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State Support for Higher Education: How Changing the Distribution of Funds Could Improve College Completion Rates

Prepared for the

National Commission on Financing 21st Century Higher Education

By: Bridget Terry Long, Harvard Graduate School of Education

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Letter from the Commissioners

The University of Virginia Miller Center created the National Commission on Financing 21st Century Higher Education in 2014 to recommend policy and funding changes to help the nation attain the goal of 60 percent of the labor force with a postsecondary degree or certificate by 2025. This means that 62 million Americans must graduate with a postsecondary degree or credential between 2015 and 2025. At current rates, the United States will produce only 39 million such graduates, leaving a gap of 23 million—a shortfall of more than 2 million per year.

To meet the goal, the nation must maintain high school graduation and college entrance rates at or above 75 percent and 70 percent, respectively—reachable goals close to historical norms. The nation must also *increase* college graduation rates from 40 percent to 60 percent. Increasing the college graduation rate is inherently challenging but made even more so because of major demographic changes. Many of the upcoming college-aged individuals will be people of color or from low-income families, populations that traditionally have needed additional counseling, mentoring, academic support, and financial assistance to successfully enter into and complete higher education. How to increase access and graduation rates and thus equality for these two population groups is the major focus of the commission.

The need to address these issues is also urgent given that other nations are catching up to—and even surpassing—the United States in postsecondary degree- and credential-attainment rates. The United States ranked 13th relative to other Organization for Economic Cooperation and Development countries in 2014 in the percentage of 25- to 34-year-olds with higher education degrees or credentials. The cost of failure in attaining this goal—to the nation in terms of international leadership and to citizens in terms of job creation and income—is too high, and so action is required now.

To learn more about these issues, the commission engaged highly qualified experts to create 10 white papers on different dimensions of the higher education problem. The commission asked all the authors to push the limits of their knowledge and engage in "blue sky" thinking on individual topics. Each paper represents the views of the individual authors, not the commission. Nevertheless, the papers provide a foundation for the recommendations in the final report. In addition, the commission hopes the papers stimulate further discussion and debate about higher education policy and funding.

The 10 papers and the final report focus on answering three primary questions related to reaching the 60 percent goal. First, how do we realign incentives and retarget existing public funding to make the entire system more efficient and to increase graduation rates for students generally and students of color and from low-income families in particular? Second, what are the new, innovative models to deliver postsecondary education that can both lower the cost and increase the productivity of the entire system? Third, what options do federal and state governments and the private sector have for increasing funding for higher education? It is important to stress here that the interest is in the " value proposition " that underlies these three primary questions. The" value proposition " focuses on the national imperative of building a more highly skilled and educated work force not merely a more credentialed one.

The U.S. higher education system is still the envy of the world, but it must become more affordable for the next generation. It must also become more innovative and adaptable, especially in its use of technology, and be more productive with regard to graduation rates. Finally, additional funding must be available from federal, state, and private-sector sources to reach the goal.

National Commission on Financing 21st Century Higher Education

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- Bob Graham, former governor of Florida and former U.S. senator (co-chair)
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White Papers written for the National Commission on Financing 21st Century Higher Education

Paper 1. **Crowded Out: The Outlook for State Higher Education Spending**
Authors: Dan White and Sarah Crane, Moody's Analytics

Paper 2. **Transformations Affecting Postsecondary Education**
Author: Jeffrey J. Selingo, Arizona State University and Georgia Institute of Technology

Paper 3. **State Higher Education Finance: Best Practices**
Authors: Martha Snyder, Brian Fox, and Cristen Moore, HCM Strategists

Paper 4. **Financing American Higher Education in the 21st Century: What Can the United States Learn From Other Countries?**
Author: D. Bruce Johnstone, professor, Higher and Comparative Education Emeritus, University at Buffalo

Paper 5. **State Strategies for Leveraging Employer Investments in Postsecondary Education**
Authors: Robert Sheets and Stephen Crawford, George Washington Institute of Public Policy, The George Washington University

Paper 6. **Understanding State and Local Higher Education Resources**
Authors: Sandy Baum and Kim S. Rueben, Urban Institute

Paper 7. **New Directions in Private Financing**
Author: Andrew P. Kelly, American Enterprise Institute

Paper 8. **Higher Education: Social Impact Bonds and Income Share Agreements**
Author: Carlo Salerno, higher education economist/analyst

Paper 9. **State Support for Higher Education: How Changing the Distribution of Funds Could Improve College Completion Rates**
Author: Bridget Terry Long, Harvard Graduate School of Education

Paper 10. **The Federal Role in Financing 21st-Century Higher Education: Effectiveness, Issues, and Alternatives**
Author: Gabriel R. Serna, Virginia Polytechnic Institute and State University

Acknowledgments

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Raymond Scheppach
Professor of Public Policy, Batten School of Leadership and Public Policy
Economic Fellow at the Miller Center
University of Virginia

Executive Summary

When it comes to higher education funding, the role of the federal government receives most of the attention. However, states are responsible for a substantial amount of the money directed to postsecondary students. State appropriations to higher education, which act as operational support for public colleges and universities and lower the tuition price for in-state students, amount to more than double what the federal government spends on the Pell Grant Program and are comparable to federal student loan spending. The amount and way state appropriations are distributed to postsecondary institutions have important implications for who goes to college, which institutions they attend, whether they persist, and the resources they receive at their schools. Dramatic reductions in state appropriations in recent years have also exacerbated the resource challenges that public institutions face.

This paper presents a detailed analysis of trends in state support for higher education since 1988. It presents evidence on how the distribution of state appropriations varies by institution type and, by extension, students. Moreover, this paper describes how state support for public higher education has changed over time. The paper provides new information about the declining role of state appropriations and highlights critical differences in how these changes affect the degree to which institutions (and students) are affected. Finally, this analysis considers the implications of these funding patterns and reductions in state support. Increasing the resources committed to public institutions and addressing current funding inequities could help the country make significant progress towards the goal of increasing the number of adults who achieve postsecondary credentials.

The author thanks Nick Chatman for his able research assistance and the Delta Cost Project for making the data available. All errors, omissions, and conclusions are the author's.

Introduction: The Critical Role of State Appropriations

State appropriations to public colleges and universities are the most significant source of higher education funding in the United States. These funds act as operational support for public colleges and universities and enable institutions to lower the tuition price for in-state students. In 2015, states invested $81.8 billion in higher education, with an additional $9.1 billion in local appropriations to community colleges. Together, public colleges and universities received $70.6 billion in appropriations for general operating expenditures.[1] For decades, the magnitude of this funding source has dwarfed all other forms of financial aid, from grants to loans to other subsidies. Even after the most recent recession, which marks a historic low in state support, total state appropriations to public colleges and universities exceeded every other funding source. In comparison, the total amount spent on Pell Grants in 2015 was only $30.3 billion—less than half of state support amounts.[2]

Although the amount spent on state appropriations is large, this funding source garners relatively little attention compared to federal aid programs. Recent dramatic cuts and a growing awareness of the connection between these funds and tuition prices, however, have created greater interest in understanding trends in this form of support and how the distribution of these resources relates to postsecondary outcomes. State support is an important source not only for slowing the rate of growth in tuition prices but also in maintaining or increasing the quality of education and support an institution can give its students.

Certainly, state support for higher education has been under assault in recent years. According to a 2016 report from the Center on Budget and Policy Priorities, state funding is still below pre-recession levels. From 2008 to 2016, all but four states experienced reductions in state spending per student after adjusting for inflation, and the reductions have been staggering in a number of states, the top five being Arizona (–55.6 percent), Louisiana (–39.1 percent), South Carolina (–37.0 percent), Alabama (–36.2 percent), and Pennsylvania (–33.3 percent).[3] However, the trend of declining state appropriations has been happening much longer one than just the past decade. Since 1980, state and local appropriations to higher education have declined from being 50 percent of revenue for public, degree-granting institutions to only 37 percent by 2000.[4] This decline suggests that current trends should not be viewed as an abnormal dip caused by a bad recession but rather a more permanent shift in the role of states in financing higher education.

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1 State Higher Education Executive Officers Association, *State Higher Education Finance: FY 2015* (Boulder, CO: State Higher Education Executive Officers Association, 2016), http://www.sheeo.org/sites/default/files/SHEEO_SHEF_FY2015.pdf (accessed May 31, 2016). Additional state funds ($10.5 billion) went to special-purpose appropriations (e.g., research, medical education) and state-funded student financial aid that students receive directly ($9.3 billion). Other funds went to operations at independent institutions or non-credit and continuing education programs.

2 College Board, *Trends in College Pricing 2015* (New York: College Board, 2015), http://trends.collegeboard.org/sites/default/files/2015-trends-college-pricing-final-508.pdf (accessed February 19, 2016). The only source of aid comparable to state appropriations is the total amount spent on the Federal Subsidized and Unsubsidized Stafford Loan Program, which amounted to $76.4 billion in 2014-15.

3 Michael Mitchell, Michael Leachman, and Kathleen Masterson. *Funding Down, Tuition Up: State Cuts to Higher Education Threaten Quality and Affordability at Public Colleges* (Washington, DC: Center on Budget and Policy Priorities, 2016), http://www.cbpp.org/research/state-budget-and-tax/funding-down-tuition-up (accessed May 31, 2016).

4 National Center for Education Statistics, *Digest of Education Statistics 2002* (Washington, DC: National Center for Education Statistics, U.S. Department of Education, 2002), http://nces.ed.gov/pubs2003/2003060.pdf (accessed September 2, 2016).

