

RESEARCH REPORT

Tuition and State Appropriations

Using Evidence and Logic to Gain Perspective

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Tuition and State Appropriations: Using Evidence and Logic to Gain Perspective

How much do declines in state funding per student contribute to increases in tuition prices at public colleges and universities? The idea that a decline in revenue from one of these two main sources of funding for public higher education leads to increased reliance on the other source has strong intuitive appeal, and that relationship is frequently cited as an explanation for the rapid increase in prices when the economy is weak and state budgets are strained.

But both evidence and logic suggest that declines in state funding are only one of a number of factors that may influence price increases, and these funding declines generally lead to a combination of higher prices, lower spending, and changes in the composition of in-state and out-of-state students enrolled. Responses to changes in funding depend on an institution's market position and therefore differ by institution and over time. Universities with access to a deep pool of qualified students can react to cuts in appropriations by increasing tuition and enrolling more out-of-state students. For those universities with limited access to qualified students, the only available response might be decreasing expenditures.

Some researchers claim to demonstrate that most of the price increases in recent years are attributable to the failure of state funding to keep up with enrollment increases (Hiltonsmith 2015). Others have recently questioned the assertion that declines in state appropriations cause price increases, arguing that strong empirical evidence does not exist for this relationship, that other factors explain why colleges raise their prices, and that increasing state appropriations would not go far toward mitigating price increases (Cooper 2017; Delisle 2017). Observers promulgating this position sometimes refer to the hypothesis Howard Bowen (1980) put forward almost 40 years ago. His "revenue theory of costs" posited that institutions spend more when they have more revenue and that costs per student decline only when revenue declines.

Neither extreme position is accurate. However, the preponderance of analyses (including Bound et al. 2016; Rizzo and Ehrenberg 2004; Webber 2017) suggest that state funding declines explain a significant and perhaps an increasing portion of tuition increases, but that portion is considerably smaller than much general commentary might suggest.

Empirical evidence should be able to help resolve this debate, but the political implications of the debate ensure it will be very difficult to reach a consensus. Advocates of greater support for public higher education focus on the social benefits of higher levels of education and on the barriers to access associated with high tuition prices. Advocates of restraint in government spending tend to argue that colleges and universities spend whatever money they can get their hands on, that productivity increases are the most promising route to controlling costs and prices, and that students can and should pay for the benefits they get from higher education. By and large, the current debate ignores that an institution's reaction to appropriation cuts depends on its market position.

In this report, we first step back from the empirical analyses to define the relevant concepts, examine data, and develop the logic that should provide a framework for testing alternative hypotheses. We then look more closely at the varying methodologies researchers use to understand the relationship between state funding and tuition prices and, in a nontechnical way, explain some reasons we should be skeptical of the conclusions of several relevant studies.

We aim to clarify the bewildering extremes of the positions researchers and advocates have taken as a step toward charting a more constructive path forward to an equitable and efficient financing system. We do not provide a definitive answer to the question of what portion of price changes is directly attributable to funding changes. In fact, we question whether a single answer should be the goal of this line of inquiry.

We argue the following:

1. The consensus of reliable research is that cuts in appropriations significantly affect tuition prices. However, that effect is much smaller than much of the conversation on the issue suggests. Institutions use several strategies to adjust to lower state revenues, such as reducing expenditures, enrolling more nonresident students (who pay higher tuition prices), and increasing the average net prices they charge state residents to attend.
2. Estimating an average price response to declining appropriations will obscure significant differences both across institutions and over time. One answer will not work for all institutions in all circumstances. Some institutions will raise the price of tuition for state residents to cover most of the revenue loss, but others will not (and in some cases cannot, because of laws in some states that give the legislature or other state bodies authority over pricing decisions).
3. Both price increases and spending cuts can diminish educational opportunities. Price increases may have more impact on initial enrollment, but cuts in institutional resources and expenditures on education can diminish the quality of education and student success.

