

Do Institutions Respond Asymmetrically to Changes in State Need- and Merit-Based Aid?

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Abstract

In the past two decades, states have implemented quite different financial aid policies with respect to whether they support the academic merit or financial need of students. However, there is still limited knowledge of the distributive consequences of these practices and the connection between state policy goals and actual net costs faced by students. This study builds upon our previous research by asking whether institutions respond through changing net price disproportionately to the policy priorities established through alternative merit- and/or needs-based state financial aid programs. We find that both public and private institutions lowered their listed tuitions and fees levels when states increased merit-based financial aid, indicating that institutions may be competing with each other for high ability students. Conversely, we find that higher education institutions raise net-price and lower their average institutional financial aid award when their states increase need-based awards, and indication that they are capturing increased state financial generosity. Our study highlights one of the mechanisms through which state spending on student aid may, or may not contribute to the achievement of the declared objectives of state government, such as increased access, increased retention, and an increase in the number of graduates in particular geographic and employment areas.

Keywords: Higher Education, State Policy, Financial Aid, Tuition Pricing
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INTRODUCTION

Increasing college access and completion is at the top of the U.S higher education policy agenda (Lumina Foundation, 2010; U.S. Department of Education, 2006). Growing tuition costs, high unemployment, and state budget crises have brought greater focus to the role of financial aid programs in preserving affordability, encouraging enrollment, and guaranteeing a more efficient use of public resources. Policy-makers have access to a large and established literature exploring the effects of financial aid on student access and success. There is also a growing body of research on recent trends in state student aid policy, including the use of these programs to achieve political goals, make up for drops in the value of federal aid relative to higher education costs, or as a more cost-effective alternative to direct institutional appropriations (e.g., Toutkoushian & Shafiq, 2010; Ness, 2010). Finally, there is growing use of institutional student aid programs to attract particular kinds of students and also make up increasing tuition costs (e.g., Curs & Singell, 2010; Singell & Stone, 2007).

Unlike most countries, the American higher education finance landscape involves a series of complex dynamic interactions among federal, state, and institutional student aid programs. In addition to the primary stated goal of increasing college affordability through increasing both access to and success within higher education, each of these programs also incorporates a variety of secondary goals that may or may not be compatible or aligned (i.e., preventing state brain drain, attracting higher-ability students to a particular institution, redistribution of resources to certain constituencies, or increasing student performance indicators). As a result, overlapping programs, competing priorities, political-economy cycles, and differences in state policy contexts often lead to vastly different prices paid by similar students in comparable institutions. Despite

their obvious significance, policy coordination issues (or lack thereof) are a much less explored piece of the college affordability puzzle.

In this paper, we continue our efforts towards making a contribution to the theoretical and empirical understanding on how governments and institutions interact to determine average prices paid by students and, ultimately, the actual versus intended government goals for higher education. In previous research, we investigated whether institutions of higher education adjust their pricing strategies as state financial aid policy changes. That is, we asked whether higher education institutions adjust their tuition and/or institutional aid when states alter the generosity of their financial aid policies (Curs & Dar, 2010). Here we take a step further and ask whether institutional responses differ with respect to the type of financial aid, (merit- or need-based) states provide. Instead of focusing on whether and when state financial aid programs are effective in reducing net price paid by students, we explore how institutions respond to different *types* of state student aid programs and, as a result, if they reinforce states redistributive priorities in the higher education sector.

We find that both public and private institutions lowered their listed tuition and fee levels when states increased merit-based financial aid, indicating that institutions may be competing with each other for high ability students, who are now subsidized at a higher rate by the states. Conversely, we find that higher education institutions, both public and private, raise net-price by increasing list tuition and lowering average institutional financial aid awards when their states increase need-based awards. These results indicate that institutions may view high ability students as desirable and thus compete for students through lowered prices in states that are rewarding merit. On the other hand, institutions see increased need-based aid as a potential opportunity to raise net price and capture increased rents, all else equal. Our findings support our

concluding argument that student aid programs have to be better designed in light of different cost-sharing arrangements and levels of higher education institutional autonomy in the states.

In the next section we provide background information on recent trends in institutional and state financial aid programs. We also summarize the pertinent literature on the links between government student aid programs and institutional pricing strategies. The third section describes the data, our empirical strategy and primary results. The last section discusses the findings and lays out potential policy implications. We conclude by arguing that state public resources spent on student aid may not meet the expectations of a lower cost of higher education if not coupled with better policy design and/or institutional oversight and control.