The trends we see in state appropriations have direct implications for tuition prices.[5] As operational subsidies, state appropriations allow public colleges and universities to forego charging higher tuition rates to cover their costs. The reverse is also true: As state appropriations are cut, tuition prices increase. This has been a robust finding over time, as illustrated in Figure 1. When state funding per full-time equivalent (FTE) student goes down—as it did in the early 1990s, early 2000s, and most recently during the last recession—tuition and fees at public colleges and universities grow much more quickly. Prior to the Great Recession, the greatest increases in tuition occurred for academic year 1991-92, when state appropriations fell 7.5 percent and average tuition rose 8.7 percent, and in 2003-04, when state appropriations fell 6.6 percent and average tuition rose 11.6 percent.[6] During the most recent recession, data from 2008 to 2016 show that 10 states increased their average tuition at public four-year colleges by more than 50 percent after adjusting for inflation. For example, average list tuition at public four-year institutions rose 87.8 percent in Arizona and 79.8 percent in Louisiana.[7] These large increases in tuition have several implications for both college access and student success. Moreover, the level of state appropriations can influence the amount of educational resources available to students, which could influence rates of success, as well.[8]

This paper focuses on the important role of state appropriations in higher education and provides information about trends in state support since 1988. Using extensive data on institutional finances and characteristics, I document how state support for public higher education has changed over time for different kinds of institutions. In addition, I explore how the distribution of appropriations varies by institution type, state, and (by extension) students. As a result of this work, I provide new details about the declining role of state appropriations and highlight critical differences in the degree to which institutions (and students) are affected. My analysis looks at differences by institution level and mission; region and state; and student body characteristics such as the proportion receiving Pell Grants, SAT scores, and institutional retention rates. It is imperative to understand the current distribution and trends in state appropriations to consider ways to improve the system of funding support with the goal of improving student outcomes.

In addition, I was charged to consider whether there is a mismatch in the current system between where resources are most needed to support college completion and where they are currently directed. Where an earlier paper in this series focuses on state financial aid given directly to students, this paper instead focuses on the state appropriations given to institutions, thereby indirectly supporting students, and I consider the implications of the documented funding patterns of state support. The second part of the paper is motivated by the fact that rates of student success differ by institution type. For example, the mean 2013 first-year retention rate at research and doctoral universities was 80.2 percent, while it was only 69.9 percent at other four-year institutions and 56.5 percent at public two-year colleges.[9] Likewise, there are large gaps in rates of degree completion by institution type. These differences in success rates are certainly related to differences in the student bodies and resources available at various kinds of schools, but if the goal is to improve

5 Although there has been recent debate about whether dwindling state appropriations are to blame for skyrocketing tuition prices, the evidence linking state support to college tuition is quite robust.
6 College Board, *Trends in College Pricing*.
7 M. Mitchell, *Funding Down*.
8 Ronald G. Ehrenberg and Douglas A. Webber, "Student Service Expenditures Matter," *Change* 42 no. 3 (2010): 36–39.
9 I calculated these statistics for the analysis sample using the Integrated Postsecondary Education Data System (IPEDS) variable that measures the percentage of the previous fall's full-time cohort returning the following fall.

educational attainment in the future, then we need to pay special attention to institutions with lower persistence and degree-completion rates. The questions of this paper are whether those institutions have the resources they need to make improvements in student outcomes and what the role of state appropriations is. As I discuss later in the paper, changing funding structures to increase resources to public institutions overall as well as address current inequities for schools that serve many struggling students could help the country make significant progress toward the goal of increasing the number of adults who have a postsecondary credential. The conclusion of this paper offers several ideas for reforms that might improve support for student success and degree completion.

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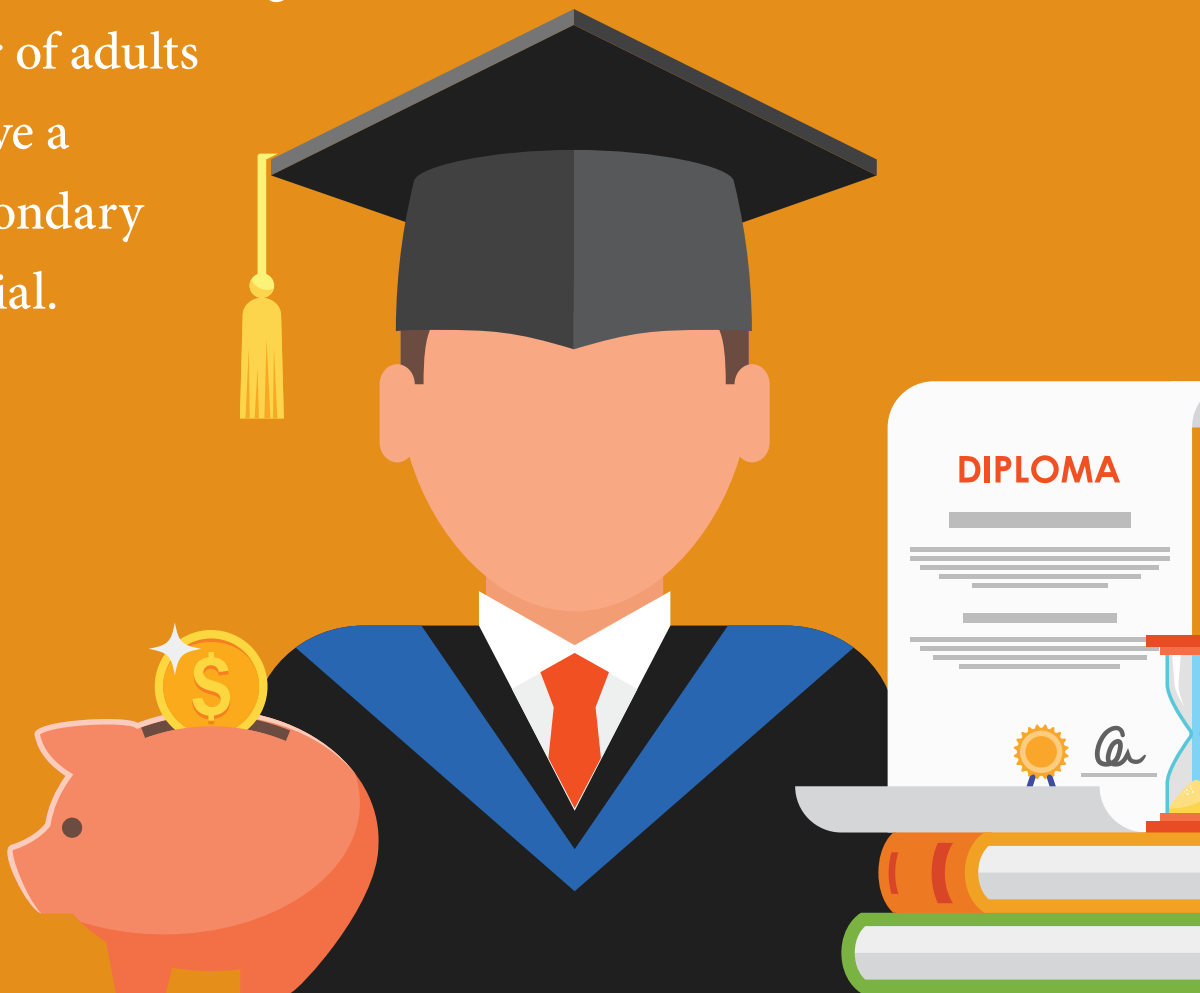

Background: Key Facts About the Role of State Appropriations

Key Features of Higher Education Support from State Appropriations

Several key features influence how state appropriations help support higher education that influence their role. First, state appropriations primarily serve as operational subsidies to public institutions, which allows those schools to offer in-state students a discounted price. In essence, the funds from state taxpayers go toward reducing the price of college for that state's residents. However, because these funds are largely given to public colleges and universities, the discounted price favors one sector of higher education over others—namely, private nonprofit or for-profit institutions. In other words, the subsidy implicit with state appropriations is available only at certain schools and so is a form of in-kind aid. In contrast, many other forms of financial aid, like Pell Grants, are awarded to the student, who can use the money at any accredited institution. This difference has important implications for how the benefits of state appropriations–based support are distributed across students based on enrollment patterns by background, preparation, and interest. The in-kind format of the aid also influences college choice, with students favoring public over private institutions, as well as four-year over two-year colleges, depending on the size of the discount the state subsidy enables.[10]

Another key aspect of state appropriations is that they are a form of across-the-board aid, meaning that all students attending a particular college receive the same size subsidy.[11] Stated another way, when state appropriations help lower the list price of a college or university, all students attending that college enjoy the discount equally because they are all charged the same catalogue price. In contrast, need-based aid separates students by ability to pay and results in students paying different prices. In one respect, this distinction makes state appropriations an expensive way to provide aid to students because the money does not target the neediest students; a student's ability to pay is not taken into account when determining the size of the subsidy. The research literature suggests, however, that students—particularly those from low-income families—are much more responsive to sticker price than discounts provided through financial aid, possibly because there is low awareness of aid programs and students must complete an application to be eligible for a financial aid award. In other work, I document how such processes can be a substantial barrier to students, with some students foregoing financial aid they are eligible to receive.[12] In contrast, list tuition price is highly visible and easy to understand, and so a policy that aims to keep tuition prices low or reduce them is likely to have a larger impact on student enrollment than a grant program.

A third fact about state appropriations is that there is a great deal of variation in the amount specific states allocate to higher education. As shown in Figure 2, the College Board's *Trends in College*

10 Bridget Terry Long, "Does the Format of an Aid Program Matter? The Effect of In-Kind Tuition Subsidies," *Review of Economics and Statistics* 86 no. 3 (2004): 767–782; and Sam Peltzman,"The Effect of Government Subsidies-in-Kind on Private Expenditures: The Case of Higher Education," *Journal of Political Economy* 81 no. 1 (1973): 1–27.

11 Within an institution, it may be the case that students in different parts of the school receive slightly different subsidies because the cost of providing an education in the sciences is higher than in the humanities, but the point stands that within a field or department, students receive the same size subsidy from the state, regardless of ability to pay.

12 Eric Bettinger, Bridget Terry Long, Philip Oreopoulos, and Lisa Sanbonmatsu. "The Role of Application Assistance and Information in College Decisions: Results From the H&R Block FAFSA Experiment," *Quarterly Journal of Economics* 127 no. 3 (2012): 1–38.

Pricing 2015 report illustrates the tremendous variation found at the state level. The height of the bars denotes the amount of state funding per FTE student for 2014-15, while the diamonds signal the level of personal income in the state; together, they give some sense of the overall state effort to support higher education given the relative income of residents. The figure displays the fact that state funding varies from less than $4,000 per FTE student (for New Hampshire) to more than $18,000 per FTE student (for Alaska), with the national average being $7,380 per FTE student. The pattern of which states give high or low amounts is partly the result of history—for example, in states in where private institutions grew first (e.g., the Northeast), state appropriation levels tend to be smaller. However, multiple recessions and differences in how states have responded when under pressure to cut appropriations have changed the relative position of some states along the continuum. One example is Massachusetts, which has rebounded quite a bit after major cuts to state appropriations in the early 1990s. In comparison, California has fallen lower in the ranking of states by funding as it has cut state appropriations to its public colleges and universities.