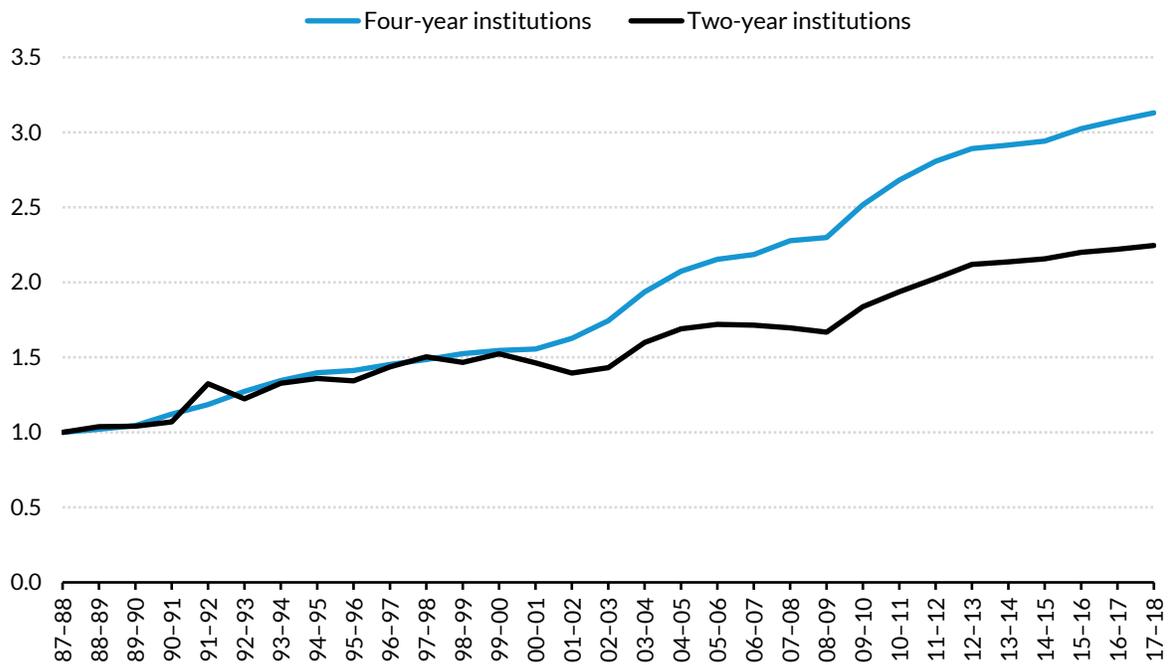
Changes over Time

The most visible concern is that tuition and fees at public colleges and universities are increasing much more rapidly than average prices in the economy. Figure 1 illustrates the rise in these prices over 30 years, from 1987–88 to 2017–18. If tuition had risen at the same rate as the Consumer Price Index, these lines would be horizontal. After adjusting for inflation, average tuition and fees at public four-year colleges and universities are more than three times as high in 2017–18 as they were in 1987–88, and at public two-year colleges (community colleges), the current average price is 2.25 times its 1987–88 level. But considerable variation in tuition growth among public four-year institutions lies behind the averages in figure 1. For example, tuition has increased more rapidly at public master’s universities than at public doctoral universities over the past decade (Ma et al. 2017).

Tuition and fees have not risen at a steady pace over time. The largest increases tend to follow recessions or periods when state budgets are tight, appropriations grow slowly or even decline, and enrollments increase in the face of weak labor market opportunities. As table 1 indicates, the most-recent decade demonstrates this pattern. Between 2007–08 and 2012–13 (the Great Recession and its immediate aftermath), average tuition and fees rose 27 percent beyond the rate of inflation at public four-year institutions and 25 percent beyond the rate of inflation at public two-year colleges. As the economy has recovered, tuition price increases have slowed markedly, although they remain above the rate of general price increases in the economy.

FIGURE 1

Published Tuition and Fees at Public Colleges and Universities Relative to 1987-88



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Source: Jennifer Ma, Sandy Baum, Matea Pender, and Meredith Welch, *Trends in College Pricing 2017* (New York: College Board, 2017), figure 4B.

TABLE 1

Increases in Published Tuition and Fees at Public Colleges and Universities

Five-year range	Four-year institutions	Two-year institutions
1987-88 to 1992-93	27%	22%
1992-93 to 1997-98	17%	23%
1997-98 to 2002-03	17%	-5%
2002-03 to 2007-08	31%	18%
2007-08 to 2012-13	27%	25%
2012-13 to 2017-18	8%	6%

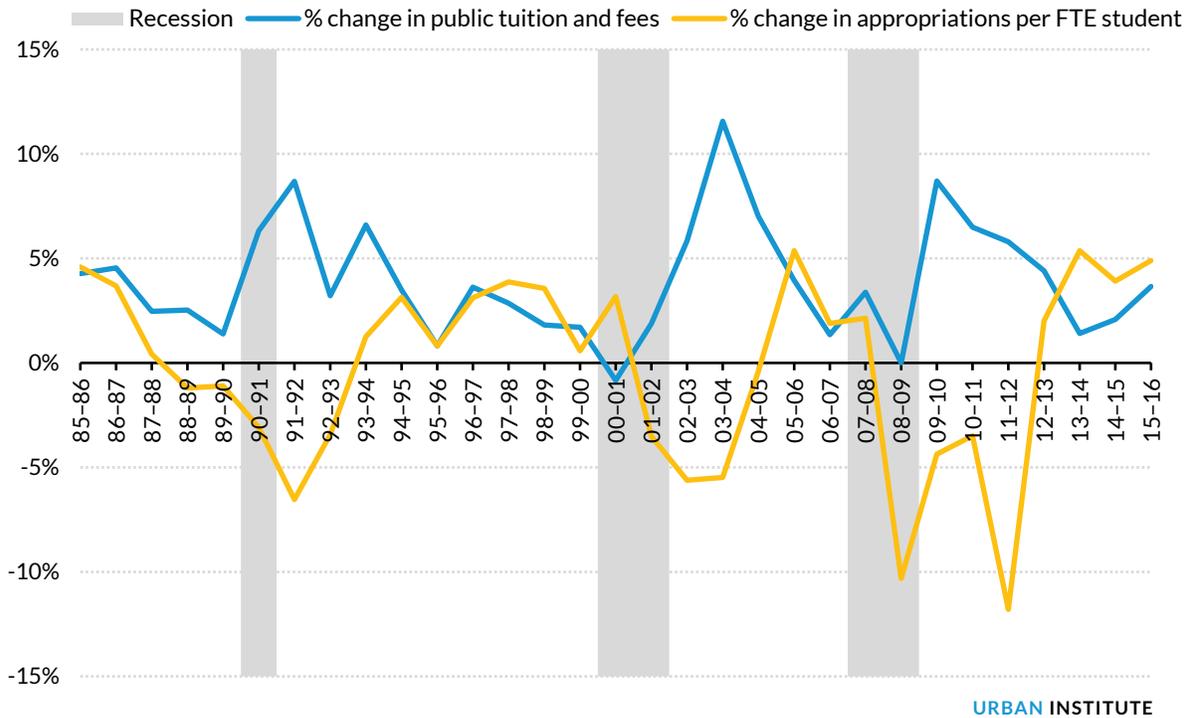
Source: Jennifer Ma, Sandy Baum, Matea Pender, and Meredith Welch, *Trends in College Pricing 2017* (New York: College Board, 2017), figure 4B.