BACKGROUND

The most recent College Board reports on student aid and college pricing show that published college prices increased substantively in the past year, something expected given the financial constraints imposed by the recession started in 2007 (Baum & Ma, 2010a, 2010b). However, the most important indicator of college affordability, average net price paid by students, turned out to be lower in 2009-2010 than five years previous due in part to significant expansions in federal grant aid and tax benefits. Baum and Ma (2010a) report that the maximum Pell grant saw a 16 percent increase in constant dollars from 2009 to 2010. Moreover, average institutional grant awards have also increased, but the share of these that are need-based make up only 42 percent of all discounts offered by institutions. In sum, recent data indicate that increases in federal financial support have given lower- and middle-income students a reprieve from continuing rises in tuition, but that is unlikely to continue in the upcoming years.

Prior research on the links between federal student aid programs and institutional pricing behavior have so far been inconclusive, but in light of the relevance of the issue researchers

continue to refine empirical strategies and pursue alternative data sources to offer more solid evidence to inform policy (Long, 2008). So far, there is emerging evidence that changes in public subsidy to students affect pricing in at least part of the higher education sector, sometimes producing unintended consequences (Long, 2004; Singell & Stone, 2007). Nonetheless, increasing the amount of financial aid awards such as the Pell continue to be a key element of the Federal government's strategy to increase college affordability and part of ongoing political and policy battles (Baum & Ma, 2010a; Mettler, 2010).

While the Federal government has recently sought to curtail the incentives states face to decrease funding for higher education in response to budgetary constraints and increases in federal student aid funding, the same has not yet been true for incentives created for institutions or students (Alexander, Harnish, Hurley, & Moran, 2010; Curs & Singell, 2010). Declines in state appropriations are often linked to tuition increases, potentially limiting the purchasing power of federal and state student aid programs (Doyle, forthcoming; Koshal & Koshal 2000; Rizzo & Ehrenberg, 2007). Conversely, student responses to different types of aid programs and net prices affect institutional revenues, and subsequently, the likelihood a particular institutional pricing strategy will succeed (Curs & Singell, 2010). The increasing institutional use of price discrimination strategies based on student needs and abilities have brought another layer of complexity to federal and state efforts to increase college affordability and encourage enrollment.

At the state level, the links between financial aid policy and institutional pricing behavior have had less attention in the literature. However, with the continuing shift in states spending priorities from institutional appropriations to student aid, potential institutional responses to increases in student purchasing power through state grants have grown in importance. Moreover,

the redistributive consequences of this shift, especially when part of state aid is merit-based, have generated intense debate in the scholarly and policy literatures (Heller & Marin, 2002; McPherson & Schapiro, 1998; St. John, 2003).

In general, one must consider that net price paid by students may vary not only through changes in tuition, but also through adjustments in non-tuition prices and institutional aid awards. Indeed, recent research show some evidence that institutions do not capture additional state funds through changes in institutional aid awards (Doyle, Delaney, & Naughton, 2009), but may do so by adjusting prices for room and board (Long, 2004). Lowry (2001) found that institutions in states with governance structures giving states more political control tend to charge lower prices than those in states with more decentralized systems.

In our research, we found that institutions reinforce state policy preferences, mainly through downward adjustments in tuition levels, but changes in state aid affects institutions differently depending on state governance structures (Curs & Dar, 2010). Institutions in states with more centralized governance structures (i.e. with less control over institutional tuition pricing) are increasing net price mostly through cutting institutional financial aid disbursements as state increase the generosity of their financial aid programs. Conversely, institutions in states with more decentralized governance structures alter pricing choices more in line with state preferences, showing drops in net price both through tuition decreases and institutional aid increases.

Our findings indicate that the level of state oversight and control constrain the ability of higher education institutions to capture additional resources coming from state student aid programs. However, our prior research does not test whether different *types* of student aid programs affect institutional responses. As mentioned earlier, states have used student aid

programs not only to increase college affordability but also as policy tools to achieve other goals, such as, increasing enrollment, encouraging students to stay in the state, or as a political benefit to middle- to upper-middle income constituents (Ness, 2010; Zhang & Ness, 2010).