Variation in State Appropriations by institution mission and focus

Within a state, there is also a great deal of variation in how much colleges and universities receive. After standardizing the amount of funds by the number of FTE students, public four-year institutions receive more in state appropriations than community colleges, with the state's flagship institution receiving the most. In a study of state appropriation levels in 1991, I found that the most selective public four-year college in California (i.e., the University of California-Berkeley) received almost nine times more in state subsidies per student than the two-year community colleges.[13]

Some of the variation in state appropriations by institution is driven by the range of public colleges and universities a state supports in terms of mission and focus. For example, research universities—especially those that have a strong focus on science, technology, engineering, and mathematics (STEM) fields and medicine—have very different cost structures, and state funds are given with the explicit purpose of supporting the creation of knowledge and serving specific state needs—missions beyond simply supporting students as they move toward degree completion. For this reason, this analysis often focuses on changes in state support over time within a group of similar institutions (e.g., flagship universities or community colleges). It is also useful to examine trends in the percentage of revenues that state appropriations cover, which is an indirect way to take into account differences in the total operating budgets of institutions and instead focus on the degree to which the state is helping cover total expenses.

Given differences in the types of students who attend different levels of colleges—four-year versus two-year institutions—and colleges with varying levels of selectivity (i.e., academic and test-score requirements), the differences in appropriations within a state have implications for the amount of state subsidy students from different backgrounds receive. More affluent students, who often attend higher quality kindergarten through grade 12 schools, are much more likely to attend a state's public flagship institutions and other universities. Meanwhile, low-income students are more likely to attend less selective, four-year or community colleges. In fact, 41 percent of first-generation college students,

[13] B.T. Long, "Format of an Aid Program."

57 percent of Hispanic students, and 52 percent of Black students attend community colleges.[14] As such, the size of the subsidy students receive varies by demographic and income groups, favoring white, higher-income individuals over lower-income students and students of color.[15]

The rest of this paper focuses on state appropriation trends and patterns of support across different kinds of colleges and universities. The distribution pattern of state appropriations across institutions is an important driver of differences in funding across students. Coupled with differences across groups in academic preparation levels and other challenges to college completion, our higher education system results in allocating the smallest state subsidies to our most vulnerable students—students who might benefit greatly from additional resources used to bolster their persistence and likelihood of degree completion. These considerations must be balanced with the differences in funding and support that stem from variance in the cost structures of institutions with different activities and missions (e.g., research and hospitals versus those institutions that focus predominantly on teaching students). Moreover, given the substantial reductions in state resources that all public colleges and universities have experienced, it is clear that additional resources will be necessary to accomplish the goal of improving rates of college completion.

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14 American Association of Community Colleges, "Fast Facts: February 2016" (Washington, DC: American Association of Community Colleges, 2016), http://www.aacc.nche.edu/AboutCC/Documents/FastfactsR2.pdf (accessed June 10, 2016).

15 While upper-income families benefit from larger subsidies, they also pay more in taxes, so it is not clear how the net difference (benefit minus cost) varies by income group. Early researchers of this question voiced concerns that state appropriations to higher education may actually redistribute tax dollars from the poor to the rich because everyone pays taxes but the rich are much more likely to attend college and—more specifically—attend universities that have very large subsidies. With changing subsidy levels and enrollment patterns, however, it is not clear whether state appropriations are distributed in a progressive or regressive way. W. Lee Hansen and Burton Weisbrod, "The Distribution of Costs and Direct Benefits of Public Higher Education: The Case of California," *Journal of Human Resources* 4 no. 2 (1969): 176–191; and W. Lee Hansen and Burton Weisbrod, "On the Distribution of Costs and Direct Benefits of Public Higher Education: Reply," *Journal of Human Resources* 4 no. 3 (1969): 363–374.

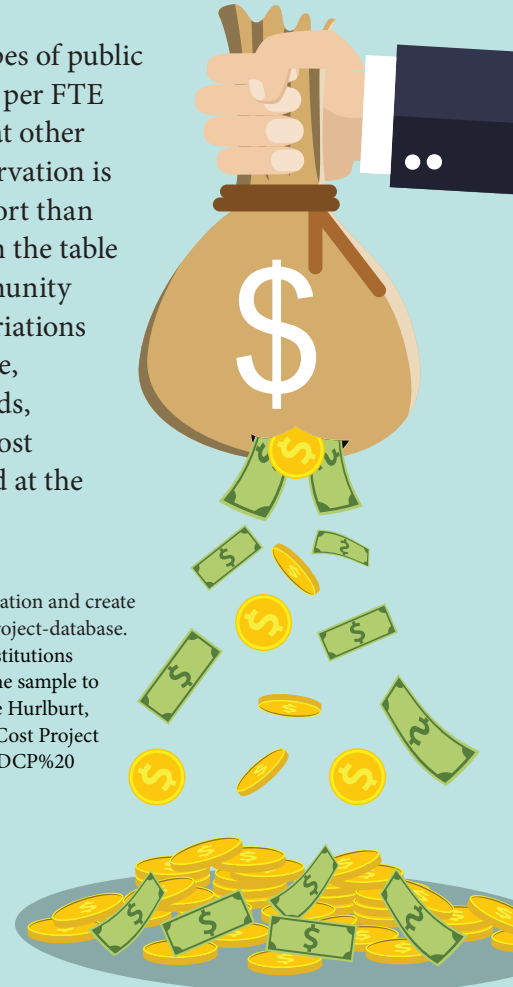
Recent Trends in State Support for Higher Education

To investigate trends and the distribution of state appropriations to public colleges and universities, I use data from the Integrated Postsecondary Education Data System (IPEDS). The U.S. Department of Education collects this institutional data set annually, and it reports information on institutional characteristics, finances, enrollment, and other variables for any college or university that participates in federal financial aid programs. I use the longitudinal database that the Delta Cost Project assembled, which aims to make IPEDS data more readily available and usable for studies on trends in revenue and expenditures in U.S. postsecondary education. Great care has been taken to make sure the finance data are comparable over time by making adjustments to account for different financial reporting standards.[16]

Trends in state support by institution type

Table 1 provides a sense of what happened to state appropriations to public colleges and universities from 1988 to 2013. Institutions are grouped by type, with research and doctoral universities in the left columns (shown separately for flagship and non-flagship institutions, and then together), and the other four-year colleges and community colleges in the right columns; specialized institutions are not part of the sample. I've calculated the median level of state appropriations, standardized per FTE student, to try to account for differences in institution size and growth in enrollment over time. The figures are shown at five-year intervals to highlight trends over the 25-year period, and I have converted all years to 2013 dollars to account for inflation. In other words, the figures are in real, not nominal terms.

Table 1 makes it clear that state support declined significantly for all types of public institutions from 1988 to 2013. During that period, state appropriations per FTE student fell 37 percent at research and doctoral institutions, 32 percent at other four-year colleges, and 30 percent at community colleges. Another observation is that research and doctoral universities receive much more in state support than the other four-year colleges and community colleges. The last column in the table gives a sense of the difference between the flagship campuses and community colleges. In 1988, the flagships received 2.45 times more in state appropriations per FTE student. Although the size of the difference fluctuated over time, by 2013, the difference in funding remained the same size. In other words, the percentage reduction in the amount of state appropriations at the most selective, highly-resourced institutions was the same as that experienced at the less selective, less-resourced colleges.



[16] For more information about the database and methodologies used to standardize the finance information and create matched sets of data, see the Delta Cost Project website at http://www.deltacostproject.org/delta-cost-project-database. For this analysis, I used a sample that is largely balanced across the panel, but for some years, several institutions may be missing from the calculation of a summary statistic. Additional analysis suggests that limiting the sample to institutions that report data for each year does not affect the overall effects. Donna M. Desrochers, Steve Hurlburt, and Jie Sun, *Delta Cost Project Database 1987–2013: Data File Documentation* (Washington, DC: Delta Cost Project at American Institutes for Research, 2015), http://www.deltacostproject.org/sites/default/files/database/DCP%20Database%20Documentation%201987-2013.pdf (accessed February 26, 2016).

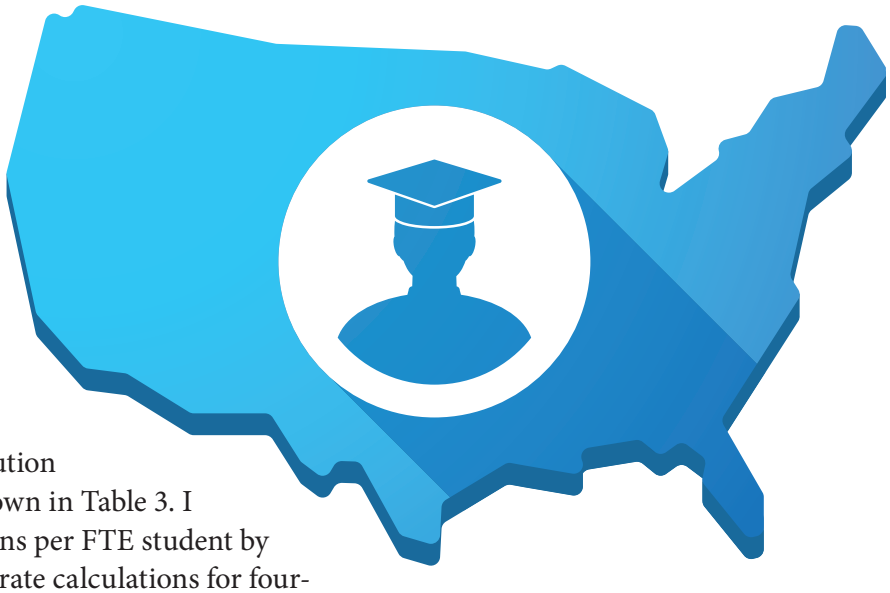
There are definite differences in funding levels by institution type, but part of this variation results from the research expenses associated with the research and doctoral institutions and the fact that four-year institutions tend to have higher expenditures overall than community colleges (although how much of this greater spending is a function of having more financial support and higher tuitions is unclear). One way to take these differences in underlying finances into account is to look at the percentage of revenue an institution gets from state appropriations. This is also one way to better understand the importance of state support for a college or university. Table 2 displays those numbers and reports the median percentage of revenue from state appropriations. Note that although the research and doctoral universities received more in state support per student than other institutions, the state funds make up a smaller proportion of total revenue: In 1988, state support constituted 39 percent of revenue for flagship institutions but 47 percent of revenue for community colleges. State support was most important for the master's and bachelor's four-year colleges (51 percent of revenue in 1988).