Figure 2 illustrates the negative correlation between annual changes in tuition and fee prices and changes in state and local appropriations per student.

FIGURE 2

Annual Percentage Change in Inflation-Adjusted Per-Student State and Local Funding for Higher Education and in Tuition and Fees at Public Institutions

1985-86 to 2015-16



Source: Jennifer Ma, Sandy Baum, Matea Pender, and Meredith Welch, *Trends in College Pricing 2017* (New York: College Board, 2017), figure 12A.

Note: FTE = full-time equivalent.

Another perspective on the relationship between state and local appropriations and prices comes from data on the changing composition of institutional revenues (table 2). Between 2004-05 and 2014-15, per student revenues at public four-year institutions from federal, state, and local governments declined by \$2,280 (\$1,720 in appropriations and \$560 in other government funding). Net tuition revenue (which includes federal and state grant aid students receive to help them pay for college) rose by \$3,000. The loss in appropriations cannot explain the entire increase in tuition revenues. But total revenues per student rose by only \$720 despite the large increase in tuition payments. The numbers for public two-year colleges are smaller, but the pattern is similar.

TABLE 2

Average Revenue per Student by Source, Public Four-Year and Two-Year Institutions
2004–05, 2009–10, and 2014–15

	Net tuition revenue	State and local appropriations	Federal appropriations and federal, state, and local grants and contracts	Total
Four-year institution				
2004–05	\$7,170	\$8,850	\$7,400	\$23,420
2009–10	\$8,680	\$7,880	\$7,590	\$24,150
2014–15	\$10,170	\$7,130	\$6,840	\$24,140
Change 2004–05 to 2014–15	\$3,000 42%	-\$1,720 -19%	-\$560 -8%	\$720 3%
Two-year institution				
2004–05	\$2,740	\$5,910	\$1,590	\$10,240
2009–10	\$2,980	\$4,980	\$1,510	\$9,470
2014–15	\$3,460	\$5,480	\$1,540	\$10,480
Change 2004–05 to 2014–15	\$720 26%	-\$430 -7%	-\$50 -3%	\$240 2%

Source: Jennifer Ma, Sandy Baum, Matea Pender, and Meredith Welch, *Trends in College Pricing 2017* (New York: College Board, 2017), figure 14.

Notes: Net tuition revenue is the amount of revenue an institution takes in from tuition and fees from both undergraduate and graduate students, net of all institutional grant aid provided to students. Some of this revenue comes in the form of Pell grants and other financial aid from federal and state governments and other sources.

The Concepts

Estimating the association between tuition and state funding is not as simple as it sounds. The most commonly cited figures about tuition are based on published tuition prices and required fees for one year of full-time study. According to the College Board, in 2017–18, the average published prices at public institutions across the nation were \$9,970 for in-state students at four-year colleges and universities (\$10,830 at doctoral universities and \$8,670 at master’s universities), \$25,620 for out-of-state students at four-year institutions, and \$3,570 for in-district two-year college students (Ma et al. 2017, table 1).¹

But these prices are not the most relevant ones for understanding how much students pay or for analyzing institutional revenues. Because colleges and universities discount their tuition for many

students or provide institutional grant aid, their tuition revenues are lower than the published tuition price multiplied by the number of students enrolled. It is the *net* tuition revenue that is available to help fund their operations. Further, net tuition revenue and the published tuition price are not necessarily tied together. When institutions increase their published prices, they may provide larger discounts to students. Much of the public concern about rising prices focuses on the more visible sticker prices, but the logic of responses to changes in state revenues applies best to net prices.

As detailed in the next section, the patterns vary considerably across institutions. Institutions can increase their net tuition revenues by raising their sticker prices, lowering the discounts they offer students, recruiting more out-of-state and international students who pay higher prices, or by combining any of these strategies.

Some studies focus on net tuition revenues per student (Cooper 2017), and others focus on tuition prices (Bound et al. 2016). To the extent that colleges respond to declining state revenues by changing the composition of their student bodies, they may be able to increase their revenues without raising their prices. Students who are residents of other states and international students pay higher prices than state residents. Further, tuition prices for part-time students (and the associated costs of these students) are not exactly proportional to their enrollment intensity.

Over time, declining state appropriations² per student and increasing net tuition revenues have changed the composition of institutional revenues. The percentage of total revenues at public colleges and universities that comes from net tuition payments has increased, while the share covered by state appropriations has decreased. But a decline in the share of expenses covered by appropriations is distinct from an absolute decline in appropriations. If revenues from state and local governments grow at a slower rate than tuition revenues, the share of government appropriations will fall—this is a matter of arithmetic, and the changing share need not have been sparked by a change in government policy.

