medicaid, pensions, and other state costs soar (Hovey, 1999; Kane et al., 2003). The economic troubles of the late 2000s, which have caused huge budget deficits in many states, make long-term predictions deemed pessimistic in the early 2000s now seem realistic or perhaps even optimistic.

We find that higher education finance policies became more equal across states in certain areas and less equal in others. The differences in need-based grant aid narrowed the most, as states with large programs in 1989 did not substantially increase them over time, while states

25

without substantial programs added them. The former trend will likely grow even stronger.

Many of the states with the largest grant programs, such as New Jersey, New York, and Illinois,

have high-profile budgetary problems, and atypically large state grant aid programs that serve

low-income families will be vulnerable to cuts.

The growth in non-need-based aid was highly unequal as a minority of states added

gigantic merit-aid programs. These programs are not concentrated on low-income students, and

among those critical of this approach, there was substantial fear in the early 2000s that these

programs would spread to other states. However, the giant budget problems many states face

should seriously impede future growth. Most merit-aid programs were started when states were

provided with new infusions of money from the introduction of state lotteries or the settling of

tobacco lawsuits. State budgets are currently so dire that the federal government is now

providing money to states just to help them balance their existing budgets. Those stimulus funds

will dry up soon, at the same time that pensions and Medicaid costs rise. New states will not add

large new programs, and the primary question is whether states with existing programs can

maintain spending. Politicians will face serious political pressure from middle-class voters to

preserve merit-aid programs, but these programs are growing more expensive over time.

The proportional differences across states in tuition and fees have narrowed over time,

but the dollar gap has grown. As the basic foundations supporting low-tuition policies further

erode, we might expect low-tuition states to continue to increase at higher percentages so that the

dollar gaps start to narrow. The extent to which this occurs, however, depends upon differences

across states in student demand and political constraints. If low-tuition states have governance

structures and ideological commitments that favor low-tuition policies, they may not see higher

tuition growth even if institutions within those states can demonstrate the strongest need for more

tuition and fee revenue. Low-tuition states could also face different levels of student demand.[16]

As tuition and fees grow, market constraints that are determined by students' willingness to pay will grow in importance. Future research is needed on how political and market constraints impede tuition and fee growth for institutions in strong need of additional revenues.

We found that a number of key bivariate relationships changed over time in interesting ways, but thorough analysis of the forces driving these relationships was beyond the scope of this paper. Consequently, we have pointed the ways towards several promising lines of research. For example, we found that a state's two-year enrollment share is positively related to its population at a point in time. Changes to the two-year enrollment share in recent years, however, are negatively related to changes in population. One potential explanation for these findings is that states are not responding to increasing population by growing capacity at two-year institutions like they have in the past. Future research that more carefully tests this possibility is needed, and in general, we need to improve our understanding of how states respond to increasing demand when extra funds are not available due to difficult state budgets.

We also find that the relationship between tuition and state grants has changed over time, primarily due to the introduction of large merit-aid programs. Researchers have long been interested in the linkage between tuition and aid policies, as the philosophical justification for high-tuition policies assumes that substantial aid is directed to low-income students when tuition rises (Griswold and Marine, 1996). However, a strong tuition-aid linkage is not often found. As states scramble to reduce giant budget deficits, we might expect coordination between tuition and aid policies to suffer even more, and future research should examine this possibility.

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[16] Student demand will depend upon students' ability to pay, which will reflect the economic situation of a state's citizens. This demand will also reflect the quality of the education provided. Like almost all studies in higher education, we avoided the quality issue because this construct is difficult to define and measure clearly. As in most areas of higher education research, successful attempts at including quality considerations would represent a major advance.

Institutional financial aid represents another emerging area of interest. As Heller (2006) points out, institutional grants now represent the largest source of grant aid to students and their families. Variation across states in their institutions' patterns of awarding grants may contribute to between-state differences in access, magnifying or reducing these differences. We did not examine these issues due to data limitations, and future work that can overcome these limitations is needed. Recent papers by Curs and Dar (2010) and Doyle et al. (2009) suggest that state policies and institutional policies interact in interesting ways.

We have clearly demonstrated that national trends are highly dependent upon the experiences of a few large states. Historically, the most extreme tuition and aid policies often occur in some of the largest states in the country. California has historically had a very large two-year enrollment share and low tuition. In the 1980s, Texas also had a policy of low tuition. New York is the only low-tuition state that had a large state need-based grant program. These states substantially lowered national averages of higher education prices, because large weights were assigned to the figures from these states. Over time, however, these states are becoming less distinctive, which is contributing to the rise in prices. A major question for the future is how the California higher education system will be altered by the huge budgetary problems facing that state.