Like Table 1, Table 2 tells a story of declining state support. All institution types experienced reductions in the percentage of revenue the state covered. The research and doctoral institutions saw a 52percent decrease from 1988 to 1993. Put another way, in only 25 years, the state went from contributing 44 percent of the resources public universities received in 1988 to only 21 percent by 2013. This is a dramatic change, one that precipitated rising tuitions and the search for other revenue sources. Meanwhile, community colleges saw the proportion of their budgets that the state supported fall by 42 percent: In 1988, the state contributed 47 percent of their revenue but had reduced this support to only 27 percent by 2013. These data further document the known reductions in state support to higher education during the past 25 years.

Figure 3 displays trends in state appropriations from 1987 to 2013 for institutions that received among the highest or lowest levels of state support. Although there is slight variation in the magnitude of reductions, all institutions suffered losses, from those that receive the most in support (i.e., institutions at the 90th percentile of funding) to those that typically receive far lower levels (i.e., institutions at the 10th percentile of funding). This is true for public four-year colleges and universities and two-year colleges. As Figure 2 showed, some of this change reflects the fact that all states cut their appropriations during this time, from the most generous states (e.g., Illinois, Connecticut, and North Carolina) to the states with the lowest levels of funding per FTE student (e.g., New Hampshire, Arizona, and Colorado). Therefore, this is not a story in which the reductions were limited to a subset of institutions: All now face far less state support regardless of where they started in 1988. The gap between those receiving the most support and those receiving the least is now smaller, however, because institutions that previously were at the highest end of the distribution experienced larger reductions. This is especially true among four-year institutions (Panel A), though colleges and universities all along the distribution seemed to experience similar levels of reduction in appropriations during the last recession.

Figure 4 also displays how state support changed from 1987 to 2013, but here the focus is instead on the percentage of revenue from appropriations, not the appropriation level. Again, the significance of state appropriations as part of an institution's budget declined for all institutions. Among four-year institutions (Panel A), the declining trend lines are remarkably parallel to each other, suggesting that institutions at all points of the distribution followed the same pattern. In contrast, among community colleges (Panel B), the reductions were more dramatic and slightly larger for colleges that had previously received a larger percentage of their revenue from state appropriations. In each case, institutions at the median (i.e., the 50th percentile) went from just below 50 percent of their revenue coming from the state to about

27 percent, although there was greater variation in funding among the community colleges at the beginning of the period, and some of the gap between the 90th and 10th percentiles had closed by 2013.



Trends in state support by region and state

State appropriations level and distribution differ across states and regions, as shown in Table 3. I present the median state appropriations per FTE student by U.S. Census Bureau region, with separate calculations for four-year colleges and universities (the left side of the table) versus two-year colleges (the right side of the table).

Again, there is evidence that state appropriations fell across the country, although the numbers suggest differences by level of school and location. Among four-year colleges and universities, there were similar trends across the Northeast, Midwest, and South, all of which realized reductions in the state support amount per FTE student of approximately 31 percent from 1988 to 2013. The experience in the West, however, was far more dramatic: Four-year colleges and universities had their amount of state appropriations cut in half over 25 years, from a median of $10,885 in 1988 to $5,134 in 2013. Although four-year institutions bore the brunt of these reductions, two-year colleges in the West did not have cuts in state appropriations as large (17.2 percent). Two-year colleges in other parts of the country did not fare as well, with the South cutting the per-FTE student appropriation by 35 percent (more than the reduction its four-year institutions experienced), and the Northeast and Midwest cutting state appropriations levels by 26 and 20 percent, respectively.

Given that the trends for the West are heavily driven by the actions that California takes—the largest public higher education system in that region by far—it is important to look within key states to better understand the trends. Table 4 provides the within-state details for four large states, including California. I chose these states because they all have at least five schools in each institutional category (research/doctoral, other four-year institutions, and two-year institutions), making the calculations less susceptible to the behavior of a single college or university. Looking across the states, California (Panel A) experienced the largest reductions in state appropriations from 1988 to 2013, followed by Texas (Panel B), New York (Panel C), and North Carolina (Panel D). Panel E displays the national medians, which are also reported in Table 1 and Table 2.

As the numbers show, there has been tremendous variation by state in the level of appropriations, how they differ by type of institution, and the percentage of a school's revenue that is from the state. In the case of California, in 1988 public institutions received larger subsidies per FTE student than most other states, as reflected in the amount and percentage of revenue from state appropriations. By 2013, however, reductions in state support brought California institutions much closer to or even below the median levels for the nation. The percentage change in state appropriations is striking:

Four-year institutions in California experienced reductions greater than 60 percent over the 25-year period. Texas also experienced severe cuts in state support. Research and doctoral institutions suffered especially large cuts—a 47percent reduction in state appropriations per FTE students from 1988 to 2013—but all institution types lost substantial funding. Today, Texas colleges and universities get less than one-quarter of their funding from the state.

Compared to California and Texas, New York's institutions did not have cuts as large, but they still experienced a strong downward trend in state support. Across the board, institutions in New York saw their state appropriations per FTE student cut 25 to 29 percent during the 25-year period. Still, New York remains near the top in the amount of funding its four-year institutions receive, although its community colleges are below the national median in state support per student. Although New York's four-year colleges and universities receive up to 40 percent of their funding from the state, the community college median is only 22 percent of revenue—a proportion below the national median.

North Carolina's experience contrasts with the other states. There, state appropriations were not cut much for the four-year institutions: only 15 percent for the research and doctoral universities and 10 percent at the other four-year colleges and universities. Instead, the state cut support more deeply for community colleges (a 26percent reduction between 1988 and 2013), although these cuts were still below the national median. In North Carolina, the public institutions continue to rely on state appropriations to a greater degree than elsewhere. Therefore, although state support followed a similar downward trend, this is an example of a state that did far better in terms of minimizing cuts.

Taken together, these four examples show how different states chose to either maintain a relatively high level of state support or significantly cut resources to public institutions. Other publications have shown how the level of support varies in the aggregate by state (similar to Figure 2), but it is also important to note that states differ in how they do or do not prioritize support for four-year versus two-year institutions and research institutions. The within-state distribution of appropriations to different types of institutions and the trends in where reductions have been the greatest have huge implications for those state populations. One could easily imagine that student outcomes vary at institutions that are well supported versus those that are not and at schools that suffered smaller reductions versus those that experienced substantial cuts. The next section looks more specifically at the relationship between student body characteristics and outcomes and state appropriation levels.

Trends in state support by student body characteristics

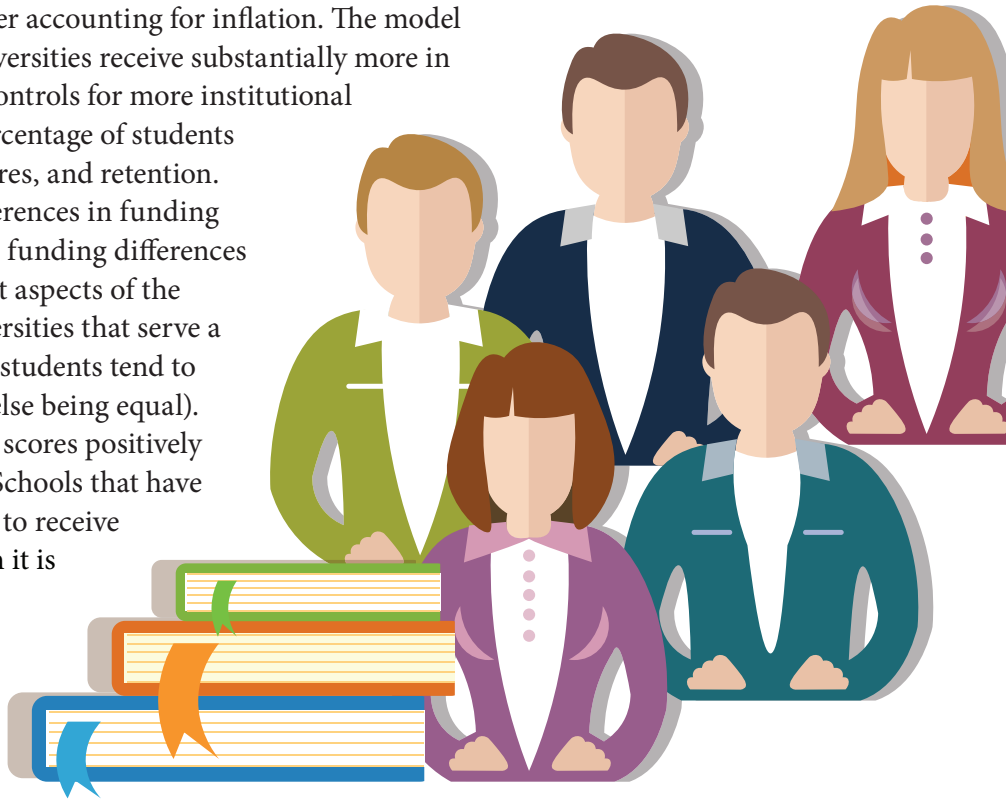
Tables 1–4 tell the story of how state appropriations vary by institution type. This information gives us a sense of how subsidies vary by type of student based on differing patterns of enrollment at each kind of institution, but the tables this section references look explicitly at the relationship between student body characteristics and state appropriation levels. Unfortunately, the institution-level data that report state appropriations do not allow one to discern much about student body characteristics, except for academic preparation level (as proxied for by SAT scores)[17] and income level (as reflected by

17 The SAT measure I use is the 75th percentile of an institution's student body's math SAT score in 2002, which is the earliest year SAT data are available in the Integrated Postsecondary Education Data System. By defining the variable based on this year, the measure remains constant over time and changes in the median state appropriations are not the result of changes in the composition of institutional groups.