The distinction between costs and prices is also critical. Colleges are unlikely to raise their prices dollar for dollar in the face of declining state revenues; they are aware of the price sensitivity of students and of the political resistance to such a move. Rather, they complement their tuition strategies with strategies for lowering (or slowing the rise in) expenditures. Some of these may be stopgap measures, such as hiring freezes. Others may have a long-run impact on costs through, for example, the elimination of programs or improved efficiencies.

Recent discussions focus almost exclusively on concerns about rising prices. But cuts in expenditures in response to funding declines can also be problematic. A study by Orszag and Kane

(2003) provides important perspective 14 years later. The opening paragraph could easily have been written recently:

In recent years, many public colleges and universities around the country have announced double-digit increases in tuition. The recession and the resulting squeeze on state revenues are the immediate causes. However, the short-term crisis should not be allowed to obscure a longer-term shift in state financing of higher education, which began more than a decade ago. As states have struggled to respond to other demands on their budgets—primarily due to rising state Medicaid obligations—parents and students have been asked to pay an increasingly large share of the costs in public higher education.

Focusing not just on dollars per student but also on state appropriations relative to personal income, the authors argued that although tuition increases were the most visible sign of the secular decline in state funding, the quality of public higher education had also declined. According to Orszag and Kane (2003), increases in Medicaid spending explained about 80 percent of the decline in spending on higher education between 1988 and 1998.

Orszag and Kane's analysis did not find that tuition increased enough to offset declines in appropriations. Instead, expenditures per student declined, negatively affecting the quality of public higher education. According to the authors, the ratio of spending per full-time equivalent student at public colleges and universities to spending at private institutions fell from about 70 percent in 1977 to about 58 percent in 1996. Their main concern was that tuition had *not* increased enough to compensate for the loss of other revenues and that the nation faced a serious problem of declining quality in public higher education (Orszag and Kane 2003).

Recent work by Deming and Walters (2017) raises a similar concern. The authors compare the impact of marginal dollars spent on lowering tuition prices to dollars spent on increasing the quality of the college experience. They find that institutional spending increases have a significant positive impact on postsecondary attainment, but cuts in average net tuition do not.

Balancing Institutional Budgets

Public colleges and universities generally have to balance their budgets annually or at least over two- to three-year periods. State legislatures tend not to look favorably on campuses amassing funds that might be drawn on for a “rainy day” or for purposes the legislature has not specifically approved.³ Saving for a rainy day may work for families, but public institutions are likely to see their state funding slashed if

they do not spend all their revenue each year. This means that there is no ready source for making up revenue shortfalls in bad years.

If state appropriations decline, institutions must either find replacement revenue or spend less. This accounting reality means it is reasonable to expect institutions to consider raising tuition when other revenue sources dry up. They will likely also look for ways to spend less, and they will look for more students who are able and willing to pay higher prices.

One Size Does Not Fit All

As we noted, there is every reason to believe that the response to changes in appropriations will vary depending on the constraints and opportunities the market presents to different classes of institutions, as well as to different institutions within a class. In fact, there is considerable variation in the patterns over time and across institutions, both between and within institutional subgroups.

The search for patterns in the relationship between state funding and college prices inevitably involves focusing on averages across groups of institutions. But at the institution level, there will always be a lot of noise (variation that we lack either the data or the understanding to explain). If some institutions raise their tuition dollar for dollar when they lose state revenues, but others cut their expenditures and seek alternative revenue sources, the average will not be very meaningful. Some institutions may expand enrollment to bring in more tuition dollars. Some may cut enrollments to reduce expenditures.

Not all options are available to all institutions. Some have considerable autonomy in setting their tuition prices, but other institutions may be subject to prices that state entities dictate. Some may be able to attract many out-of-state or international students, but others have few nonresident applicants or are barred by state law from reducing the share of resident students. The values, experiences, and constraints institutional leaders face and the character of the relationships these leaders have with political leaders will also affect policy.

Bound and colleagues (2016) decompose the change in net tuition revenues per student at individual research universities between 2007–08 and 2012–13 into the share attributable to increases in undergraduate in-state tuition, the share attributable to changes in the number of international students and the tuition premium they pay, and the share attributable to changes in the number of out-of-state domestic students and the tuition premium they pay. Patterns varied dramatically across

institutions. At the Ohio State University, for example, 62 percent of additional revenues came from international students and 14 percent from out-of-state revenues; increases in in-state tuition accounted for 23 percent of the increase in net tuition revenues. At the University of Missouri, only 13 percent of the growth in tuition revenues came from international students, 78 percent came from out-of-state students, and 9 percent came from in-state students. The University of Florida did not have substantial increased revenues from either international or out-of-state students; the school raised its in-state tuition price 66 percent over those five years (after adjusting for inflation), compared with 5 percent at Ohio State and 4 percent at Missouri (Ma et al. 2017).

Timing is another critical factor that can make measuring responses to funding changes challenging. Some institutions may be able to find temporary economies or enrollment modifications, postponing tuition increases for a year or more. In other cases, the impact of tuition increases may all be felt soon after funding changes are announced.