Eligibility criteria vary considerably across states, but most programs fall into two major categories: need-based or merit-based aid. Institutional responses to different types of student aid programs can shift the redistributive, educational, and economic outcomes desired by a particular state at a particular point in time. Given institutional incentives to maximize prestige and guarantee financial viability (by attracting more high-ability and/or full paying students), it is reasonable to expect that there may often be a mismatch between state and institutional goals. In this paper we focus on whether institutions respond asymmetrically to changes in these two types of state student aid programs. We report our findings in the next section.

EMPIRICAL METHODS AND ANALYSIS

Data Sources and Definition of Variables

Our analysis uses primarily institution-level data available from the Integrated Postsecondary Education Data System (IPEDS). IPEDS annually surveys the population of higher education institutions in the United States, providing detailed data on institutional characteristics, revenue sources, and pricing structures. We supplement the institutional data with secondary data sources on state socioeconomic and fiscal characteristics. Table 1 provides summary statistics and the following sections provide descriptions of the primary dependent and independent variables of the analysis.

Primary dependent variables. Institutions have the ability to alter their net price through two mechanisms, list tuition and fees as well as institutional financial aid awards. To allow for heterogeneity across institutional pricing policies we estimate our empirical models with three

related dependent variables. First, to investigate the pricing behavior of higher education institutions, we use a measure of net price (tuition and fees minus average institutional financial aid) consistent with previous research (e.g., McMillen, Singell, & Waddell, 2007; Singell & Stone, 2007). Public institutions typically have differentiated pricing structures for instate and out-of-state students. Thus, for public institutions we calculate alternative instate and out-of-state versions of our net-price measure to reflect this difference. The average institutional financial aid award offered to first-time, first-year undergraduate students is used as our measure of institutional financial aid. We specifically restrict our measure of financial aid to institutional aid, and not total aid, as a way to include in our dependent variable only those awards over which institutions have direct control.

Alternatively, we separate net price into the separate components of list tuition and fees and average institutional aid. Long (2004) showed that in response to the Georgia HOPE Scholarship public institutions in Georgia did not significantly alter their tuition levels but did significantly increase other prices under their control. By modeling tuition and institutional aid separately we may be able to observe differences in the propensity to alter net price through alternative policy mechanisms. Further, we are able to observe whether institutions may alter list tuition and financial aid strategies separately in response to changes in state financial aid policy.

Institutional data representing annual tuition, fees, and institutional grant aid is collected from the IPEDS and summary statistics for our sample are found in Table 1. The average net price at public institutions across our sample is \$2,616 for instate students and \$10,394 for out-of-state students, as compared to an average net price of \$10,905 for private institutions. It should be noted that all variables representing dollar amounts have been adjusted for inflation by the Current Price Index and normalized to the last year in the sample, 2007.

The sample mean for public list tuition and fees is \$5,389 for instate and \$13,124 for out-of-state students, and the mean institutional grant for public institutions is \$2,829. Private institutions have higher average tuition and fees, \$18,064, and institutional grant support, \$7,828.

Primary explanatory variables. We build on Curs and Dar (2010) by allowing changes in state merit- and needs-based aid to have separate effects on institutional pricing behaviors. As a result, the independent variables of primary interest are the average state merit-based ($State_Merit_{st}$) and need-based ($State_Need_{st}$) grants per college-aged person (defined as 18 to 24 year olds). The National Association of State Student Grant and Aid Programs (NASSGAP) collects expenditures data on state merit- and needs-based aid and the population of college-aged students is collected from the US Census Bureau.

Sample. To focus on a well-defined set of colleges with a common academic mission, we restrict the sample to non-profit institutions that offer at least a bachelors degree. This excludes community colleges, for-profit schools, and trade schools. Given the availability of IPEDS data, the prevalence of missing data in early survey years, and changes in accounting standards, we constructed a longitudinal dataset that spans the academic years 2002-2003 through 2007-2008. Within our sample are 539 public institutions and 1138 private institutions.

Empirical Model

Informed by prior research, we model institutional pricing behavior as a function of outside financial aid revenue, institutional revenue from non-tuition sources, institutional characteristics, and state characteristics (e.g., Long, 2004; Singell & Stone, 2007). To test whether state and financial aid awards have an impact on institutional pricing behaviors we estimate a fixed effects model for institutions using the following specification:

$$(1) \quad NetPrice_{it} = \beta_1 State_Merit_{st} + \beta_2 State_Need_{st} + \theta X_{it} + \phi S_{st} + \delta_i + \delta_t + \varepsilon_{it}$$

where $NetPrice_{it}$ is institution i 's net price (list in-state tuition and fees minus average institutional financial aid) in time period t , and $State_Merit_{it}$ and $State_Need_{it}$ are the average merit- and needs-based financial aid awards per college-aged student in state s .