the receipt of need-based financial aid).[18] In addition, IPEDS offers limited information about student outcomes. Here, I focus on the retention rate of FTE students into their second year.[19]

To attempt to isolate the relationship between a student body characteristic and funding levels, I use regression analysis and simultaneously account for institutional type (flagship university; non-flagship, research university; other four-year institution; or two-year college), size, region or state, and multiple student measures. The estimates should be interpreted as "all else equal," meaning that a positive coefficient suggests that institutions that have a particular characteristic receive more in state appropriations than a school that does not have that characteristic, holding constant the other variables in the model. These results should not be interpreted as causal, but by controlling for multiple institutional characteristics at the same time, I am better able to establish the degree to which institutions with certain kinds of students tend to get more or less in state support.[20]

Table 5 displays estimates for how the level of state appropriations per FTE student varies by institutional characteristic. As in the earlier tables, state appropriations are in 2013 constant dollars. In the first model, I include only a one-year trend and the dummy variables for institutional type, which should be interpreted relative to a flagship university. As shown in the first row, state appropriations per FTE student declined over the time period (1987 to 2013) by nearly $61 per year after accounting for inflation. The model also estimates that flagship universities receive substantially more in appropriations. Model 2 adds controls for more institutional characteristics, such as size, percentage of students receiving a Pell-Grant, SAT scores, and retention. This reduces the estimated differences in funding levels by institution type, as the funding differences are related to other things about aspects of the institutions. Colleges and universities that serve a higher proportion of Pell grant students tend to receive more state support (all else being equal). Meanwhile, having higher SAT scores positively correlates with funding levels. Schools that have higher retention rates also tend to receive more in state funding, although it is unclear whether resources are driving the higher outcomes or larger state appropriations are the reward for high student performance.



18 The variable I use is the percentage of full-time, first-time, degree or certificate-seeking undergraduates who received a Pell Grant in 2000 (the first year the data are available), a proxy for the proportion of low-income students.

19 Although the Integrated Postsecondary Education Data System also has limited graduation information, degree completion is a poor indicator for most community colleges. Second-year retention is also a fuzzy measure of student outcomes for community colleges, but it is likely to be a better proxy than the alternative.

20 These estimates are just correlations and reflect average patterns of state support levels. One should not interpret, for instance, that having lower average SAT scores "causes" schools to receive less state funding. It could be the case that lower levels of funding result in schools having difficulty recruiting students who have high test scores (i.e., the funding level influences the student body characteristics). It is also possible that the student characteristic is not directly related to the funding level.

The exception is schools with retention rates below 55 percent, which receive less than schools with retention rates over 80 percent but more than schools with rates of 55 to 80 percent. Model 3 adds state fixed effects so that the estimates only look at differences in funding within a state; this does not change the results in a meaningful way.

Finally, Models 4 and 5 estimate the relationship between institution type and state support levels, with research universities being the comparison group. Even with all the institutional controls, I estimate that the research institutions received about $2,504 more than other four-year schools and $5,227 more than public two-year colleges. On average, all institutions lost $59 per year in state funding after accounting for inflation.

Table 6 explores the relationship between state appropriations and institutional characteristics by region. Model 1 gives the estimates using the national data; looking across the columns, one can see how certain patterns are particularly strong or weak in certain parts of the country. For example, it is clear that the reductions in state appropriations per FTE student were largest over the time period in the Northeast (Model 2) followed by the South (Model 4). All regions favored the flagship universities in terms of funding, but the differences with other types of institutions varied by region. The gap with community colleges was largest in the Northeast, although in all regions except the South community colleges received only a fraction of what any four-year institution received. (In the South, the difference between the other four-year colleges and community colleges was not very large.)

Focusing on the measures for the student body, the percentage of students receiving a Pell grant strongly relates to (i.e., is statistically significant) differences in funding in the Midwest (Model 3) and South (Model 4), with a weaker relationship in other parts of the country. Meanwhile, student body test scores are not statistically related to funding patterns in the Midwest, although the strength of the pattern varies in the other regions. Finally, any pattern seen in retention rates and funding appears to be driven by patterns in the Midwest and West.

In conclusion, state support levels vary by an institution's student body characteristics even after controlling for institution type and size. Funding levels have favored institutions that serve greater numbers of Pell Grant recipients, particularly in the Midwest and South, but schools that have higher student body test scores receive more overall. Funding has also favored schools that have higher retention rates, which is also related to a higher level of student preparation. In other words, there is some indication that state funding is going disproportionally to the colleges and universities that serve the students who are best prepared academically to succeed. As noted earlier, this is not necessarily a conscious decision by states to devote more resources to certain kinds of students. Rather, it may be a function of differences in support by institutional activity or mission. However, if the goal is to improve rates of student persistence and degree completion, there is a need to devote more resources to the institutions that have students who are less prepared because state aid does little to address inequities in funding; in fact, it may exacerbate them.

Is There a Mismatch Between State Support and the College Completion Agenda?

Data analysis confirms that state appropriations do in fact vary along several dimensions, including by state, level, research activity, and student body academic preparation levels. Some of this variation is the result of differences in costs related to the type of work being done (e.g., expensive STEM-related research) or the location of the school (e.g., an expensive city versus a rural community). Research universities, for instance, include as part of their mission a set of costly activities, and these activities explain some of the differences in finances. However, much of the variation that has evolved over time is also partly the result of a particular state's commitment to public institutions. States have varied in their level of support and how they distribute it across different types of institutions. Moreover, evidence exists that the differential patterns of support have meaningful implications for different kinds of students in terms of the resources they receive. Given the strong need to better support students with the goal of improving personal and social outcomes, I now consider whether our current patterns of support reflect this particular goal. The question of how to make gains in educational attainment in the future suggests the need for greater attention on the students who have tenuous prospects of college success and the institutions that serve them.

Before considering how the distribution of resources influences on-campus support and educational quality, it is first worth emphasizing the important role of tuition price on college access and persistence. One consequence of the major reductions in state appropriations per FTE student has been dramatic increases in tuition prices, and researchers have consistently found that tuition price influences multiple college outcomes. First, there is a robust literature on the effects of price on college enrollment,[21] and many additional studies have shown that price reductions (i.e., financial aid) positively impact college access, especially grant programs that have transparent eligibility criteria and straightforward application processes.[22] Still, there is no question that tuition price alone is one of the most visible aspects of a college to families, and rising tuition prices have strong negative effects on price-sensitive families.

Research has also shown that college student costs are related to the likelihood of student success. For example, Dynarski and Scott-Clayton have each found that the introduction of state merit-based grants has resulted in increasing college completion rates among eligible students. Moreover, my study of the Florida Student Access Grant (FSAG) found that the need-based grant substantially increased the rate of credit accumulation and bachelor's degree completion within six years.[23] Research of a private need-based grant program in Wisconsin found that additional grant aid increased the odds of bachelor's degree attainment,[24] again emphasizing the important role of

[21] Bridget Terry Long, "The Contributions of Economics to the Study of College Access and Success," Teachers College Record 109 no. 10 (2007): 2367–2443; Thomas J. Kane, *Rising Public College Tuition and College Entry: How Well Do Public Subsidies Promote Access to College?* National Bureau of Economic Research Working Paper 5164 (Cambridge, MA: National Bureau of Economic Research, 1995), http://www.nber.org/papers/w5164 (accessed September 3, 2016); A. Noorbakhsh and D. Culp, "The Demand for Higher Education: Pennsylvania's Nonresident Tuition Experience," *Economics of Education Review* 21 no. 3 (2002): 277–286; and Bridget Terry Long, "How Have College Decisions Changed Over Time? An Application of the Conditional Logistic Choice Model," *Journal of Econometrics* 121 no. 1–2 (2004): 271–296.

[22] David Deming and Susan Dynarski, "Into College, Out of Poverty? Policies to Increase the Postsecondary Attainment of the Poor," in *Targeting Investments in Children: Fighting Poverty When Resources Are Limited,* ed. Philip Levine and David Zimmerman (Chicago: University of Chicago Press, 2010).

[23] Benjamin Castleman and Bridget Terry Long, "Looking Beyond Enrollment: The Causal Effect of Need-Based Grants on College Access, Persistence, and Graduation," *Journal of Labor Economics.* In press.

[24] Sara Goldrick-Rab et al., "Reducing Income Inequality in Higher Education: Experimental Evidence on the Impact of Financial Aid on College Completion," *American Journal of Sociology* 121 no. 6 (2016): 1762–1817.

In 2011, community college spending was at its lowest level in a decade—a period that included two recessions. From 2001 to 2011, instructional expenditures per FTE student fell 12 percent after accounting for inflation, and expenditures on student services and academic support fell 7 and 17 percent, respectively.

college affordability and price in determining student outcomes. **The implications of declining state appropriations are clear for student outcomes: Higher tuition prices are related to reductions in college access and lower the chances of persistence and degree completion.**

Beyond college price, the level of support, including state appropriations, could influence the quality of education and the support available at an institution. Ehrenberg and Webber[25] argue that institutional expenditures on student services and academic support are important determinants of students' persistence and degree completion. Facing reductions in revenue that cause them to increase price and limit expenditures, public institutions have been forced to move in a direction counter to bolstering degree completion.

The community colleges have fared the worst in recent decades. They serve a diverse population, in need of both financial and academic support, but community colleges have far fewer resources than other institutions. An analysis of college spending from 2001 to 2011 by the Delta Cost Project concluded:

> "Community colleges continued to show the greatest financial strain across higher education (even amid slower enrollment growth), with declines in revenue per student accompanied by widespread spending cuts."[26]

In 2011, community college spending was at its lowest level in a decade—a period that included two recessions. From 2001 to 2011, instructional expenditures per FTE student fell 12 percent after accounting for inflation, and expenditures on student services and academic support fell 7 and 17 percent, respectively.

The primary sources for the differences in the resources that community colleges and other types of institutions receive relate to declining state and local appropriations to community colleges and efforts by community colleges to hold down their tuition prices (given the populations they serve), which results in them receiving far less in tuition revenue. By having fewer resources to devote to instruction and academic support, however, it is incredibly difficult to move forward on the goal of improving certificate and degree completion. Given the large numbers of students that community colleges serve, including many teetering on the edge of success or failure depending on the resources and support available to them, it is imperative that states devote more funding to these institutions and their students if serious progress is going to be made toward improving educational attainment in the United States.