This research has also identified a hidden force that has restrained tuition and fee growth over time: the growing importance of Sun Belt states in determining national averages and the declining importance of northern industrial states. Geographic region has long been recognized as a major determinant of higher education prices (Hearn et. al, 1996). If these regional differences persist over time, then future population shifts across regions will continue to alter the national picture of state higher education finance policy independent of any policy decisions.

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Figure 1: Changing Between-State Inequality in T&F

Fig. 1A: Four-Year T&F
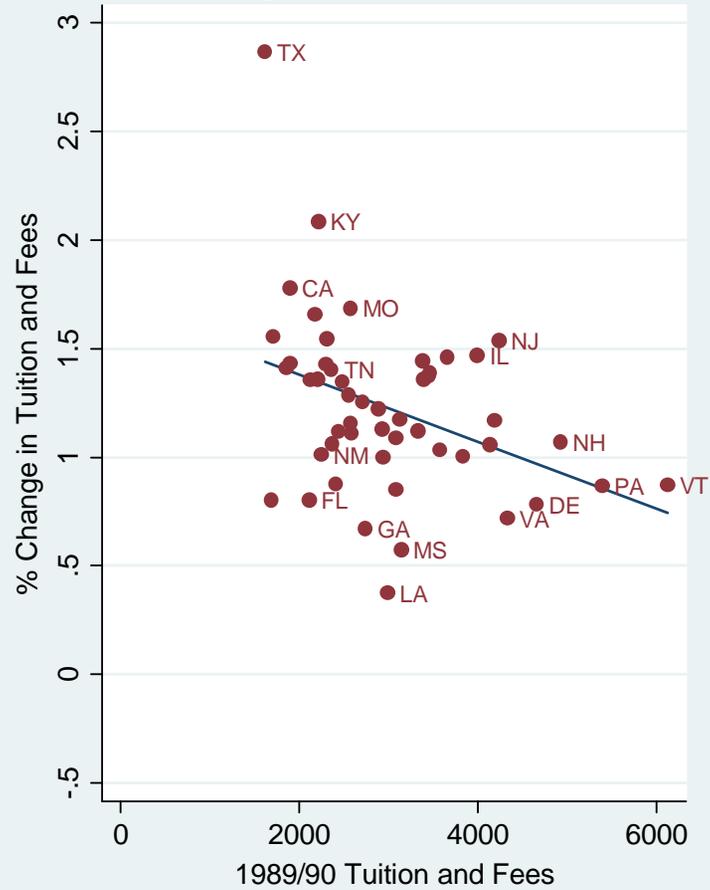
Fig. 1B: Two-Year T&F
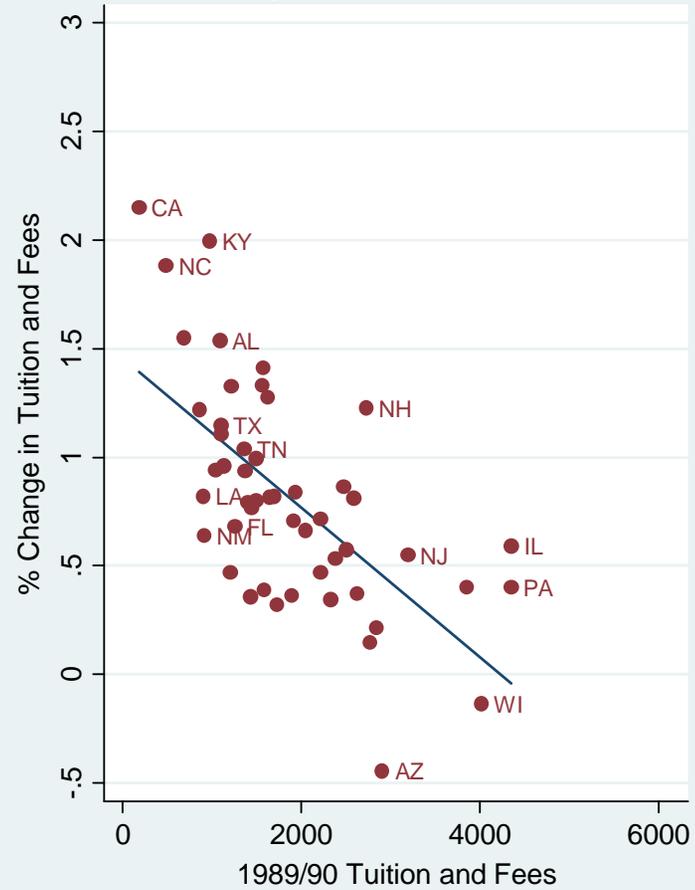
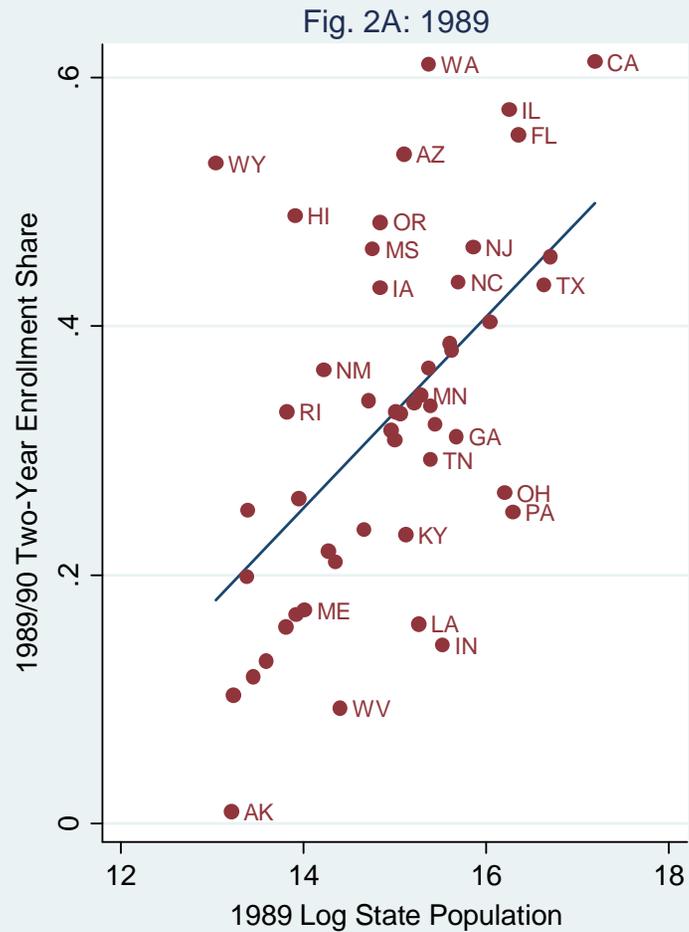Figure 2: Two-Year Enrollment Share & State Population
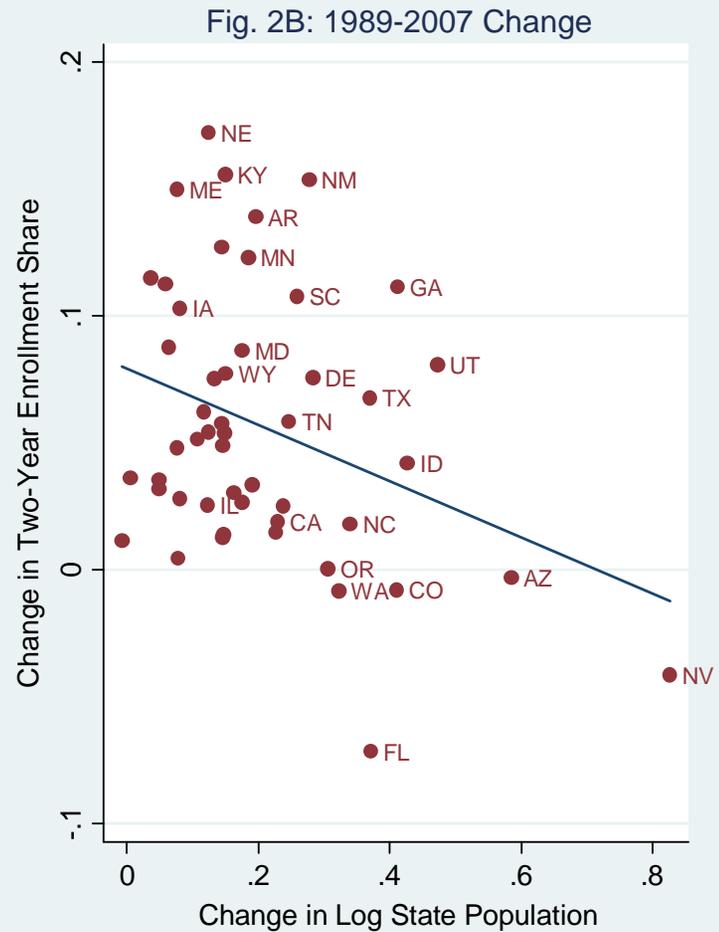
Figure 3: Changing Between-State Inequality in State Grants
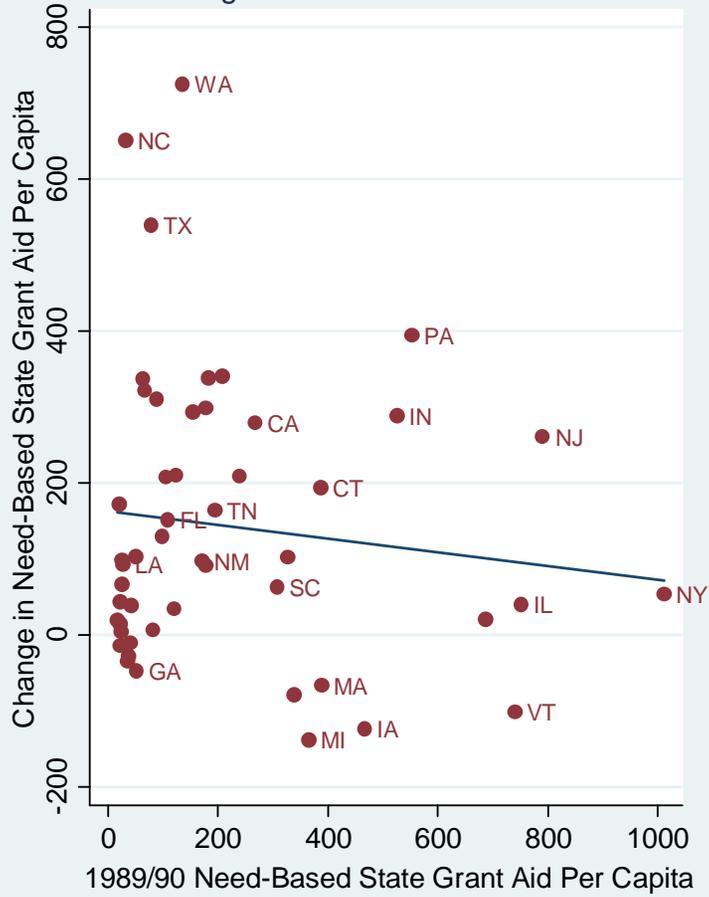