The vector X_{it} represents control variables that are expected to correlate with institutional pricing and financial aid strategies (e.g., Long, 2004; Singell & Stone, 2007). Institutional level control variables include measures of institutional size and sources of institutional revenue (state appropriations, investment income, and gift income). Following Rizzo and Ehrenberg (2003), we included a vector S_{st} to control for state-level measures of higher education demand (median family income and the population of 18- to 24-year-olds). We included year fixed effects, δ_t , to control for any unobserved time dependence. Finally, the selectivity of an institution and other sources of time-invariant heterogeneity are absorbed into the error treatment through the fixed-effects specification, represented by δ_i (Schneider, Carnoy, Kilpatrick, Schmidt, & Shalveson, 2007; Wooldridge, 2002).

We estimate our models separately to account for differences in pricing behaviors between public and private institutions. Evidence suggests that private institutions may be more responsive to changes in federal financial aid (Singell & Stone, 2007) and state-based merit aid (Long, 2004). However, public institutions also have been found to respond to increased governmental financial aid by raising net tuition levels (Rizzo & Ehrenberg, 2003). Thus, we allowed for the responses to changes in state financial aid policy to differ between public and private institutions by estimating the models separately based on institutional control.

Alternative identification strategy. Despite the strength of a fixed-effects empirical strategy to control for time-invariant unobserved heterogeneity, the model does not control for unobserved effects that vary across time. For example, unobserved changes in institutional

financial aid policy in response to state and financial aid policy will not be accounted for and could potentially lead to endogeneity bias in our estimated coefficients. Alternatively, individual state and federal financial aid awards are often calculated based upon estimates of tuition, fees, and other cost of attendance measures of an institution. It is entirely plausible, and mandated by law in some cases, that institutional pricing behaviors may affect average state financial aid awards. Thus, due to the potential endogeneity of state financial aid in equation (1) the estimated parameters are potentially biased.

Faced with similar challenges, researchers have utilized a variety of empirical approaches to account for endogeneity bias when investigating comparable models including difference-in-difference (Long, 2004) and instrumental variables (Singell & Stone, 2007). We chose the instrumental variables strategy as a potential correction for unobserved factors likely to cause endogeneity bias in the estimated relationship between state financial aid and institutional financial aid (Angrist & Pischke, 2009; Schneider et al., 2007). In particular, we used state general tax revenue and state lottery revenues as instruments for state financial aid. Indeed, state-level revenue sources have been widely used as instruments for governmental policy choices, including state appropriations to higher education and state financial aid awards (Besley & Case, 2003; Hearn & Griswold, 1996; Hossler, Ramin, Westfall, & Irish, 1997).

The inclusion of institution-level fixed effects, combined with models that use instrumental variables, contributes to the understanding of the relationship between state and federal financial aid and institutional pricing behaviors. Models with and without the use of instrumental variables allow us to check the robustness of our findings across various assumptions regarding the error term.

Findings

Fixed Effects Estimation Strategy. Table 2 provides the fixed effects results when equation (1) is estimated with institutional net price as the dependent variable. For public institutions, we estimate separate models for in-state and out-of-state net price and report the results in columns 1 and 2, respectively. Based on the fixed effects estimates, the results indicate that public net price is not responsive to changes in either state merit- or needs-based financial aid. These results indicate that public institutions do not alter their pricing strategies when their states alter their own financial aid policies. In contrast, the relationship between both state merit- and needs-based financial aid and net price is positive for private institutions. Thus, as states become more generous with their financial aid policies private institutions respond by increasing their net price.

With respect to control variables, the estimated relationships for both public and private institutions generally meet expectations. Not surprisingly, public institution net price is negatively related to state appropriation revenues, which, although falling as a percentage of total revenue is still an important revenue stream for most public institutions. Similarly, public in-state net price is negatively related to institutional revenue from gifts, of which a large portion is earmarked for financial aid. The net price of private institutions is negatively related to institutional revenue generated from investment income. Given that private institutions are heavily dependent on endowment income for operating revenue, this finding is expected.