25 R.G. Ehrenberg, "Student Service Expenditures Matter."

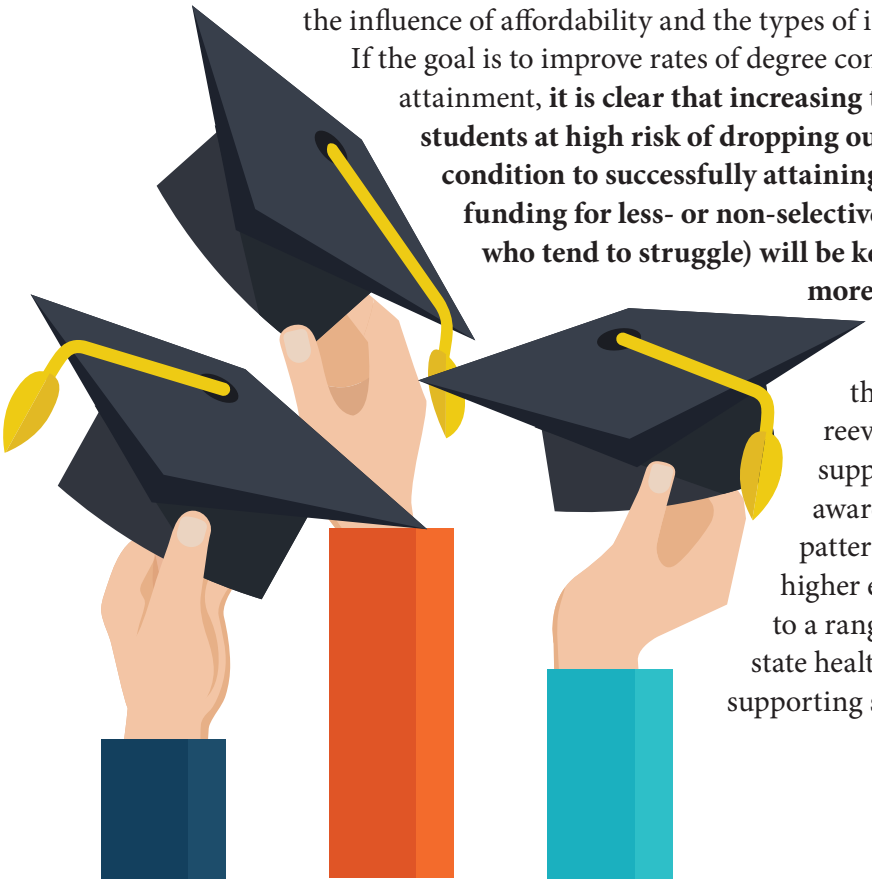
26 Donna M. Desrochers and Steve Hurlburt, *Delta Cost Project Trends in College Spending, 2001–2011* (Washington, DC: Delta Cost Project at American Institutes for Research, 2014), http://www.deltacostproject.org/sites/default/files/products/Delta%20Cost_Trends%20College%20Spending%202001-2011_071414_rev.pdf (accessed September 3, 2016).

Conclusion and Implications

This analysis provides further evidence of the dramatic decline in state support for public colleges and universities. Although many have highlighted how state appropriations fell precipitously during the last recession, as these data show, the downward trend has been ongoing for several decades. No institution, whether a research university or community college, whether in a more generous state or a less generous one, was spared significant reductions in state appropriations. All public colleges and universities have suffered from declining state support, resulting in increasing reliance on tuition (i.e., student charges) or declining expenditures. Unfortunately, these trends have coincided with a period in which there is growing need to support students through degree completion.

Although all public institutions have experienced major reductions in state support, there are long-standing differences in the amount of state appropriations different kinds of institutions receive, and these differences persist even after the recent turmoil in funding. The inequitable distribution of state funding for public higher education results in lower levels of state funding flowing to institutions that tend to serve students who have lower levels of academic preparation (i.e., less selective four-year colleges and community colleges). This trend is reflected in the fact that funding favors flagship and other research universities, schools whose students have higher SAT test scores, and schools with high first-to-second-year retention rates. It is partly related to differences in institutional mission and activities, which result in different cost structures, but it also reflects the relative funding priority given to certain kinds of institutions, which can vary by state and region. This analysis suggests that some states have protected the open-admissions sectors (i.e., community colleges) in their state relative to four-year institutions, while other states have done the opposite.

The implications of trends in state appropriations and differential patterns of support by institutional characteristics are meaningful for different kinds of students. Gaps in funding have direct repercussions on tuition prices, an important determinant of college access and long-term outcomes. Moreover, there is growing evidence linking resources to student outcomes, both in terms of the influence of affordability and the types of institutional support (i.e., expenditures). If the goal is to improve rates of degree completion and increase educational attainment, **it is clear that increasing the resources at institutions that serve students at high risk of dropping out will be a necessary, if not sufficient, condition to successfully attaining the objective. Addressing low levels of funding for less- or non-selective institutions (and thereby for students who tend to struggle) will be key to providing better support to help more students reach the college finish line.**



Several policy options exist to improve the system. The first is to have states reevaluate their level and distribution of support to public institutions, with greater awareness of the repercussions of funding patterns. Supporting the multiple missions of higher education by devoting state appropriations to a range of institution types is important for state health, but often overlooked is the fact that supporting student success is an important aspect

of state well-being, as well. Some states have already shown willingness to protect the funding of their open-admissions institutions, which serve many students who need resources and support to be successful, but it is unfortunately the case that all states seem to be following the long-term trend of cutting operational support to higher education. This trend suggests that solving the resource problem is not a matter of simply redistributing state appropriations among colleges. In other words, it is unlikely that we will make much progress toward the goal of increasing educational attainment by "robbing Peter to pay Paul." Instead, institutions will need additional resources to really improve student outcomes.

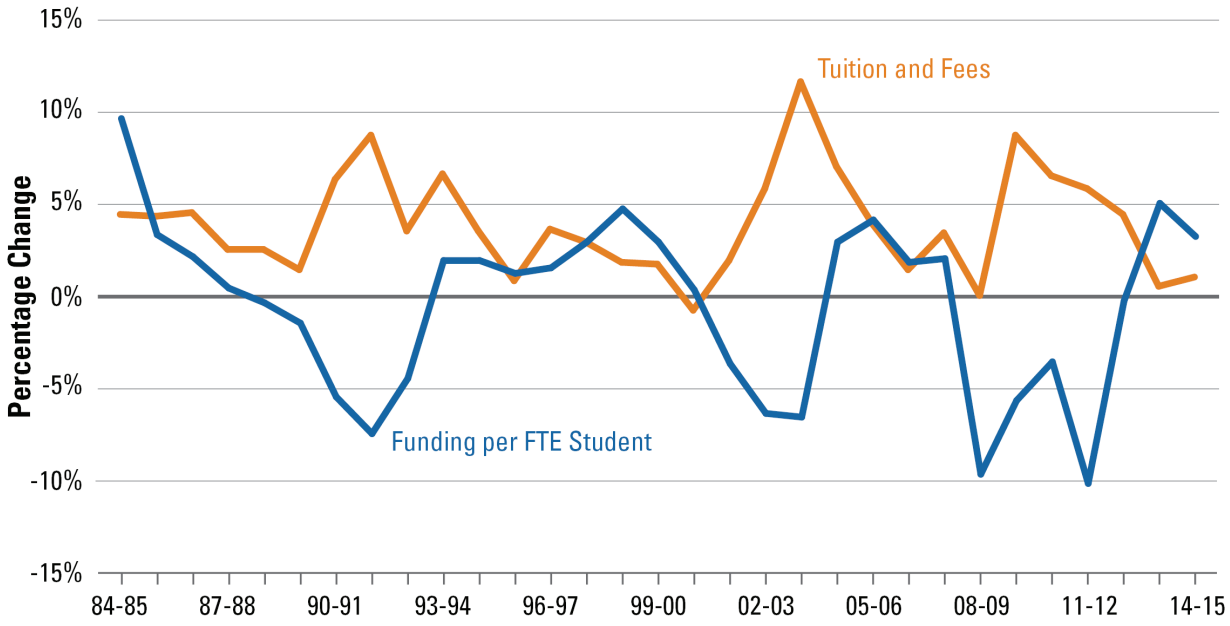
Another strategy is to focus on aid directly targeted at certain kinds of students rather than across-the-board operational subsidies, which I have already shown have suffered tremendously. In addition to increasing college access, research has found that targeted, need-based aid can be an effective way to improve student persistence and degree completion.[27] Creating and growing financial aid programs that focus on the needs of students and support academic progress among a group that faces preparation challenges could help balance some of the funding gaps between different kinds of students and allow us to be more intentional as we use resources to support certain outcomes and result in moving the country closer to the goal of increasing educational attainment levels.

At the institution level, a greater focus on student outcomes is another policy option. Already, there have been many attempts at performance-based funding. Key to making such efforts successful is using a value-added approach. Stated another way, policies should be careful not to award institutions that cater to students who already have a high likelihood of success. Instead, funding should be geared toward institutional efforts to help at-risk students make progress towards their degrees. If the goal is to make gains in educational attainment in the future, then we must pay greater attention to where problems exist now and redouble efforts to address them.

Finally, it is worth considering what steps the federal government could take to help sectors of higher education that are suffering the most in terms of reductions in state support. For example, four-year institutions in California have experienced especially large cuts in state support. It is important to note that California also experiences the greatest growth in students of color, many of whom are low-income and potentially first-generation college students. Whether state systems like California are able to serve and support these students has important implications for educational attainment and other outcomes for the entire country and therefore may justify a stronger federal role. Although so much is left to the states, when the consequences have national repercussions, it may be time to consider how our federal government can provide special support (or oversight) to remedy substantial reductions in educational support.