Moreover, it is reasonable to believe that even for individual institutions, responses are not consistent over time. For example, the political landscape may change, institutions may become more aware of price sensitivities among their potential students, or the potential for attracting international or out-of-state students may change. It may also be the case that institutions respond differently to changes in appropriations per student that result from enrollment increases rather than from declines in total appropriations. Between 2005–06 and 2010–11, for example, total funding from state appropriations rose slightly, even after adjusting for inflation. But a 19 percent increase in public-sector enrollments across the nation created a significant decline in funding per student (Ma et al. 2017). Relying on data over time or across institutions to generate a single estimate of how changes in state funding are passed on to students through tuition changes may not be illuminating.

Variation across States

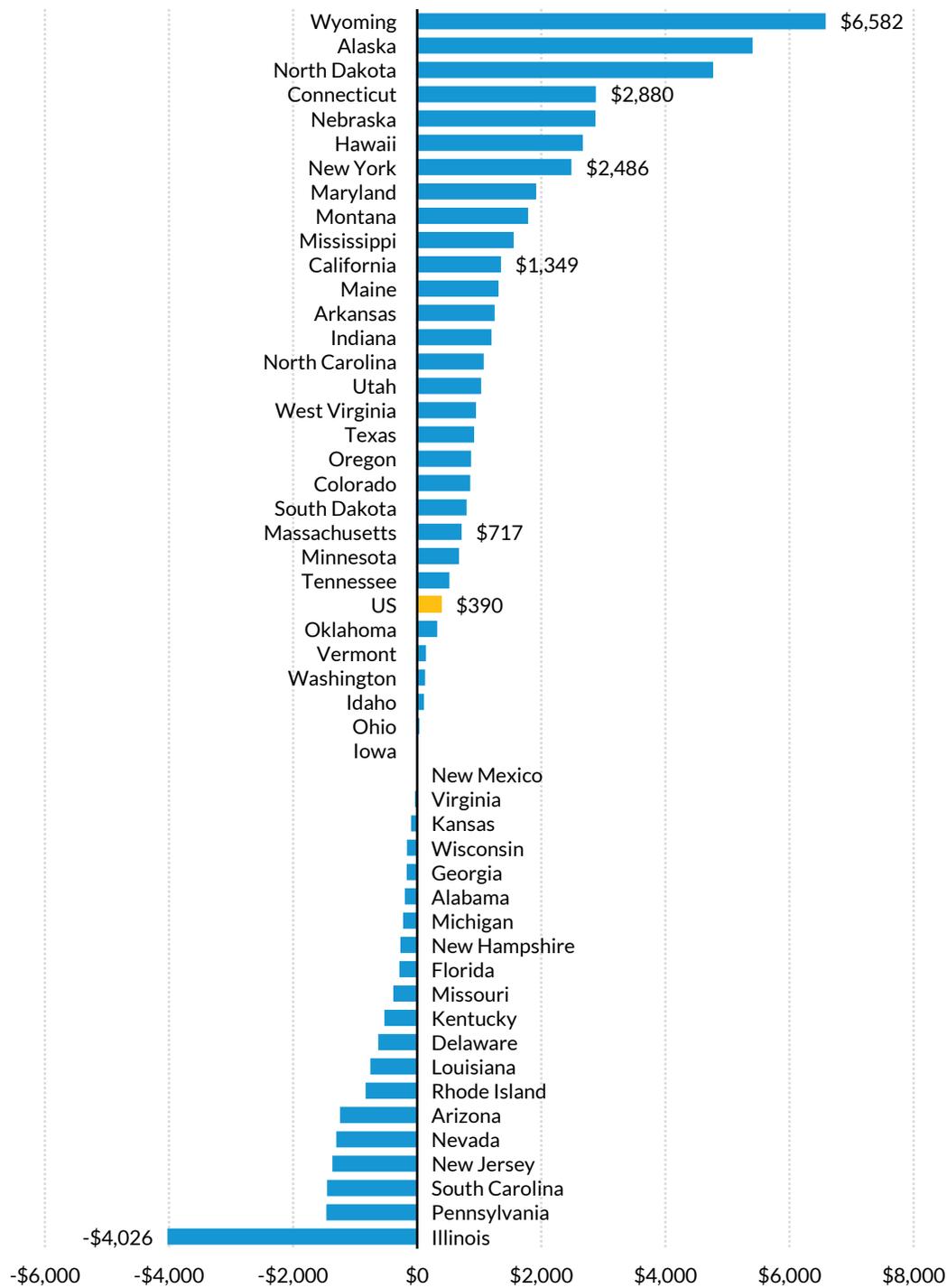
Although national patterns suggest a negative correlation over time between changes in state funding and tuition revenues at public four-year colleges and universities, comparisons across states do not follow this pattern. As figures 3 and 4 show, between 2005–06 and 2015–16, there is little correlation between the dollar changes in state and local per student funding of public institutions and the dollar changes in net tuition revenues. In 10 states with declines in funding or increases smaller than the national average of \$390 per full-time equivalent student, increases in net tuition revenue were smaller than the national average of \$2,530. For example, state and local funding per student declined by \$1,450 in South Carolina and by \$1,300 in Nevada. Net tuition revenues increased by \$2,120 in South

Carolina and \$1,810 in Nevada. And in 13 states with increases in funding larger than the national average, net tuition revenue rose more than the national average. For example, state and local funding per student rose by \$2,880 in Connecticut, and net tuition revenue rose by \$5,160.⁴

As the data in figures 3 and 4 demonstrate, factors other than appropriations are at play. Each state has a different composition of institutions and students, a different starting level of tuition, a different ability to attract out-of-state and international students, different capacity utilization, different tuition-setting mechanisms, and different levels of expenditures per student. Such differences are further evidence that there is a great deal of unexplained variation in these data.