Despite evidence that suggests that institutions set tuition and financial aid jointly, by estimating them separately, we have the potential to observe asymmetries in the institutional response to state financial aid generosity through tuition and aid choices. Table 3 presents the re-estimation of equation (1) but with list tuition and fees (public in-state is reported in column 1,

public out-of-state in column 2, and private in column 3) and average institutional grant aid (public in column 4 and private in column 5) as the dependent variable.

Our estimates indicate that public instate tuition is positively related to state needs-based grant aid and not related to state merit-based grant aid. A similar pattern was found for private institutions. This would imply that as states increase their financial aid generosity to low-income students higher education institutions respond by increasing their instate tuition levels. The findings would indicate that public institutions may attempt to capture the increased generosity of state financial aid policy by increasing their own net price, thus, minimizing the ability of state financial aid policy to increase access for low-income students.

As both state merit- and needs-based aid increases public institutions increase their institutional financial aid awards in response. The increased financial aid awards in response to needs-based financial aid mitigate the increased tuition response, although the tuition increase is the dominant effect as indicated by an overall increase in net price. It appears that public institutions may compound increased state financial aid awards with institutional aid awards in a more targeted financial aid policy, consistent with a move towards a high-tuition, high-aid pricing policy.

In contrast, private institutions decrease institutional financial aid awards when states increase the generosity of their merit-based financial aid programs. This could indicate that private institutions may allow state merit aid to substitute for their own financial aid packages.

Findings of the Instrumental Variable Estimations. Tables 4 and 5 present the estimates of otherwise identical empirical specifications presented in Tables 2 and 3, while using an instrumental variables identification technique to control for the potential endogeneity of state

financial aid. Specifically, we instrument for the state merit- and needs-based financial aid award with state-level measures of tax revenue and lottery revenues.

In contrast to the insignificant findings in the fixed effects models for state merit-based financial aid, the instrumental variable estimates of the relationship between state merit-based aid grants and public in-state net price is negative. Specifically, the results indicate that public institutions lower their net price when states increase merit-based financial aid generosity. Further, the response of public institutions to changes in state financial aid awards appears to come primarily through decreases in list tuition levels as opposed to increases in institutional grants. Thus, the results would indicate that public institutions may compete for instate merit students by keeping tuition levels low. This empirical pattern indicates that public institutional pricing strategies work with state level financial aid policy when states promote access through merit-based financial aid strategies.

Alternatively, the instrumental variables estimates indicate that institutions raise net price in response to their state's increased needs-based financial aid generosity. Increases in net price with respect to increases in state needs-based aid appear to come through both increases in tuition and decreases in institutional aid. Thus, it appears that as state financial aid policy privileges students with financial need public institutions appear to raise price to capture rents. Thus, institutions may undermine state policies to promote access to higher education for low-income students.

SUMMARY AND IMPLICATIONS

This paper explores whether institutions respond disproportionately through their pricing strategies to the policy priorities established through state financial aid programs. We find that both public and private institutions lowered their listed tuitions and fees levels when states

increased merit-based financial aid, indicating that institutions may be competing with each other for high ability students which are being subsidized at a higher rate by the state. Conversely, we find that higher education institutions raise net-price and lower their average institutional financial aid award when their states increase need-based awards.

Our findings highlight one of the mechanisms through which state spending on student aid may (or not) contribute to the achievement of state governments' declared objectives (i.e., access, retention, increase in the number of graduates in particular areas) controlling for other sources of revenue and institutional characteristics. These results indicate that state student aid policy must be coupled with better design and/or institutional oversight. Most importantly, policy-makers must factor in the potential unintended consequences of allocating additional resources to student aid programs. While they may provide short-term political benefits, they may be ineffective in the long run.

This research highlights the fact that when a public body or institution creates financial aid policy the decentralized higher education finance system in the United States may inhibit the policies from meeting their intended goals. In a period of increasing college prices which are eroding at affordability of higher education for low- and middle-income students, research is needed to better understand the interplay of institutional and public objectives. A better understanding of how higher education objectives, such as prestige and revenue generation, alter the ability of state and federal governments to meet their own higher education objectives, access and workforce development.