27 B. Castleman and B.T. Long, "Looking Beyond Enrollment."

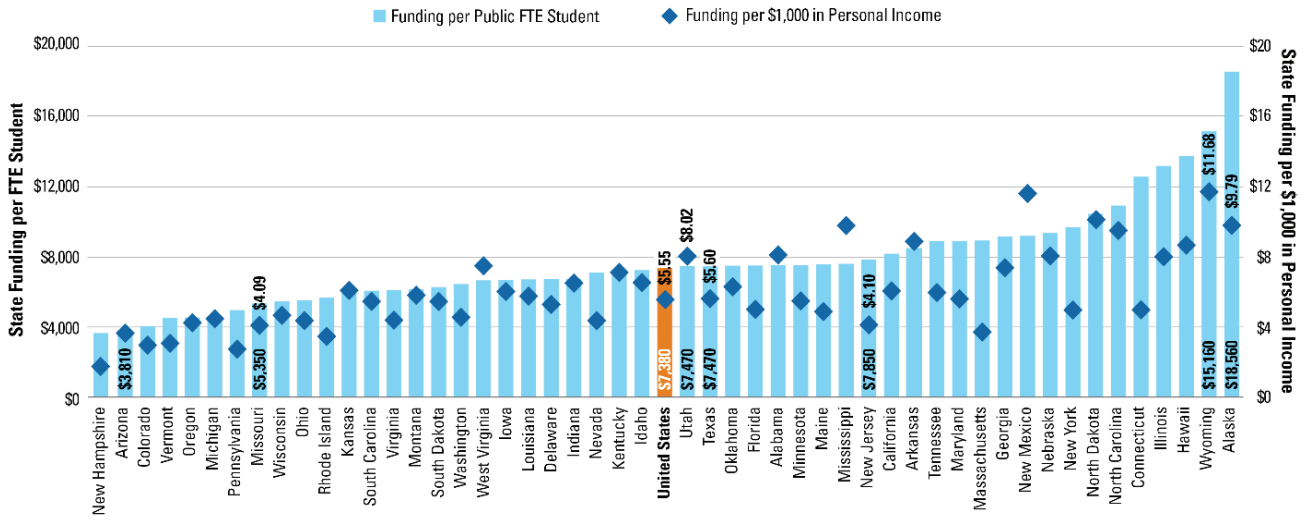
Figure 1: Annual Percentage Change in Inflation-Adjusted per-Student State Funding for Higher Education and in Tuition and Fees at Public Institutions, 1984-85 to 2014-15



Source: College Board, *Trends in College Pricing 2015* (New York: College Board, 2015), Figure 16A.

Note: FTE = full-time equivalent.

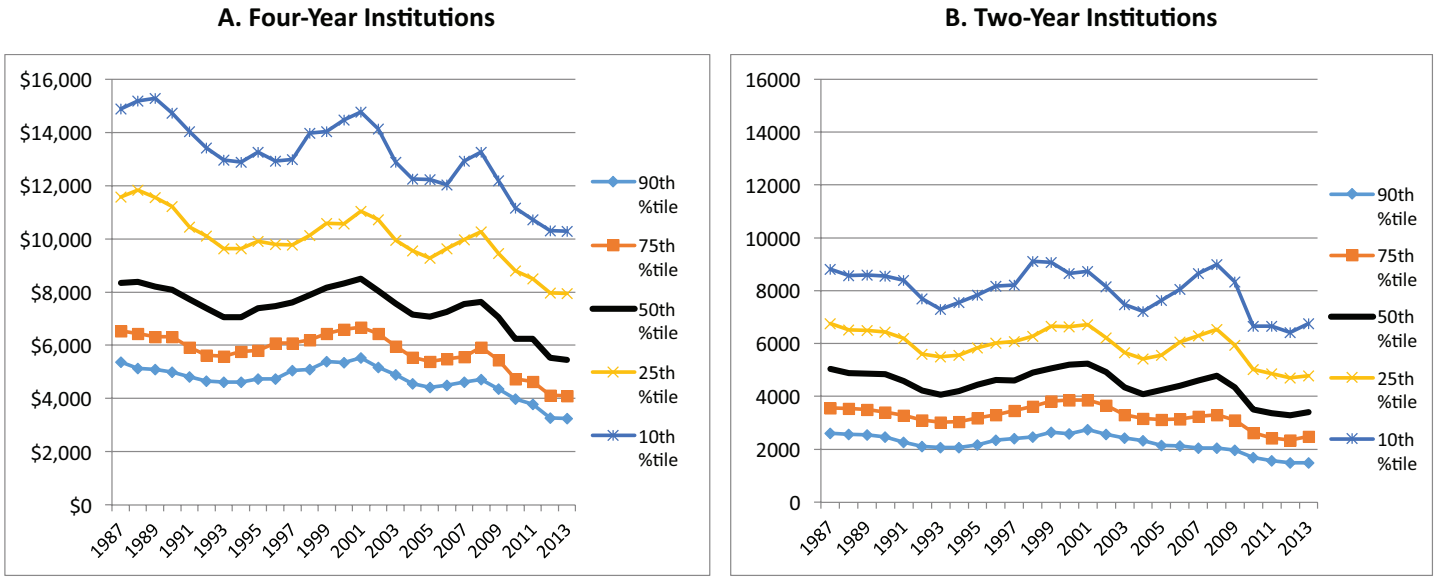
Figure 2: State Funding for Higher Education per Student and per $1,000 in Personal Income, by State 2014-15



Source: College Board, *Trends in College Pricing 2015* (New York: College Board, 2015), Figure 17B.

Note: FTE = full-time equivalent.

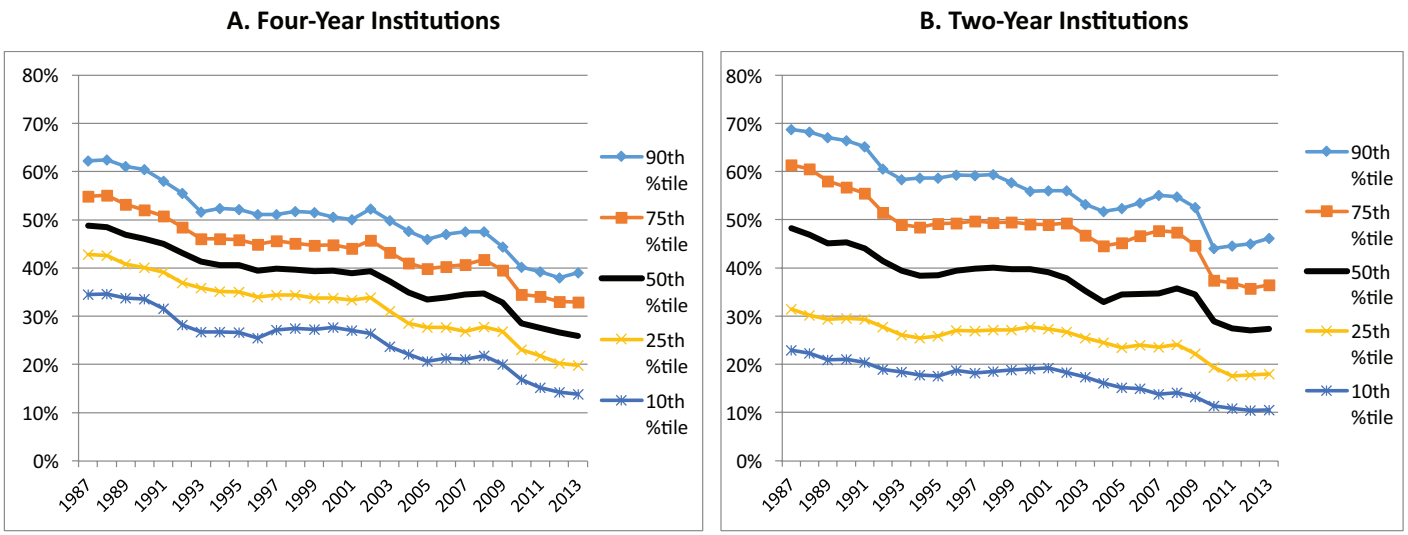
Figure 3: State Appropriations per Full-Time Equivalent Student by Percentile, 1987 to 2013 (Constant 2013 Dollars)



Source: Author's calculations using Integrated Postsecondary Education Data System data based on the extract assembled by the Delta Cost Project.

Note: The sample is limited to non-specialized institutions.

Figure 4: Percentage of Revenue From State Appropriations by Percentile, 1987 to 2013



Source: Author's calculations using Integrated Postsecondary Education Data System data based on the extract assembled by the Delta Cost Project.

Note: The sample is limited to non-specialized institutions.

Table 1: Median State Appropriations per Full-Time Equivalent Student (Constant 2013 Dollars)

	Research and Doctoral Universities			Other Four-Year Institutions (Master's and Bachelor's Degrees)	Two-Year Institutions (Associate Degree)	Flagship ÷ Two-Year Subsidy
	Flagships	Non-Flagships	All Research/ Doctoral			
1988	$12,007	$10,086	$10,717	$7,379	$4,895	2.45
1993	$10,899	$8,632	$9,470	$6,319	$4,075	2.67
1998	$11,833	$9,756	$10,125	$7,084	$4,898	2.42
2003	$11,269	$8,968	$9,599	$6,885	$4,353	2.59
2008	$11,073	$9,303	$9,558	$6,916	$4,781	2.32
2013	$8,362	$6,117	$6,717	$5,006	$3,409	2.45
Percentage Change: 1988 to 2013	*–30.4%*	*–39.4%*	*–37.3%*	*–32.2%*	*–30.4%*	
No. of Institutions	46	112	158	306	690	

Source: Author's calculations using Integrated Postsecondary Education Data System data based on the extract assembled by the Delta Cost Project.

Note: The sample is limited to non-specialized institutions.

Table 2: Median Percentage of Revenue From State Appropriations

	Research and Doctoral Universities			Other Four-Year Institutions (Master's and Bachelor's Degrees)	Two-Year Institutions (Associate Degree)
	Flagships	Non-Flagships	All Research/ Doctoral		
1988	38.7%	44.8%	43.7%	50.6%	46.9%
1993	32.8%	38.4%	37.4%	42.6%	39.4%
1998	30.6%	37.1%	35.8%	40.7%	40.0%
2003	26.2%	34.1%	31.7%	39.2%	35.3%
2008	24.3%	30.9%	28.9%	37.9%	35.7%
2013	17.5%	22.2%	21.0%	28.8%	27.4%
Percentage change: 1988 to 2013	*–54.9%*	*–50.4%*	*–51.9%*	*–43.0%*	*–41.6%*
No. of Institutions	46	112	158	306	690

Source: Author's calculations using Integrated Postsecondary Education Data System data based on the extract assembled by the Delta Cost Project.