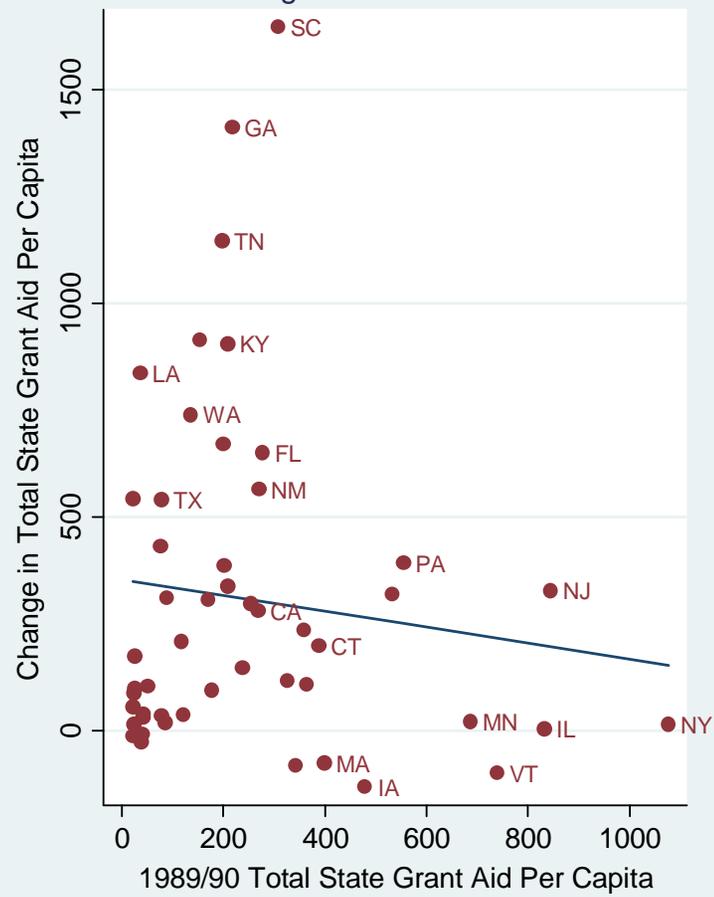Fig. 3A: Need-Based Grants

Fig. 3B: Total Grants

Figure 4: Relationship Between Tuition & Fees and State Grants