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Table 1: *Sample Characteristics*

	Public Institutions		Private Institutions	
	Mean	Std. Dev.	Mean	Std. Dev.
Dependent Variables				
Net Price, In-state	\$2616	2146	\$10905	4452
Net Price, Out-of-State	\$10394	3759		
Tuition, In-State	\$5389	2222	\$18064	7937
Tuition, Out-of-State	\$13124	4414		
Average Institutional Grant	\$2829	1575	\$7828	5208
Independent Variables				
Average State Merit-Based Grant	\$67	132	\$57	116
Average State Need-Based Grant	\$170	133	\$200	135
Average Federal Grant	\$3208	589	\$3609	1136
Institutional Revenue: State Appropriations	\$80	100	\$0.3	5.0
Institutional Revenue: Gifts	\$7.9	23.4	\$12.9	48.6
Institutional Revenue: Investment Income	\$8.7	49.8	\$0.9	12.9
Total Enrollment	11101	10308	2601	3803
Median Family Income in State	\$48960	6904	\$49621	6127
Population of 18- to 24-Year-Olds in State	9.8	9.0	11.0	9.2
Observations	3097		6118	
Number of Institutions	539		1138	

Table 2: *Institutional Fixed Effects Estimates of the Effects of State and Federal Financial Aid on Institutional Net Price*

Independent Variable	Public In-state Net Price (1)	Public Out-of-State Net Price (2)	Private Net Price (3)
Average State Merit-Based Grant	-0.405 (0.704)	2.362** (1.182)	1.569* (0.853)
Average State Need-Based Grant	1.144 (0.909)	3.519*** (1.355)	2.334** (0.918)
Average Federal Grant	-0.378*** (0.0600)	-0.442*** (0.0808)	-0.372*** (0.0435)
Institutional Revenue: State Appropriations	-3.426* (1.785)	-13.52*** (3.657)	3.897 (2.512)
Institutional Revenue: Gifts	-2.934** (1.478)	-2.157 (1.924)	0.861 (1.758)
Institutional Revenue: Investment Income	-0.370 (0.571)	1.631 (2.335)	-25.73*** (2.708)
Total Enrollment	0.0186 (0.0263)	-0.0278 (0.0564)	0.0122 (0.0562)
Median Family Income in State	-0.0163 (0.0108)	0.0151 (0.0154)	-0.000872 (0.0137)
Population of 18- to 24-Year-Olds in State	-414.9*** (68.71)	30.90 (134.9)	382.3*** (125.9)
Year Fixed Effects	Yes	Yes	Yes
Institutional Fixed Effects	Yes	Yes	Yes
Constant	7688*** (896.5)	10404*** (1655)	7234*** (1525)
Observations	3097	3097	6518
Number of Institutions	539	539	1148
R^2	0.137	0.175	0.135

Note. Robust standard errors in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$

Table 3: *Institutional Fixed Effects Estimates of the Effects of State and Federal Financial Aid on Institutional Tuition and Grants*

Independent Variable	Public In-state Tuition (1)	Public Out-of-State Tuition (2)	Private Tuition (3)	Public Institutional Grant (4)	Private Institutional Grant (5)
Average State Merit-Based Grant	-0.0299 (0.463)	2.766** (1.269)	-0.430 (0.515)	0.353 (0.649)	-2.013*** (0.711)
Average State Need-Based Grant	2.511*** (0.389)	5.031*** (1.120)	2.287*** (0.628)	1.216 (0.817)	-0.265 (0.861)
Average Federal Grant	-0.0225 (0.0442)	-0.0849 (0.0696)	0.0189 (0.0183)	0.352*** (0.0497)	0.390*** (0.0429)
Institutional Revenue: State Appropriations	-7.463*** (1.138)	-17.57*** (3.671)	-0.902 (2.833)	-4.009*** (1.511)	-5.034* (2.670)
Institutional Revenue: Gifts	-0.838 (0.842)	-0.0580 (2.452)	3.778*** (1.279)	2.070 (1.285)	2.819 (1.944)
Institutional Revenue: Investment Income	0.963 (0.670)	2.964 (2.450)	-0.865 (1.950)	1.319*** (0.365)	24.74*** (4.054)
Total Institutional Enrollment	-0.0202 (0.0157)	-0.0687 (0.0517)	-0.0297 (0.0454)	-0.0344 (0.0270)	-0.0429 (0.0452)
Median Family Income in State	-0.0159** (0.00689)	0.0149 (0.0125)	-0.00468 (0.00947)	0.0000589 (0.00929)	-0.00113 (0.0123)
Population of 18- to 24-Year-Olds in State	-59.06 (37.26)	381.6*** (139.7)	342.9*** (108.1)	362.4*** (64.19)	-50.11 (113.3)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Institutional Fixed Effects	Yes	Yes	Yes	Yes	Yes
Constant	6360*** (546.2)	9097*** (1543)	13389*** (1245)	-1376 (851.1)	6436*** (1354)
Observations	3133	3133	6675	3097	6518
Number of Institutions	540	540	1149	539	1148
R^2	0.462	0.306	0.585	0.134	0.191