Note: The sample is limited to non-specialized institutions.

Table 3: Median State Appropriations per Full-Time Equivalent Student by Region (Constant 2013 Dollars)

	Four-Year Institutions				Two-Year Institutions			
	Northeast	Midwest	South	West	Northeast	Midwest	South	West
1988	$10,125	$7,261	$7,946	$10,885	$3,641	$3,602	$6,007	$4,834
1993	$8,440	$6,543	$6,577	$8,167	$3,019	$3,276	$4,958	$4,108
1998	$8,171	$7,697	$7,639	$8,446	$3,086	$4,105	$5,769	$4,769
2003	$7,461	$7,077	$7,399	$8,649	$3,329	$3,482	$5,218	$4,124
2008	$8,301	$6,404	$7,686	$8,935	$3,314	$3,314	$5,426	$5,844
2013	$7,106	$4,932	$5,493	$5,134	$2,686	$2,872	$3,894	$4,000
Percentage change: 1988 to 2013	*–29.8%*	*–32.1%*	*–30.9%*	*–52.8%w*	*–26.2%*	*–20.3%*	*–35.2%*	*–17.2%*
No. of Institutions	77	110	193	84	82	166	287	159

Source: Author's calculations using Integrated Postsecondary Education Data System data based on the extract assembled by the Delta Cost Project.

Note: The sample is limited to nonspecialized institutions. The Northeast region consists of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The Midwest region consists of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The South consists of Alabama; Arkansas; Delaware; Florida; Georgia; Kentucky; Louisiana; Maryland; Mississippi; North Carolina; Oklahoma; South Carolina; Tennessee; Texas; Virginia; Washington, D.C.; and West Virginia. The West consists of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Table 4: State Examples of Trends in State Appropriations (Constant 2013 Dollars)

	State Appropriations per Full-Time Equivalent Student			Percentage of Revenue From State Appropriations		
	Research/ Doctoral	Other Four-Year Institutions	Two-Year Institutions	Research/ Doctoral	Other Four-Year Institutions	Two-Year Institutions
A. CALIFORNIA						
1988	$22,269	$13,783	$4,825	50.7%	76.0%	50.4%
2013	$8,796	$4,861	$4,223	14.1%	29.7%	31.9%
Percentage Change	*–60.5%*	*–64.7%*	*–12.5%*	*–72.2%*	*–61.0%*	*–36.7%*
B. TEXAS						
1988	$9,803	$7,311	$4,675	51.9%	48.7%	43.9%
2013	$5,201	$4,926	$2,749	24.1%	25.8%	22.0%
Percentage Change	*–46.9%*	*–32.6%*	*–41.2%*	*–53.6%*	*–47.0%*	*–50.0%*
C. NEW YORK						
1988	$20,450	$11,864	$3,641	59.2%	55.7%	29.0%
2013	$15,280	$8,530	$2,578	33.6%	40.0%	21.8%
Percentage Change	*–25.3%*	*–28.1%*	*–29.2%*	*–43.2%*	*–28.2%*	*–24.7%*
D. NORTH CAROLINA						
1988	$13,220	$11,529	$9,072	53.4%	56.5%	69.2%
2013	$11,237	$10,357	$6,743	36.5%	44.4%	46.9%
Percentage Change	*–15.0%*	*–10.2%*	*–25.7%*	*–31.5%*	*–21.4%*	*–32.2%*
E. NATIONAL MEDIAN						
1988	$10,717	$7,379	$4,895	43.7%	50.6%	46.9%
2013	$6,717	$5,006	$3,409	21.0%	28.8%	27.4%
Percentage Change	*–37.3%*	*–32.2%*	*–30.4%*	*–51.9%*	*–43.0%*	*–41.6%*

Source: Author's calculations using Integrated Postsecondary Education Data System data based on the extract assembled by the Delta Cost Project.

Note: The sample is limited to non-specialized institutions. These states were chosen because each has at least five schools in each institutional group.

Table 5: Trends in State Appropriations per Full-Time Equivalent Student (Constant 2013 Dollars)

	Year Trend and Institution Type	Adding Student Body Information	Adding State Fixed Effects	Relative to All Research Universities	All Student Body Info. and State Fixed Effects
	Model 1	Model 2	Model 3	Model 4	Model 5
Academic Year	-60.57***	-56.66***	-58.74***	-62.30***	-59.37***
	(8.12)	(3.58)	(3.54)	(8.28)	(3.49)
Institution Type (Relative to Flagship Universities)					
Non-Flagship Research Universities	−16,195.43***	−1,433.02*	−1,315.07*		
	(3,303.42)	(861.80)	(727.59)		
Other Four-Year Public Institutions	−18,567.48***	−3,576.78***	−3,560.28***	−8,790.00***	−2,504.39***
	(3,288.32)	(872.54)	(736.27)	(1,421.15)	(381.89)
Public Two-Year Colleges	−21,115.71***	−5,416.27***	−6,329.55***		−5,227.32***
	(3,284.92)	(873.85)	(768.83)		(407.73)
Institution Size					
Full-Time Equivalent Student Enrollment		−0.03**	−0.03**		−0.02*
		(0.01)	(0.01)		(0.01)
Percentage Receiving Pell Grant (Relative to <25%)					
Percentage Pell 25–39%		751.59***	818.18***		803.85***
		(199.82)	(177.26)		(178.26)
Percentage Pell ≥40%		1,252.34***	1,461.62***		1,443.12***
		(193.13)	(177.95)		(178.37)
Math SAT 75th Percentile (Relative to Score ≥600)					
SAT score 550–590		−1,614.52**	−1,765.62***		−1,937.29***
		(639.78)	(584.92)		(596.68)
SAT score <550		−1,701.89**	−1,905.80***		−2,036.17***
		(711.62)	(648.88)		(669.46)
No SAT information (Likely Nonselective)		−2,493.81***	−1,882.68***		−1,984.60***
		(673.71)	(615.81)		(632.02)
Full-Time Equivalent Student Retention to Second Year (Relative to Retention >80%)					
Retention 65–80%		−1,074.73**	−1,141.72***		−1,263.85***
		(429.23)	(381.89)		(369.71)
Retention 55–65%		−1,448.64***	−1,261.25***		−1,386.29***
		(413.84)	(375.07)		(362.94)
Retention <55%		−877.25**	−632.91		−760.50**
		(434.03)	(399.68)		(387.58)
State Fixed Effects			Yes	Yes	Yes
R^2	0.27	0.35	0.50	0.21	0.50
N	31,458	30,396	30,396	31,458	30,396

* $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$.

Notes: The sample timeframe is 1987 to 2013. Robust standard errors shown (clustered by institutional ID).

Table 6: Trends in State Appropriations per Full-Time Equivalent Student by Region (Constant 2013 Dollars)

	Full Sample	Census Region: Northeast	Census Region: Midwest	Census Region: South	Census Region: West
	Model 1	Model 2	Model 3	Model 4	Model 5
Academic Year	-57.18*** (3.53)	-63.36*** (8.34)	-57.75*** (5.71)	-58.45*** (5.79)	-49.94*** (10.76)
Institution Type (Relative to Public Research Universities)					
Other Four-Year Public Institutions	−2,452.49*** (403.80)	−1,541.77 (1,326.05)	−1,845.09*** (454.27)	−3,014.13*** (689.37)	−2,236.22* (1,349.62)
Public Two-Year Colleges	−4,301.60*** (415.46)	−5,890.39*** (1,714.89)	−4,817.08*** (468.88)	−3,658.74*** (746.82)	−4,690.65*** (1,215.27)
Institution Size					
Full-Time Equivalent Student Enrollment	−0.03* (0.01)	−0.04 (0.02)	0.05** (0.02)	−0.03 (0.03)	−0.06* (0.03)
Percentage Receiving Pell Grant (Relative to <25%)					
Percentage Pell 25–39%	741.31*** (200.68)	777.60 (629.14)	735.52*** (240.97)	564.64* (314.64)	805.03* (462.49)
Percentage Pell ≥40%	1,239.58*** (194.03)	1,230.38* (687.55)	1,096.34*** (243.68)	1,091.90*** (286.58)	643.70 (458.28)
Math SAT 75th Percentile (Relative to Score ≥600)					
SAT score 550–590	−1,816.50*** (653.01)	−1,761.65 (1,224.86)	19.86 (1,051.19)	−2,554.49** (1,155.35)	−3,122.42* (1,646.11)
SAT score <550	−1,865.62** (737.42)	−3,338.31** (1,468.10)	168.28 (1,077.40)	−1,817.67 (1,328.65)	−2,798.16 (1,926.66)
No SAT Information (Likely Nonselective)	−2,601.23*** (696.82)	−2,128.69 (1,690.12)	288.96 (907.23)	−2,501.84** (1,218.07)	−3,306.01** (1,665.48)
Full-Time Equivalent Student Retention to Second Year (Relative to Retention >80%)					
Retention 65–80%	−1,178.25*** (420.91)	−490.48 (1,018.47)	−1,467.77*** (518.34)	−345.46 (921.60)	−1,382.40* (816.10)
Retention 55–65%	−1,533.44*** (408.81)	−921.46 (1,168.94)	−986.79* (530.97)	−1,032.62 (856.93)	−1,833.69** (867.75)
Retention <55%	−957.66** (429.79)	−510.22 (1,289.79)	−814.85 (554.51)	−611.61 (873.60)	−1,810.55* (928.19)
R^2	0.34	0.42	0.54	0.27	0.38
N	30,396	4,215	7,197	12,652	6,332

* $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$.

Notes: The sample timeframe is 1987 to 2013. Robust standard errors shown (clustered by institutional ID). The Northeast U.S. Census Bureau region consists of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The Midwest Census

region consists of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The South Census region consists of Alabama; Arkansas; Delaware; Florida; Georgia; Kentucky; Louisiana; Maryland; Mississippi; North Carolina; Oklahoma; South Carolina; Tennessee; Texas; Virginia; Washington, D.C.; and West Virginia. The West Census region consists of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.