FIGURE 3

Dollar Change in State and Local Funding per Student by State, 2005–06 to 2015–16

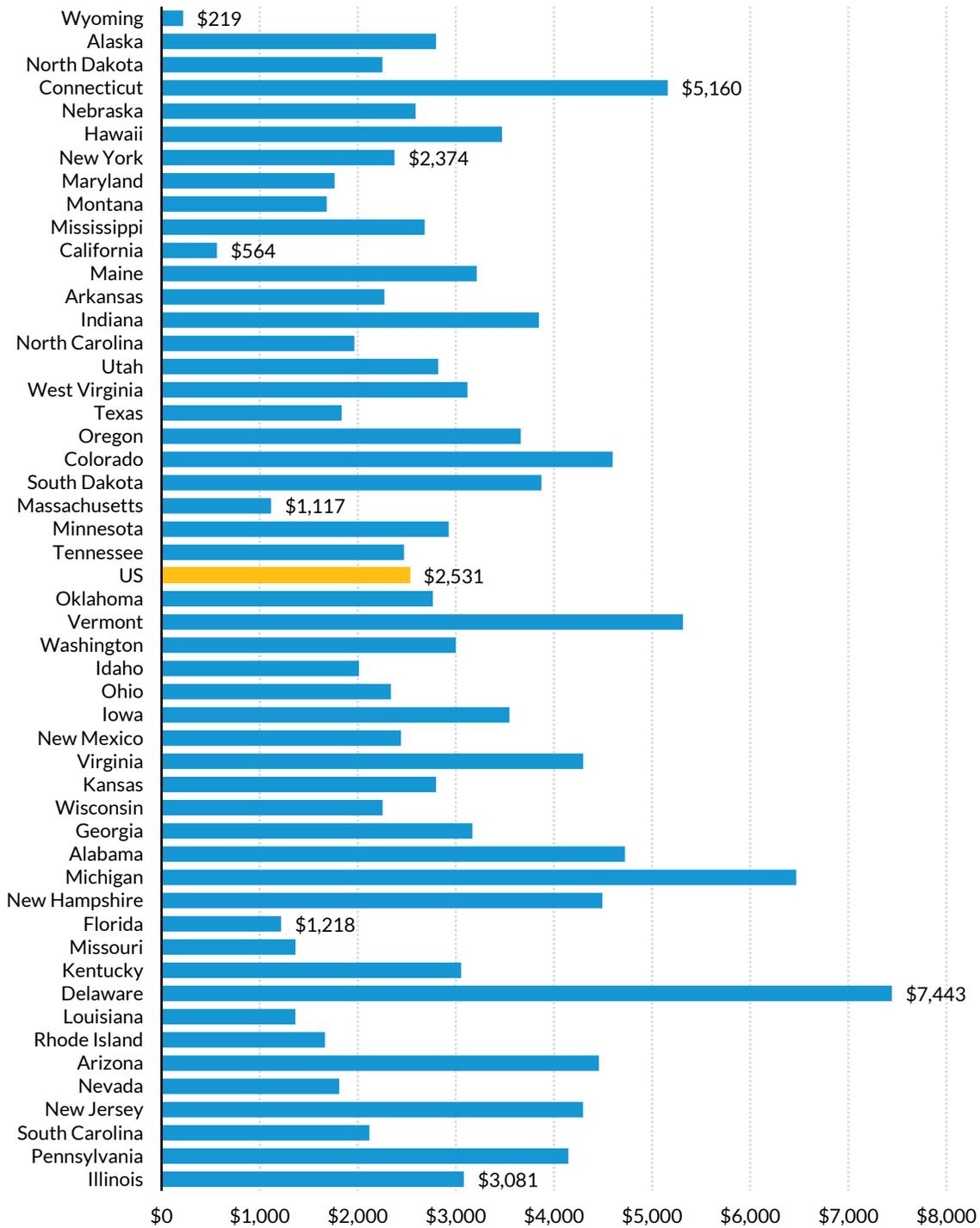


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Source: State Higher Education Executive Officers (SHEEO), *State Higher Education Finance (SHEF): FY 2016* (Boulder, CO: SHEEO).

FIGURE 4

Dollar Change in Net Tuition Revenue per Student by State, 2005–06 to 2015–16



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Source: State Higher Education Executive Officers (SHEEO), *State Higher Education Finance (SHEF): FY 2016* (Boulder, CO: SHEEO).

Empirical Analyses

Studies that attempt to determine the extent to which changes in state and local appropriations *cause* tuition to increase fall into two main categories: accounting and econometric.

The Accounting Approach

Much of the discussion about the relationship between state funding and tuition prices focuses on how much of the increase over time in prices is attributable to declines in state funding and how much results from other forces, such as increased expenditures per student or declines in revenue from other sources. A different question is how much a decline in state revenues generates price increases and how much it leads instead to cost reductions or enrollment changes. It is possible to imagine a scenario in which funding declines are almost entirely translated into tuition increases, but other factors also put upward pressure on tuition, which could then rise more than enough to compensate for the revenue decline. It seems clear that one simple explanation will not suffice.