Note. Robust standard errors in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$

Table 4: *Instrumental Variables Estimates of the Effects of State and Federal Financial Aid on Institutional Net Price*

Independent Variable	Public In-state Net Price (1)	Public Out-of-State Net Price (2)	Private Price (3)	Net
Average State Merit-Based Grant	-5.949*** (2.145)	-4.017 (3.611)	-3.320 (2.053)	
Average State Need-Based Grant	24.15*** (7.356)	45.36*** (12.38)	16.50*** (5.338)	
Average Federal Grant	-0.416*** (0.0469)	-0.505*** (0.0789)	-0.386*** (0.0274)	
Institutional Revenue: State Appropriations	-1.465 (1.835)	-10.16*** (3.090)	3.668 (9.923)	
Institutional Revenue: Gifts	-3.272 (2.575)	-2.876 (4.334)	1.104 (2.002)	
Institutional Revenue: Investment Income	-0.158 (0.714)	2.000* (1.203)	-27.86*** (6.371)	
Total Enrollment	-0.00861 (0.0315)	-0.0827 (0.0531)	0.0141 (0.0539)	
Median Family Income in State	-0.0347** (0.0140)	-0.0190 (0.0236)	-0.0202 (0.0153)	
Population of 18- to 24-Year-Olds in State	-50.87 (180.8)	766.8** (304.4)	653.2*** (187.7)	
Year Fixed Effects	Yes	Yes	Yes	
Institutional Fixed Effects	Yes	Yes	Yes	
Constant	2482 (2368)	142.8 (3986)	3028 (2766)	
Observations	3097	3097	6518	
Number of Institutions	539	539	1148	
<i>R</i> ²	.	.	.	

Note. Robust standard errors in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$

Table 5: *Instrumental Variables Estimates of the Effects of State and Federal Financial Aid on Institutional Tuition and Grants*

Independent Variable	Public In-state Tuition (1)	Public Out-of-State Tuition (2)	Private Tuition (3)	Public Institutional Grant (4)	Private Institutional Grant (5)
Average State Merit-Based Grant	-4.517*** (1.284)	-2.343 (3.026)	-8.853*** (1.315)	1.374 (1.647)	-5.111*** (1.852)
Average State Need-Based Grant	13.95*** (3.716)	33.08*** (8.757)	13.46*** (3.397)	-9.554* (5.647)	-6.353 (4.817)
Average Federal Grant	-0.0484* (0.0273)	-0.139** (0.0643)	0.00233 (0.0171)	0.367*** (0.0360)	0.391*** (0.0248)
Institutional Revenue: State Appropriations	-6.271*** (1.069)	-14.97*** (2.520)	-1.464 (6.432)	-4.843*** (1.409)	-5.375 (8.954)
Institutional Revenue: Gifts	-1.002 (1.505)	-0.628 (3.545)	3.719*** (1.297)	2.272 (1.977)	2.427 (1.806)
Institutional Revenue: Investment Income	1.077*** (0.417)	3.217*** (0.983)	-2.723 (4.130)	1.226** (0.548)	25.49*** (5.749)
Total Institutional Enrollment	-0.0311* (0.0179)	-0.103** (0.0422)	-0.0214 (0.0349)	-0.0193 (0.0242)	-0.0367 (0.0487)
Median Family Income in State	-0.0252*** (0.00802)	-0.00901 (0.0189)	-0.0263*** (0.00979)	0.00895 (0.0108)	-0.000163 (0.0138)
Population of 18 to 24 Year Olds in State	105.5 (101.8)	902.9*** (239.9)	427.4*** (116.1)	160.6 (138.8)	-305.2* (169.4)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Institutional Fixed Effects	Yes	Yes	Yes	Yes	Yes
Constant	3980*** (1310)	1977 (3086)	11905*** (1744)	1398 (1818)	10251*** (2496)
Observations	3133	3133	6675	3097	6518
Number of Institutions	540	540	1149	539	1148
R^2