Some researchers begin with the basic arithmetic that with a balanced budget, the total change in revenues from all sources has to equal the total change in spending. Such approaches ask how revenues from other sources and expenditures have changed as state funding has changed. For example, Hiltonsmith (2015) looks at the national averages of dollar increases in net tuition revenue per student and expenditures per student and the dollar declines in state funding per student. From 2001 to 2011, he finds that expenditures per student went up by about \$500 at public research universities. Funding per student declined by about \$3,000, and net tuition revenue rose by about \$3,500—enough to cover both the relatively small increase in expenditures and the decline in state funding. The balanced budget arithmetic holds.

This example suggests that tuition increases largely compensate for declining appropriations per student. But as the data above reveal, expenditures rise and fall with funding changes and net tuition revenues per student rise even when state funding is not declining.

Even if it is hard to argue that the decline in state funding did not play a significant role in the tuition increases, there is no way to predict from this information what would happen to tuition if state funding were suddenly restored. Institutional administrators may have had no choice other than to raise tuition prices (at least in cases where altering the mix of students was not a realistic possibility). But they would surely have a range of choices if the tide were to turn. They could use the extra funds either to rein in tuition or to enhance their offerings. The resultant combination would depend on circumstances and

would likely reflect both the political forces within universities and the character of university-state relationships. It is possible that some spending increases might be profligate, but others would have a measurable impact on quality and student success.

Moreover, the requirement of a balanced budget does not prove that other forces did not contribute to tuition increases over the decade in question. Even if expenditures per student did not go up much, there may have been opportunities to restrain spending, such as efficiencies from technology or reductions in the prices of equipment, that mask unnecessary expenditures in some areas. One factor limiting cost increases has been the rise in reliance on part-time and non-tenure-track faculty. Whether because of budget pressures or in response to the oversupply of PhDs making cheap labor readily available, many universities are paying less per unit of instruction than in the past.

Econometric Models

Other researchers use econometric models to estimate how a certain dollar or percentage change in appropriations is reflected in changes in tuition (Bound et al. 2016; Cooper 2017). How much does a change in appropriations affect tuition? Researchers may use data on a variety of factors that could affect tuition levels, attempting to isolate the impact of each while controlling for the others. This work is not easy for nontechnical readers to decipher, and too often the authors' conclusions make headlines without much evaluation of the analysis that generated those conclusions.

Many judgment calls go into the construction of an econometric model, but the starting point should be a hypothesis. What is the logic behind the story the model is designed to test? What assumptions do the researchers make about the factors that drive institutional decisions? How are the findings likely to be conditioned by the period studied and by the particular sample of institutions included? What role might each of the variables included play, what factors might be missing, and what problems might there be with the data?

The idea that changes in external funding sources (such as state appropriations) cause universities to make trade-offs between net price increases and expenditure cuts to balance the budget is intuitively plausible. But what logic might explain a contrary view that changes in state funding have little or no impact on tuition prices? One story would be that (despite the patterns in tuition changes noted above) state universities simply raise their net tuition charges by roughly the same amount every year, regardless of external funding, and therefore they must adjust to changes in external funding almost entirely by changing their spending. An alternative version of this theory would be that institutions vary

their tuition increases from year to year but for reasons unrelated to the external funding environment. Before simply “running the numbers,” we encourage proponents of any of these theories to explain what underlying mechanisms they believe are at work and seek evidence about their plausibility.

Evidence about the mechanisms that underlie observed behavior should not be limited to regression running. Institutional leaders sometimes offer accounts of the factors affecting their tuition-setting decisions. Of course, the credibility of their assertions needs to be assessed, but they should not simply be dismissed. For example, the president of Iowa State University recently requested an increase in resident undergraduate tuition of 7 percent in each of the next five years. Observing that enrollment has increased by more than one-third while total state funding has decreased significantly, he argued that there is simply no choice if the university is to continue offering a quality education to its growing student body.⁵ Is the decline in state funding really irrelevant to this tuition request?

Most econometric models of the relationship between tuition and appropriations have led to the conclusion that declines in state appropriations have both a negative impact on expenditures per student and a positive impact on tuition prices. Without recounting these analyses in detail, we can briefly describe the general findings. Results from four well-regarded studies (Bound et al. 2016; Deming and Walter 2017; Rizzo and Ehrenberg 2004; and Webber 2017) suggest that there is a significant negative relationship between appropriations and tuition in public higher education, with somewhere between 25 and 50 percent of an appropriations cut offset by a tuition increase, with some suggestion that this relationship is growing stronger over time. A fifth study Cooper (2017) reports almost no relationship between appropriations and tuition. Datasets and the institutions included, variable definitions (e.g., net versus gross tuition), time periods, and control variables differ across these studies, certainly contributing to variation in results. There is, however, strong evidence of a significant relationship between appropriations and colleges prices. But it is notable that declines in appropriations are far from fully reflected in price changes and that state funding changes explain only a portion of those price changes.

None of these studies separately or in aggregate can be viewed as definitive. Some simple guidelines might help in encouraging the production of more helpful studies as well as more constructive assessments of the contributions of existing studies.

1. Recognize that the relationship between changes in state appropriations and changes in tuition is likely to be different among different groups of universities and colleges and to vary over time. There simply is not some “natural constant” that is likely to apply everywhere and always. For example, colleges with excess demand for enrollment among people who are willing to pay

will likely raise prices more readily, or tilt more toward students who pay higher prices, when other revenue sources drop. Places with excess capacity may find it easier to slow the rise in costs per student by cutting back on redundant facilities and personnel. In other words, fitting one equation to the data and finding one number that summarizes the response across institutions (or across states) over time is not likely the most reliable or informative approach.

2. Researchers make many choices in conducting statistical studies. They choose which variables to include and how to measure the factors for which they are controlling. They decide whether to focus on levels or on changes in those levels. Researchers also face questions about whether to focus on dollar changes or percentage changes, whether and how to introduce lags, and so on. These choices should be explicit and explanations should support them.
3. Researchers should always carefully explain the logic of adjustments they make to the data and decisions about the structure of the model, especially when reporting results in forums that include readers who are not expert data analysts. They should also be prepared to make available to other scholars the simplest formulations of their estimates, without elaborate adjustments, as well as the results of the variations they tried. Of course, reports of findings from these various estimates should always include the statistical and economic significance of the analyses presented.

Conclusion

The broad finding, confirmed by many studies using different data and different methodologies, is unsurprising: declines in state funding affect not only net tuition prices but also expenditures per student and the mix of students that institutions enroll. Thus, the links between state funding and prices are more complex than some on either side of the debate might suggest.

No perfect study is out there waiting to be executed. Rather than framing this research activity as being a contest over which is the “correct” number, we would be far better off to recognize that we are examining complex phenomena that are unlikely to yield simple and timeless answers. Instead, we should strive for a better understanding of the many factors that affect tuition revenues and enrollments across varying institution types and periods. The best response to changes in funding depends on an institution’s current market position. Most important for the nontechnical reader is to think about the logic involved.

A more principled project than seeking one summary relationship between tuition and state funding (but also a very ambitious one) would be to develop a model of public university behavior that identifies the circumstances and interests that influence how an institution with particular characteristics will respond to an increase or a decrease in state appropriations. Such a model, with appropriate empirical support, would provide a reasonable way of explaining the variation across institutions and over time. We are a long way from having either the analytical grasp of how universities behave or the rich databases needed to create such a model. But ignoring unexplained variation and focusing only on measures of central tendency can lead to unreliable or misleading interpretations of evidence.

Counterintuitive explanations for common phenomena have understandable appeal. Simple explanations often take hold without a strong evidence base, and challenging those conclusions can be constructive. In the case of the relationship between increases in college tuition and declines in state funding per student, the simple explanation for price increases is not as reliable as it might seem. Logic, political realities, and statistical findings all indicate that other factors affect the rate of growth in tuition prices and that colleges and universities meet funding declines with a combination of actions, not just with price increases.

The focus of researchers on college prices and the factors that determine them will be constructive if it increases our understanding of the options institutions have for funding their operations. Analyses must incorporate the difference between sticker prices and the amounts students actually pay, the differences across institutions and among students depending on their financial circumstances, and the roles both prices and institutional resources play in determining the educational experiences available to students. When institutions respond to cuts in appropriation by reducing their expenditure levels rather than raising tuition, they will in many cases deprive institutions of the resources they need to support students in earning high-quality degrees.

States fund higher education through a combination of appropriations to institutions and financial aid that goes directly to students. Broadening the conversation to acknowledge the role of grant aid, which allows net prices to vary across students within institutions, could be an important side effect of the conversation. No matter how much recent declines in per student funding have contributed to tuition increases, there is no reason to believe that increases in funding will have a symmetrical effect. Carefully articulating the goals of state subsidies to higher education and considering all of the plausible potential outcomes of policy changes should be the starting point.

Notes

1. There is more than one way to divide institutions into the two-year and four-year categories. The standard definition of the US Department of Education, reflected in data published in the Digest of Education Statistics, considers institutions offering any bachelor's degrees to be four-year institutions. The College Board and other organizations count only institutions where the majority of undergraduate degrees awarded are bachelor's degrees as four-year institutions. By the former definition, only 5 percent of Florida's public-sector students are enrolled in two-year institutions (see table 307.20 in "List of 2016 Digest Tables," National Center for Education Statistics, accessed January 9, 2017, https://nces.ed.gov/programs/digest/2016menu_tables.asp). By the latter definition, that percentage is 54 percent (see Ma et al. [2017], figure 21B).
2. Local governments also appropriate funds for public colleges, particularly community colleges. We refer throughout to state appropriations for ease of exposition.
3. See, for example, Tom Kertscher, "The UW System's 'Slush Fund'—\$1 Billion, \$207 million or What?" Politifact, April 23, 2013, <http://www.politifact.com/wisconsin/article/2013/apr/23/examining-university-wisconsin-system-slush-fund-i/>.
4. The correlation is similarly weak when substituting published tuition and fee prices for net tuition revenues or when looking at percentage changes rather than dollar changes.
5. William Petroski and Jeff Charis-Carlson, "Iowa State University Seeks 7 Percent Annual Tuition Hike for Each of Next 5 Years," Iowa City Press-Citizen, August 9, 2017, <http://www.press-citizen.com/story/news/2017/08/09/iowa-state-university-seeks-7-percent-annual-tuition-hike-each-next-5-years/549703001/>.

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